The CFA Franc Zone

Common Currency, Uncommon Challenges

Editors
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Charalambos Tsangarides

INTERNATIONAL MONETARY FUND

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The following conventions are used in this publication:

- In tables, a blank cell indicates "not applicable," ellipsis points (. . .) indicate "not available," and 0 or 0.0 indicates "zero" or "negligible." Minor discrepancies between sums of constituent figures and totals are due to rounding.
- An en dash (–) between years or months (for example, 2005–06 or January–June) indicates the years or months covered, including the beginning and ending years or months; a slash or virgule (/) between years or months (for example, 2005/06) indicates a fiscal or financial year, as does the abbreviation FY (for example, FY2006).
- "Billion" means a thousand million; "trillion" means a thousand billion.
- "Basis points" refer to hundredths of 1 percentage point (for example, 25 basis points are equivalent to ¼ of 1 percentage point).

As used in this publication, the term "country" does not in all cases refer to a territorial entity that is a state as understood by international law and practice. As used here, the term also covers some territorial entities that are not states but for which statistical data are maintained on a separate and independent basis.

Foreword

Over the past five years we have seen not only renewed interest in Africa but also much good news from the continent: improved domestic policies in conjunction with higher commodity prices have produced both the highest average growth rates in decades and some improvements in key social indicators. There may still be deep-seated problems in most countries but there is also renewed optimism about a better future for Africa.

Yet Africa is a diverse continent, and regional averages can only tell part of the story. Countries differ in language, legal traditions, the definition of property rights, educational systems, and often in economic and structural policies. Understanding how such differences affect economic performance is a challenge for macro- and development economists alike.

The exchange rate regime is a highly visible difference between African countries. The countries in sub-Saharan Africa implement a wide variety of exchange rate systems, ranging from free floats to strictly fixed quasi-currency boards. However, 14 mostly francophone countries within the long-standing, rules-based CFA franc zone system share a fixed exchange rate regime, and their economic policy decisions are taken in the context of the regional monetary arrangements.

The CFA franc arrangement is unique. There is nothing like it anywhere else in the world. It is an umbrella over two regional currencies, each pegged at a common exchange rate to the euro and guaranteed by an outside country (France). The CFA franc system does offer its members a range of advantages and opportunities, including a credible monetary anchor and the potential for wider financial and goods markets than those available to nonmember countries. Yet because the exchange rate is the unalterable linchpin of economic policies, CFA franc zone members also face unique economic policy challenges, especially when the economic environment is characterized by increasing financial volatility, structural changes, and rising capital flows.

This book has several purposes. First, the IMF is engaged in regular policy dialogue with both individual CFA franc countries and the authorities for the two monetary and economic unions. The research collected

here is intended to inform this dialogue and support the design of policies appropriate to the CFA franc regime.

A second and equally important purpose of the book is to place the policy challenges facing the CFA franc zone before a broader audience of academics and "development practitioners," and to stimulate a wider debate than is currently the case.

Finally, given considerable interest in the costs and benefits of monetary unions—both in Africa and elsewhere—the book has an additional purpose. That is to inform policymakers in countries thinking about joining an existing or prospective union about not only the costs and benefits but also the policy consequences of a common currency.

In reading the contributions in this volume I am heartened to realize that most offer cautious optimism about the CFA franc zone—though subject to a significant forward-looking agenda. I agree with policymakers in the region who emphasize that recently much has been done to expand the links between member country economies and promote more flexibility in the system, but I—like the authors of this book—see at least an equal amount still to be done. Some of the issues—such as removing obstacles within the zones—are becoming more urgent with increasing globalization and rapid economic change in some CFA franc countries. The authors therefore rightly remind policymakers that the stability benefits that arise from the CFA franc zone system can only be preserved if reforms are advanced.

I would hope that institutional reforms already initiated in countries throughout the CFA franc zone are harbingers of more and deeper reform efforts. We at the IMF, and undoubtedly also those in the academic community, are ready to accompany our member countries as they move forward.

Benedicte Vibe Christensen
Acting Director
African Department
International Monetary Fund

Acknowledgments

This book collects and expands on research on the CFA franc zone undertaken in 2004–07 in connection with the IMF's regional surveillance dialogue with WAEMU and CEMAC. We are grateful, first, to the regional institutions and their senior management—including the two central banks (BEAC and BCEAO), the economic commissions of WAEMU and CEMAC, and the two regional supervisory agencies (COBAC)—for many open and fruitful discussions during this period. Some of the papers were presented in regional seminars and benefited from detailed and specific comments from the institutions. Special thanks are due to Benoit Ketchekmen, director of economic analysis at the CEMAC commission, and Frederic A. Korsaga, former WAEMU commissioner for economic and monetary policy, for their keen support and interest in research on real integration in the two areas.

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Finally, we are grateful to our families and friends, who tolerated many hours of overtime and mental preoccupation with this project.

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Abbreviations

ACP	Africa, Caribbean, and Pacific
AGOA	African Growth and Opportunity Act
ASYCUDA	Automated System for Customs Data
BCEAC	Central Bank of Equatorial African States and Cameroon (Banque Centrale des Etats de l'Afrique Equatoriale et du Cameroun)
BCEAO	Banque Centrale des Etats de l'Afrique de l'Ouest (Central Bank of West African States)
BEAC	Banque des États de l'Afrique Centrale (Bank of Central African States)
BOAD	West African Development Bank (Banque Ouest Africaine de Développement)
BRVM	Bourse Régionale des Valeurs Mobilières
CEMAC	Central African Economic and Monetary Community (Communauté Économique et Monétaire de l'Afrique Centrale)
CET	Common external tariff
CIMA	Conférence Interafricaine du Marché des Assurances
CIPRES	Conférence Interafricaine de la Prévoyance Sociale
CMA	Common Monetary Area
COBAC	Commission Bancaire de l'Afrique Centrale
COMESA	Common Market for Eastern and Southern Africa
CPI	Consumer price index
CRCA	Commission Régionale de Contrôle des Assurances
CREPMF	Conseil Régional de l'Epargne Publique et de Marchés Financiers
EBA	Everything But Arms
ECCAS	Economic Community of Central African States
ECCU	Eastern Caribbean Currency Union
ECOFIN	Economic and Financial Affairs (Council of the European Union)
ECOWAS	Economic Community of West African States

EMLFR	European marginal lending facility rate
EMU	European Economic and Monetary Union
EPA	Economic Partnership Agreement
EREER	Equilibrium real effective exchange rate
EU	European Union
EURIBOR	Euro interbank offered rate
FDI	Foreign direct investment
FEER	Fundamental equilibrium exchange rate
FFG	Funds for Future Generations
GATT	General Agreement on Tariffs and Trade
GCR	*Global Competitiveness Report*
GDP	Gross domestic product
GSP	Generalized System of Preferences
HDI	Human Development Index
HIPC	Heavily Indebted Poor Countries
IFS	*International Financial Statistics*
INS	Information Notice System
LMI	Lower- and middle-income
MDRI	Multilateral Debt Relief Initiative
MFI	Microfinance institution
MFN	Most favored nation
NCC	National Competitiveness Council
NDA	Net domestic asset
NEER	Nominal effective exchange rate
NFA	Net foreign asset
NPL	Nonperforming loan
OCA	Optimum currency area
OECD	Organization for Economic Cooperation and Development
OHADA	Organization for the Harmonization of Business Law in Africa (Organisation pour l'Harmonisation du Droit des Affaires en Afrique)
OSF	Oil Stabilization Fund
PPP	Purchasing power parity
REER	Real effective exchange rate
REP	Regional Economic Plan
RIA	Regional integration agreement
ROA	Return on assets
ROE	Return on equity
RTGS	Real-time gross settlement
SADC	Southern African Development Community

SICAV	Société d'Investissement à Capital Variable
SME	Small and medium-sized enterprise
SSA	Sub-Saharan Africa
SSATP	Sub-Saharan Africa Transport Policy
SYSCOA	West African Accounting System (Système Comptable Ouest Africain)
SYSCOHADA	OHADA Accounting System (Système Comptable de l'OHADA)
TDP	*Taxe Dégressive de Protection*
TFP	Total factor productivity
TI	Transparency International
UDEAC	Customs and Economic Union of Central Africa (Union Douanière des Etats de l'Afrique Centrale)
ULC	Unit labor cost
UN COMTRADE	United Nations Commodity Trade Statistics database
VAT	Value-added tax
WAEMU	West African Economic and Monetary Union
WAMU	West African Monetary Union
WAMZ	West African Monetary Zone
WCY	*World Competitiveness Yearbook*
WEO	*World Economic Outlook*
WGI	World Governance Indicators
WTO	World Trade Organization

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1

Overview

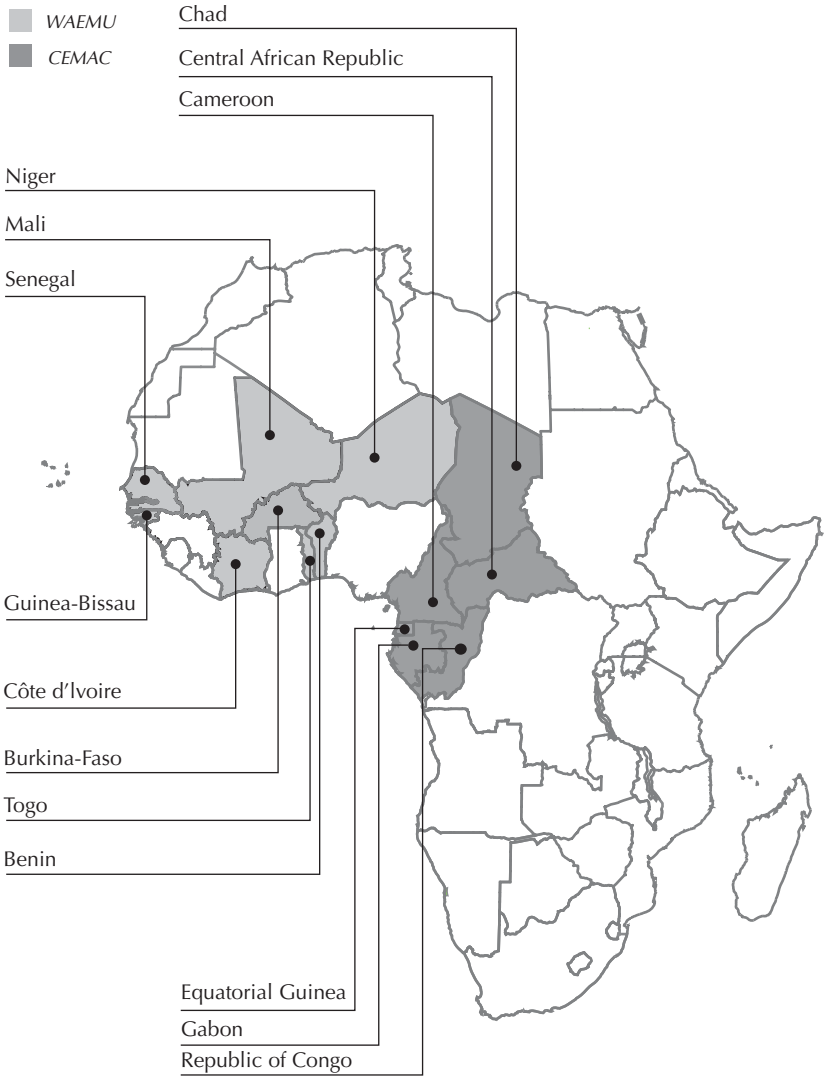
ANNE-MARIE GULDE

Most independent states have their own national currencies. Worldwide, only four groups of countries issue a common currency and conduct joint monetary policy.[1] With so few countries belonging to a monetary union, conducting monetary and related macroeconomic policies in a common currency area does pose "uncommon" challenges. Two of the four monetary unions are in Africa: the Central African Economic and Monetary Community (CEMAC) and the West African Economic and Monetary Union (WAEMU) (Figure 1.1). While CEMAC and WAEMU each have their own distinct currency, they are closely linked: both unions peg their currencies to the euro at the same level, they share certain institutional features, and they are commonly referred to as the CFA franc zone.[2]

[1]Monetary unions are characterized by a common central bank, which issues a regional currency. The four monetary unions are CEMAC, WAEMU, the euro area, and the Eastern Caribbean Currency Union (ECCU). "Dollarization" is a related but different monetary arrangement in which a country adopts the currency of another country. In that case, however, monetary policy is conducted solely by the issuing country, and there are no common monetary institutions (examples are Panama, Ecuador, and Honduras, which use the U.S. dollar). Finally in the rand monetary area in Southern Africa several countries peg their currencies to the South African rand and also accept it within their borders as legal tender. But there is no common central bank and no common monetary policy.

[2]In addition to France, WAEMU, and CEMAC, the "franc zone" also includes the Comoros. In 1979, the government of the Comoros signed a monetary cooperation agreement with France, making the Comoros part of the *franc zone* but not part of the *CFA franc zone*. The exchange rate of the Comorian franc to the French franc (now euro) has also since 1994 differed from that for the CFA franc. The Comoros are therefore not part of the discussions in this book.

Figure 1.1. The Central and West African Monetary Unions



This book examines the CFA franc zone's unique features and experiences and assesses the policy challenges it currently faces. One of the more notable characteristics of the zone is the longevity of the fixed exchange rate regime, which has been among the most stable of such arrangements worldwide. Even abstracting from the related precursors, the current system

has been in place for nearly 60 years.[3] A related feature has been the stability in the level of the peg, which was changed only once, in January 1994.

The exchange rate system and the common monetary institutions have been credited with helping the zone for many years—especially in the 1970s and 1980s and again after the exchange rate adjustment of 1994—to achieve lower inflation and more macroeconomic stability than other countries in sub-Saharan Africa. The CFA arrangement has also been linked to stronger institutions and more policy transparency. Yet, some analysts have also suggested that the arrangement has important drawbacks, given sharp shifts in the terms of trade in the regions.

With increasing financial globalization, volatile oil and raw materials prices, and some difficult regional security problems, the CFA franc arrangement now confronts deep challenges. Among them are, for example, the prolonged real appreciation of the currency brought about by the movement of the euro against the U.S. dollar, and significant changes in export prices for the two unions. All but one of CEMAC's members are oil exporters, with production and price increases reflected in sizable oil booms in some countries; in contrast, there have been sharp declines in world prices for cotton, the main export of some WAEMU countries. Both unions also face the costs and disruptions of regional conflict and the related political and socioeconomic instability in some of their members.

Against this background, the studies in this volume examine how policies need to be conducted to retain the stability benefits CFA franc countries have enjoyed in the past but also to afford sufficient flexibility for growth-oriented strategies that respond to domestic, regional, and global developments. A common theme in the essays is competitiveness, specifically, whether the gains of the 1994 devaluation have been preserved and how competitiveness can be ensured in the future. The debate touches on macroeconomic and structural determinants of competitiveness, and, where appropriate, on institutional settings that are needed to ensure appropriate adjustment.

There is considerable consistency among the findings of the authors, which is also supported by the conclusions of the IMF's surveillance work for both regions: the consensus seems to be that the arrangement has benefited the area in the past, but a number of reforms and more consistency between regional and national polices are needed to retain or regain and strengthen these benefits.

[3]First under the French Union that regrouped France's former colonies after the World War II and, since the late 1950s/early 1960s, as the monetary system of the newly independent member countries.

The discussion in this book may also offer lessons that go beyond the narrow confines of the CFA franc countries. There is now significant interest in the formation of new monetary unions, in Africa and elsewhere, as well as discussion of the pros and cons of new members joining existing groupings.[4] For these ventures the experiences and challenges of the CFA franc zone can serve both as a model and as a reminder of the policy requirements and the importance of flexibility in goods and factor markets if full benefits are to be drawn from a common currency.

The CFA Franc Setting

This section explains important features of the—sometimes complex—institutional arrangements of the CFA franc zone, describes the main economic issues, and discusses common policies in the region and the policy experience related to the operation of the exchange rate arrangement.

Institutional Background

The CFA franc zone arrangements are umbrella agreements between France and two monetary unions in Africa, CEMAC and WAEMU. The origins of the arrangement date back to colonial monetary systems (Box 1.1) but have since evolved and include also two members that were not former French colonies. Each zone has a separate treaty with France and its own currency and regional institutions, anchored by each zone's central bank. There are biannual meetings of the CFA franc zone between CEMAC and WAEMU on the one side and France on the other. These meetings review economic performance in both zones and decide on major institutional designs to be implemented in both groups. But each union decides on the exact implementation rules it will adopt, and fine-tunes operating principles to suit its economic circumstances.

The main institutional characteristics that apply to both unions are (1) a fixed peg to the euro, (2) a convertibility guarantee by the French

[4]Current examples are the relatively advanced preparations for a monetary union among the members of the West African Monetary Zone (WAMZ), and the planned monetary union among members of the East African Community (EAC), which includes Kenya, Tanzania, Uganda, Burundi, and Rwanda. There are also discussions about a possible common currency for members of the Common Market for Eastern and Southern Africa (COMESA) and African Union–led efforts for an Africa-wide common currency by 2020. Outside of sub-Saharan Africa, the Gulf Cooperation Council has been planning a monetary union, though this venture may now have been put on hold.

Treasury, and (3) a set of legal, institutional, and policy requirements designed to ensure the sustainability of the arrangement. In practice, there has been a high degree of parallelism in other institutional and operational features—such as the design of supervisory arrangements within the two unions, as well as the conduct of regional monetary and financial policies.

After the 1994 devaluation, both unions acknowledged the need to strengthen real and financial integration among their member countries (Box 1.2). Reform efforts for both monetary unions started immediately after the devaluation with a view to supporting their long-term sustainability through laws and institutions modeled on those of the European Union (EU). Key elements were (1) an agreement on macroeconomic convergence criteria designed to help coordinate macroeconomic policies, and (2) phased abolition of trade restrictions within each union and the creation of regional common markets. To facilitate integration, both unions also supplemented their central banks with new institutions supporting real integration: an economic commission (WAEMU) and an economic secretariat (CEMAC).[5]

Experience with the post-1994 reforms has, at best, been mixed. In both unions there are still many physical obstacles to integration, among them too few transportation links between countries and, in spite of the free trade zones, too many nontrade barriers. Common institutions other than the central banks have often failed to make their mark because of insufficient financing.[6]

Accordingly, both unions have given renewed impetus over the past two years to integration efforts. With financial support from donors both zones have drawn up regional economic plans. The substantial resources (amounting to more than 10 percent of GDP) that have been committed by the members of the zones themselves, bilateral donors, the EU, and the World Bank should allow for stepped-up efforts to address infrastructural and institutional requirements for integration. The priorities in both unions are regional transportation and power projects and the reinforcement of regional institutions.

[5]Other common institutions, such as a regional court of law and a parliament, and common policies, for example, competition policies, also exist or are planned. In practice, however, these institutions and policies have not yet assumed a major role in the unions or member countries.

[6]Common institutions other than the central banks and supervisory agencies are mostly financed through surcharges on external tariffs, but many countries failed to collect or to make the funds available to the regional institutions.

Box 1.1. The CFA Franc Zone: Historical Origins and Current Institutional Setting

The CFA franc zone arrangement defines the monetary relations between CEMAC, WAEMU, and France.

History

The predecessors of the CFA franc arrangement date back to colonial times when it was decided to issue currency in the dependent territories to avoid the need to transport cash. At the end of World War II, two "issuance houses" were in charge of remitting currency for the French colonies in Africa. In the run-up to independence, these institutions were renamed Banque Centrale des Etats de l'Afrique de l'Ouest (BCEAO) and Banque Centrale des Etats de l'Afrique Centrale et du Cameroun (BCEAC). Even after independence the BCEAO and BCEAC remained in place, led by France and with their headquarters in Paris. For those newly independent countries that opted to stay within the franc zone, the main aspects of their monetary affairs thus remained with the former colonial power. Conventions concluded in 1962 and updated in 1973 (with the BCEAO) and in 1972 (with the BCEAC) created formal central banks, reduced the role of France, and created African leadership in the institutions. In this context, the BCEAC was also renamed Banque des Etats de l'Afrique Centrale (BEAC). Only in the late 1970s the headquarters of the central banks were relocated from Paris to Africa: for the BCEAO to Dakar, Senegal, and for the BEAC to Yaoundé, Cameroon.

Membership

Historically, all French colonies in sub-Saharan Africa were members of the broad franc zone. Once independent, however, former French colonies in northern Africa left the arrangement to introduce their own currencies, as did Guinea (1958), Madagascar (1972), and Mauritania (1973).

Today, the principal members of the CFA franc zone are France and the two African economic and monetary unions that evolved from the country groups served by the two issuance houses—the Central African Economic and Monetary Community (CEMAC, with the BEAC as its central bank) and the West African Economic and Monetary Union (WAEMU, with the BCEAO as the central bank). CEMAC has six members: Cameroon, the Central African Republic, Chad, the Republic of Congo, Equatorial Guinea, and Gabon. (Equatorial Guinea, a former Spanish colony, joined in 1985.) WAEMU has eight members: Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. (Guinea-Bissau, a former Portuguese colony, joined in 1997.)

Main institutional and operational arrangements

- The CFA franc zone links three currencies: the CFA francs issued separately by each bank, and the euro.[1] Both CFA francs are fixed to the euro (previously to the French franc) at the same rate, 655.957 per euro. However, the CFA francs are issued by two distinct central banks and are independent of each other. Each CFA franc is nominally convertible into the euro, but they are not directly convertible into each other.
- France guarantees the peg of the CFA franc to the euro. It provides an operations account in the French Treasury for each of the two central banks, on which they may draw in case of reserve shortages. While theoretically this amounts to a possibly unlimited overdraft, there are institutional safeguards and restrictions to ensure the viability of the arrangement. The most important are that (1) at least 20 percent of sight liabilities of each central bank must be covered by foreign exchange reserves, (2) at least 50 percent of foreign exchange reserves must be held in the operations account;[2] and (3) increasing interest rate penalties apply if there is an overdraft. France is also represented on the board of both institutions.
- Within the limits of the fixed exchange rate arrangement, the BEAC and BCEAO are responsible for the conduct of monetary policy in their respective regions. Both central banks are also charged with implementing banking supervision at the regional level. Differences in the speed of policy and policy instrument reform between the two banks have led to differences in financial depth and in the array of tools available to the two central banks and to the autonomy of each central bank.
- After the 1994 devaluation the unions initiated efforts to speed up economic and financial integration within the subregions. These were largely inspired by the institutional and legal arrangements of the EU and are intended to coordinate macroeconomic policies and create a common market. The current "second generation reforms" include the creation of regional infrastructure and strengthening of regional institutions.

[1]The BCEAO issues the Franc de la Communauté Financière de l'Afrique (CFA); the BEAC issues the Franc de la Coopération Financière Africaine (CFA).

[2]Previously the required level was 65 percent. In the case of CEMAC, the new level will be phased in through 2008.

Box 1.2. The CFA Franc Devaluation

Effective January 12, 1994, the CFA francs of CEMAC and WAEMU were both devalued by 50 percent. As the sole adjustment, and a very large one, in almost 60 years, the event still marks a watershed in the operation of the regime.

Economic pressures. From the mid-1980s, members of the CFA franc zone became aware that they were losing competitiveness. Internal and external adjustment problems began to build up. In particular, a prolonged deterioration in the terms of trade and a substantial appreciation of the French franc against the currencies of major trading partners (especially during 1984–90) had made both zones less competitive. The impact of these shocks on growth, exports, and government finances was reinforced

CFA Franc Zone Developments: 1990–93 Versus 2001–06

	CEMAC				WAEMU			
	1990–93	1993	2001–06	2006	1990–93	1993	2001–06	2006
Terms of trade (average annual change, in percent)	–0.7	3.1	6.2	16.0	–2.1	4.8	0.6	1.3
Real effective exchange rate (average annual change, in percent)	–4.9[1]	–5.2	3.2	3.5	–1.1	–2.1	2.0	–0.6
Real GDP growth (average, in percent)	–0.9	–0.6	5.2	2.2	1.3	0.3	3.4	3.4
Domestic fiscal revenue (average, in percent of GDP)	15.4	14.9	23.2	29.0	15.1	13.1	15.8	16.5
Overall fiscal balance (average, in percent of GDP)[2]	–6.4	–6.6	5.7	18.9	–5.9	–6.0	–0.5	8.4
External current account (average, in percent of GDP)[2]	–1.6	–3.6	–2.6	6.2	–7.9	–7.5	–5.5	–6.8
Reserves (months of imports)	3.3	0.9	4.2	9.4	6.7	4.5	6.9	7.3
External debt (average, in percent of GDP)	63.9	78.4	57.7	24.8	65.4	71.4	61.5	36.0

Source: IMF, World Economic Outlook database.
[1]Excluding 1990.
[2]Including grants.

by such structural rigidities and fragilities as high wages and poorly managed banking systems. The eroding tax base and increased demands for fiscal transfers worsened government deficits, and accumulation of arrears then crowded out the private sector and weakened banking systems further.

Preparation and implementation. The IMF and the World Bank began to analyze the overvaluation of the CFA francs as early as the late 1980s. At the same time the African monetary union members, France, and the IMF began to discuss the possibility of an exchange rate adjustment. This required complex coordination and secrecy. The decision was finally made only in early 1994 during a meeting officially held to discuss the airline jointly operated at the time by franc zone member countries. Immediately after the devaluation, most of the countries affected agreed on IMF– and World Bank–supported programs to help them implement far-reaching policy reforms. Once the devaluation was accomplished, the region also put in place a plan to enhance economic convergence and create common markets.

Economic impact. The devaluation of the CFA franc was generally successful, and is widely credited with restoring internal and external balance. It also led to a reflow into the zone of the capital that had left in anticipation of the exchange rate change. Assessments of the equilibrium exchange rate in both zones show that a part of the competitiveness gains from the devaluation persists.[1]

Current situation. Movements between the euro and the U.S. dollar, and domestic wage developments have led to a loss in competitiveness in both zones, while the effect of terms of trade developments differed between CEMAC and WAEMU.[2] There are, however, marked differences from 1994, including less severe current account pressures (for the CEMAC significant surpluses), capital inflows, better fiscal performance, and reserve levels well above minimum levels. Addressing the structural obstacles to competitiveness remains key to longer term non-oil growth.

[1]See Chapter 6 of this volume.
[2]See Chapter 7 of this volume.

In the past years the speed of reform has varied between the two unions in important areas. As a result there are now—in spite of large commonalities in the overall framework—some noticeable differences in key areas of economic policymaking between the zones. WAEMU, for instance, has an economic commission with a more visible role in macroeconomic surveillance; CEMAC, until recently, had only a precursor (an economic secretariat) with fewer resources.[7] With the abolition of the (limited) earlier margin for central bank advances to member governments in 2003 and the introduction of a regional treasury bill market and open market operations, WAEMU also has made more progress toward the use of indirect monetary policy instruments than CEMAC. With the abolition of direct government financing the BCEAO has also achieved a more arms-length relationship to member countries and is thus closer to being an independent central bank. But in spite of differences in the speed of reforms, there is agreement between the two unions on the direction of changes.

Through the common peg, CEMAC and WAEMU essentially share a currency, but as yet there are no special institutions or programs to draw benefit from this wider union and facilitate further integration between the two. Trade between the unions is low and each union imposes its external tariff. Capital flows between the zones are restricted, and the exchange of banknotes is prohibited. While each currency is convertible into the euro, direct convertibility between the two currencies has been suspended since shortly before the devaluation. In both academic and policy debates, it has nevertheless been common practice to discuss the CFA franc zone as if it were unitary. For reasons of comparability with other studies this book will follow this tradition, but it will—where relevant for economic analysis—emphasize the differences between the two unions.

Economic Characteristics

The 14 African countries in the CFA franc zone account for nearly one-third of all sub-Saharan Africa states. Yet, in terms of population and output the zone is far smaller. The total population of 123 million amounts

[7]However, during a June 2007 meeting in N'jamena (Chad) member heads of state agreed to institutional reforms in CEMAC, notably the transformation of the CEMAC secretariat into a commission, more balanced representation of members on the board of the central bank, and other changes to strengthen regional policymaking.

to only 17 percent of the population of sub-Saharan Africa and is in fact less than the population of Africa's most populous country, Nigeria. The CFA franc zone accounts for about 15 percent of Africa's GDP and produces 22 percent of its oil (Table 1.1).

A striking feature of the economic landscape of the CFA franc zone is the heterogeneity not only between the two unions but even within each grouping. The production structures and macroeconomic and structural indicators for WAEMU and CEMAC differ significantly. And though WAEMU has more than double the population of CEMAC, its average per capita income in 2006 was less than half the CEMAC level. Measured by the share of exports to GDP, WAEMU is also less open. As a group, it has a combined current account deficit. Meanwhile, the recent oil inflows have generated current account surpluses in CEMAC for several years. Nevertheless, with more varied domestic production, internal trade in WAEMU is far more advanced. And—in part due to the creation of treasury bills—WAEMU also has significantly deeper and more developed financial markets than CEMAC (see IMF, 2006b).

Current differences in income levels and economic performance reflect historically higher average growth in CEMAC since the 1980s (Table 1.2) and, more recently, the changing production structures in the two unions. In recent years, Chad and Equatorial Guinea have emerged as significant petroleum exporters, joining Gabon, Cameroon, and the Republic of Congo—the region's longer-standing producers. By contrast only one WAEMU country (Côte d'Ivoire) produces oil. The main export products of WAEMU are agricultural goods, particularly cotton, which has suffered from sharp price drops in the past few years. The differences in fiscal performance largely reflect the different production structures, because the recent oil booms have allowed CEMAC countries to build up fiscal surpluses.

Notwithstanding some common production structures within each zone, there remain wide differences among member countries. Per capita incomes in CEMAC range from less than $400 in the Central African Republic to more than $7,000 in Equatorial Guinea. These differences reflect not only the levels of oil output and population but also the aftereffects of conflict. By contrast, differences in per capita income in WAEMU are much narrower. They range from about $200 in Guinea-Bissau to slightly less than $1,000 in Côte d'Ivoire. In WAEMU, domestic instability in Côte d'Ivoire—the WAEMU region's largest economy—has eroded its former role as the economic locomotive of the union and the destination country for labor flows and a substantial part of intraregional and transit trade.

Table 1.1. CFA Franc Zone: Key Economic Characteristics, 2006

	Population 2005 *(In millions)*	Per Capita GDP *(In U.S. dollars)*	Exports *(In percent of GDP)*	Current Account *(In percent of GDP)*	Government Revenues/GDP *(In percent)*	Financial Depth (M2/GDP)	Main Export Product
CEMAC	36.4	1,281.4	57.0	5.1	29.3	14.1	
Cameroon	16.3	999.2	26.0	–0.7	18.9	17.5	Petroleum
Central African Republic	4.4	356.1	13.9	–3.8	21.2	15.8	Diamonds
Chad	9.8	687.6	56.4	–6.3	16.8	11.3	Petroleum
Congo, Republic of	4.0	2,227.1	87.3	12.8	44.7	16.6	Petroleum
Equatorial Guinea	0.5	7,319.3	94.5	4.4	45.7	7.1	Petroleum
Gabon	1.4	6,835.6	65.9	19.7	31.7	19.6	Petroleum
WAEMU	86.7	588.5	32.1	–4.3	17.2	26.9	
Benin	8.4	623.9	10.8	–6.4	16.8	29.3	Cotton
Burkina Faso	13.2	448.9	11.9	–10.3	12.5	19.6	Cotton
Côte d'Ivoire	18.2	951.0	51.3	3.0	18.2	25.0	Cocoa
Guinea-Bissau	1.6	188.5	22.9	–12.2	19.5	34.3	Banana
Mali	13.5	486.9	30.6	–4.9	17.1	28.5	Gold
Niger	14.0	283.0	15.7	–8.3	13.1	14.9	Uranium
Senegal	11.7	820.5	25.8	–10.1	20.0	36.3	Fish
Togo	6.2	350.7	40.5	–6.0	16.9	33.2	Cement
Total CFA franc zone	123.1	793.2	44.7	0.5	23.3	21.1	
Memorandum items:							
Nigeria	131.5	769.7	56.6	12.2	27.1	20.3	
Sub-Saharan Africa	703.9	932.4	40.4	0.6	26.4	46.9	
East African Community[1]	116.3	407.6	21.6	–4.8	17.0	31.0	
Southern African Development Community	239.3	1,563.4	37.2	–1.7	28.1	61.9	
Common Market for Eastern and Southern Africa	255.1	468.5	44.5	5.1	28.0	29.5	

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; and UN COMTRADE.
[1]Includes Rwanda and Burundi, which joined in 2007.

Table 1.2. CEMAC and WAEMU: Long-Term Economic Trends
(Average, in percent a year)

	Inflation	Real GDP Growth	Government Balance	Current Account	Export Growth
CEMAC					
1970–79	10.8	2.9	–3.2	7.6	0.9
1980–89	8.3	3.8	–3.1	–6.4	13.9
1990–99	5.7	6.8	–5.5	–10.7	4.1
2000–06	3.1	7.5	4.6	–6.5	17.0
WAEMU					
1970–79	10.2	3.3	–4.6	–8.0	6.7
1980–89	12.0	2.1	–5.2	–8.6	2.9
1990–99	9.5	3.5	–4.4	–7.0	9.6
2000–06	2.4	3.3	–2.5	–7.0	5.5
Memorandum items:					
WAMZ[1]					
1970–79	14.6	3.4	–4.8	–1.9	1.6
1980–89	30.5	1.7	–4.9	–4.5	2.0
1990–99	18.7	1.4	–3.7	–4.5	6.9
2000–06	10.2	4.9	–2.6	–3.5	5.1

Sources: IMF, *International Financial Statistics* and staff estimates.
[1]The West African Monetary Zone includes The Gambia, Ghana, Guinea, Nigeria, and Sierra Leone.

Policy Experience

Academics and policymakers generally see the experience with the operation of the CFA franc system as positive, noting the benefits of the arrangement for macroeconomic stability, in particular low and stable inflation, and the way it has stimulated institutional development. Still, there is continuing debate about the potential costs of rigidities associated with a fixed exchange rate system, given that most member countries are susceptible to major shocks, such as the current fall in cotton prices. In spite of widespread official support, national authorities in member countries have more often than not failed to fully put in place the macroeconomic policies and market-oriented reforms agreed at the regional level.

Although there have been few direct empirical studies of the benefits and costs of the CFA franc arrangement, a more general strand of literature looks at the real effects of nominal exchange rate arrangements to see whether there is a systematic difference in economic performance between peggers and floaters. The consensus seems to be that fixed exchange rates lead to lower inflation and more fiscal discipline; the direct effects of the nominal exchange rate regime on growth differs among studies and is

mostly not statistically significant.[8] For the CFA franc zone specifically, the benefits for lower inflation are confirmed by Masson and Pattillo (2004). There may well be second-round benefits; there is agreement in the literature that lower inflation in itself can provide important additional advantages for the stability of the economic environment, and longer-term benefits for financial development.[9]

When the CFA franc zone was created, most, if not all, African countries—like the rest of the world—were operating fixed exchange rate systems. Following the breakdown of the Bretton Woods agreements in 1973, a debate emerged on the costs and benefits of different exchange rate regimes, including also for low-income countries. By 2004 about three-quarters of non–CFA franc zone African countries had switched to money anchors and more flexible exchange rates, mostly, it was hoped, to facilitate adjustment to real shocks. In practical terms, though, not all the advantages materialized. Most African countries have significant "fear of floating" and often lean back on managed floating.

The difficulties in implementing floating exchange rates in Africa reflect, in part, a lack of the necessary monetary and financial infrastructure to support a flexible rate system. At the same time, ongoing efforts to create or expand monetary unions in Africa, also emphasize more vigorously the perceived credibility advantages of fixed exchange rates.

In light of the official commitment of CFA franc countries to the current system, what little debate there has been on an optimal exchange rate regime for the zone has taken place largely outside of official channels. In this debate a smaller group of researchers has questioned whether the fixed rate regime itself continues to be appropriate given the unprecedented economic shocks of the past years and the global trend to more flexible exchange rate regimes in developing countries.[10] Others, along with policymakers in the region and in Europe, stress both the actual and potential credibility benefits, in particular if policy reforms can ensure smoother function of the systems.[11]

A related debate is about the quality of institutions and governance. On this score the CFA franc zone has the benefit of comparatively strong institutions, especially the well-recognized central banks. Despite some weaknesses, official assessments (such as Financial Sector Assessment Programs

[8]For an overview see Ghosh, Gulde, and Wolf (2002).

[9]See, for example, Chapter 11 of this volume.

[10]See, for example, Sissoko and Dibooglu (2006) and Michailof (2007).

[11]See, for example, Guillaume and Stasavage (2000) and Noyers (October 16, 2007, as quoted by Reuters, 2007).

and Reports on the Observance of Standards and Codes) acknowledge that the two central banks are not only relatively transparent and efficient, but also compare favorably with other institutions in sub-Saharan Africa. Similarly, the regional surveillance and review process by the two regional commissions, which publish their reports, has the potential to increase the transparency of policymaking in the region.

Policymakers in the region in general support the CFA franc arrangement, but few countries have emerged as champions for deepening regional integration and fostering policy coordination. In day-to-day national policymaking there has therefore been less emphasis on regional requirements than on pressing domestic issues. This is reflected, for example, in the history of noncompliance with regional convergence criteria. Similarly, although there is a recognized need for institutional reforms in both unions, reform efforts have been stalled for years by the inability of policymakers to reconcile national and regional goals.[12] Finally, member governments have at times circumvented regional requirements, or even legal obligations, especially those relating to trade and the pooling of reserves.

Main Challenges

The CFA franc zone may now be at a crossroads. In CEMAC, oil is rapidly coming to dominate the economic structure.[13] In WAEMU five countries (Benin, Burkina Faso, Mali, Niger, and Senegal) have reached the completion point under the Heavily Indebted Poor Countries Initiative and have benefited from the Multilateral Debt Relief Initiative, which has granted them additional fiscal space to address developmental issues. In both unions domestic or border tensions—in Côte d'Ivoire, the Central African Republic, and Chad—have been disrupting economic activities, but there are recent signs that the conflicts may be subsiding. Internally, both unions are embracing deeper regional integration and have committed to renewed efforts to put in place the foundations of an economic union—meaning an end to barriers to intraregional trade and financial flows and improvements to labor mobility.

[12]Recently, CEMAC has started refocusing on institutional reforms; in June 2007 its members agreed on the principles of an agenda, but considering the differing national priorities, implementation will be challenging.

[13]Although high oil prices have helped increase incomes, output from known sources is stagnating or declining in three CEMAC producers. The question of sources of growth outside the oil sector is becoming increasingly acute.

Against the background of a long and varied history and rapidly changing external and internal environments, the chapters in this book try to examine how the CFA franc arrangement can retain credibility, achieve its financial stability objectives, and help member countries raise potential and actual output to levels that would allow them to meet the Millennium Development Goals.

The challenges in these efforts for member countries and the unions appear to fall into three distinct groups: (1) how to maintain fiscal and monetary policies that avoid pressures on the peg and keep debt sustainable; (2) how to build capacity to adjust to inevitably changing external conditions, with economic systems that are flexible enough to absorb shocks and avoid the renewed buildup of one-sided imbalances; and (3) how to speed up integration and raise growth potential by exploring how the regions can derive more benefit from regional trade and financial integration and agree on a common roadmap for structural reforms. These three challenges are the organizing principle for this book.

Sustainability of Macroeconomic Policies

The first set of papers looks at the macroeconomic environment in the CFA franc zone. These four chapters ask whether the current CFA franc arrangement is an appropriate basis for common policies. They also seek to address the question of whether there is sufficient impetus for coordinating national and regional macroeconomic policies, a necessary condition for maintaining a common peg. Looking forward, they attempt to assess the sustainability of the policy stance. The general findings, including differences between WAEMU and CEMAC and between the countries of each region point to an important institutional reform agenda, and the need for more efficient policy coordination.

Among macroeconomic policies in a currency union, monetary policy is most clearly linked to the region. However, since the CFA franc is fixed to the euro, is there need or in fact room for independent monetary policy? In Chapter 2, Deléchat, Ramirez, and Veyrune examine this issue for CEMAC. Recognizing the persistence of significant and growing excess liquidity in the banking system, they argue that there is both scope and role for a more active monetary policy. Empirically, money growth is found to be one of the determinants of inflation, along with exchange rates and significant pass-through of foreign prices. The scope for monetary policy stems from limited capital mobility between the zone and France and—even more so—the rest of the world. The authors argue that the present policy environment in CEMAC, which is characterized by large liquidity

increases from oil inflows, calls for structural improvements and more direct monetary responses. Structural improvements, in particular in government cash management, could be a first response to limit the buildup of liquidity. However, beyond that, more active sterilization may also be needed to control money growth and keep inflation in check.

The contribution of money growth to inflation in WAEMU is examined in Chapter 3. Diop, Dufrénot, and Sanon argue that regional policymaking and appropriate responses to competitiveness challenges in the region will depend on a fuller understanding of the economic processes that drive inflation. Using an empirical model to investigate the long-run determinants of inflation, the authors find that while in WAEMU countries money supply does contribute to price changes, it is not the sole long-run determinant of inflation. Instead, reflecting the many structural obstacles to market activity in the region, supply constraints in the agricultural sector and the pass-through effects of changes of the CFA franc exchange rate (along with the euro) against third-country currencies are also significant.

Fiscal policies in a currency union with an exchange rate fixed to an anchor currency pose unique challenges. The complexities arise because fiscal policy is set at the national level and there are no provisions for intercountry fiscal transfers. The sum of members' national fiscal decisions need to be consistent with a regional monetary stance that is in line with the preservation of the peg. In Chapter 4, Adedeji and Williams turn to these issues, examining fiscal reaction functions for the CFA franc zone from 1989 through 2006. Predictably, they find that fiscal policy has to a large extent been determined by national considerations, and fiscal efforts have been significantly influenced by the stock of outstanding debt and country-specific economic circumstances and performance, such as growth, per capita GDP, terms of trade, and openness. Furthermore, past fiscal performance has a strong influence, suggesting a possible bias toward procyclical fiscal policy. The authors argue that, in these circumstances, the regional convergence criteria may not be sufficient to ensure the necessary policy coordination. Instead, they see a need for supplementary fiscal-related criteria, more squarely geared to the actual determinants of fiscal outcomes.

The sustainability of a fixed exchange rate regime is also predicated in large measure on the level of foreign exchange reserves a central bank has. Reserves not only ensure that external payments can be made on time, they also have a signaling function and contribute to economic stability by increasing the confidence of the public in the durability of the system. Measuring reserve adequacy in the CFA franc zone however is not easy, in part because the French convertibility guarantee could be seen as limit-

ing the need to hold sizable amounts of foreign currency at the regional level. Yet, in Chapter 5, Deléchat and Martjin argue that because both unions have shown a strong preference for avoiding the need to activate the French guarantee, reserve adequacy for the CFA franc zone should be measured against traditional indicators.[14] Analyzing sensitivity to balance of payments shocks and comparing reserve levels with those held by other monetary unions, the authors find that at present reserves are adequate in both CEMAC and WAEMU. Looking forward though, they argue that any changes to the arrangements—including more intensive use of funds for future generations in CEMAC to save part of the oil inflows—will need to be consistent with keeping reserves adequate.

Capacity to Adjust to External Conditions

The three chapters in the second section deal with the capacity of the zone to adjust to external conditions. Given the fixed exchange rate regime, it is central to economic performance and the preservation of growth that the unions are able to adjust to shocks and changing external conditions without any adjustment of the nominal exchange rate either within the region or between the region and the anchor currency area. These chapters look at specific issues related to the flexibility of WAEMU and CEMAC economies and areas where policy reform can help to preserve or improve external sustainability. They analyze how changes in fundamentals may have resulted in movements in equilibrium exchange rates, the determinants and measurement of competitiveness, and country homogeneities, and evaluate the adequacy of current and proposed monetary unions in West Africa.

In Chapter 6, Abdih and Tsangarides investigate the behavior of CEMAC and WEAMU real effective exchange rates in terms of their long-run equilibrium paths during 1970–2005. They apply the fundamentals equilibrium exchange rate (FEER) approach and the Johansen cointegration methodology to derive equilibrium paths and the associated misalignments for the two monetary unions. Their results suggest that for both CEMAC and WAEMU fundamentals have driven most of the movements in time-varying equilibrium exchange rates: increases in the terms of trade, government consumption, and productivity improvements are found to have put pressure on the exchange rate to appreciate, while

[14]There are also penalties for possible overdrafts from the operations account; and the conventions call for a minimum foreign exchange cover ratio. In practice, the ratio has not been binding.

increases in investment and openness had the opposite effect. Comparing actual and FEER-based equilibrium exchange rates, the authors conclude that at the end of 2005 in both CEMAC and WAEMU real effective exchange rates were broadly in line with their long-run equilibrium values. As an interesting additional finding, the analysis shows a significant difference in the marginal impact of the fundamentals and speed of reversion to equilibrium following a shock between WAEMU and CEMAC.

Given the significant growth and development needs of CFA franc countries, maintaining or improving their competitive position in the context of a fixed exchange rate regime is often seen as the principal challenge. In Chapter 7, Ramirez and Tsangarides examine a range of issues related to competitiveness. They argue that the real exchange rate alone is not a sufficient indicator. Instead, they propose the use of a broader framework that examines competitiveness based on "environment" and "policy" criteria. Determinants include indicators of productivity and labor market conditions, prices and costs, macroeconomic performance, the business environment, governance, and technology and infrastructure. Their findings suggest that, despite some recent improvements—particularly in CEMAC—when compared to peer countries in both regions competitiveness challenges are mainly structural. With this constellation of conditions, an adjustment in relative prices—for example, a devaluation—would not have a lasting impact on the unions' competitiveness. The authors therefore argue that the most appropriate response to competitiveness challenges is to undertake structural reforms to improve productivity, reduce factor costs, and create a supportive business, legal, and political environment to attract and diversify economic activity.

Monetary and economic integration efforts in Central and West Africa remain in flux. New constellations—complementing or replacing some of the current regional arrangements—are possible in the context of the West African Monetary Zone (WAMZ) or the Economic Community of West African States (ECOWAS), the possible entrance of a new member country to CEMAC, or the regional effects of the planned Economic Partnership Agreements (EPAs) with the EU. Against this background, in Chapter 8 Qureshi and Tsangarides reconsider the optimal composition of country groupings in the region. To examine country homogeneities they apply techniques of clustering analysis to a set of variables suggested by the convergence criteria and the theory of optimal currency areas. Their findings raise some questions about the geographical boundaries of several current and proposed monetary unions. They also confirm significant heterogeneities within the CFA franc zone as it now exists. The authors find that the WAMZ countries do not form a cluster with the WAEMU countries, but (interestingly) there

are similarities between CEMAC and WAMZ countries. However, within the WAMZ, there is a significant lack of homogeneity.

Integration and Growth

The final set of papers is concerned with long-term prospects for countries in the region. The papers document the level of integration that has been achieved and examine the extent to which institutional and structural conditions in the CFA franc zone allow for deeper integration and higher growth. This subsection deals first with the financial sector, where despite progress on the institutional side and the common currency, measured financial integration still lags behind in key areas. Next, growth and convergence in the region are examined, together with the extent to which integration strategies may have helped support higher and more coordinated output patterns. Finally, with free trade a core feature of the regions, the last paper in this section examines the status of trade integration and the challenges member countries now face in deepening intraregional trade in the context of global trade integration.

A common monetary area with free capital mobility holds the potential for larger and more efficient financial markets. In Chapter 9, Sy assesses the degree of actual financial integration in WAEMU. He finds that the structure of the financial sector and its institutional arrangements indicate that financial integration is in some respects well advanced. For example, common and foreign ownership of banks is very high and for the past few years cross-border transactions in government securities have become more frequent. Furthermore, common regulations and a regional supervisor help achieve a high degree of similarity in rules and their application. Nevertheless, Sy argues, financial sector integration falls short in important areas: for example, there are persistent deviations from the law of one price and few cross-border bank transactions, and the central bank continues to differentiate in how it applies certain monetary policy instruments, such as legal reserve ratios, to member countries. Sy argues that WAEMU does not yet benefit from the full economies of scale and scope of a truly integrated financial market and that policy measures might therefore be needed to achieve greater financial convergence and the related growth benefits.

Staying with the subject of financial market integration, Saab and Vacher in Chapter 10 examine the extent of retail banking integration in CEMAC and whether cross-country integration affects banking competition. Using both quantitative and qualitative indicators, the authors find some evidence of price convergence in average interest rate spreads, but they find no increase in actual cross-border flows for retail loans and deposits. They infer

that price convergence may be a symptom of excess liquidity in the region rather than a reaction to regional competition. Empirical tests make it clear that bank competition within CEMAC is very limited. The authors propose specific policies to facilitate regional integration and address shortfalls in legal and regulatory frameworks, infrastructure, and markets.

Pattillo, Tsangarides, and van den Boogaerde in Chapter 11 investigate growth and convergence in the CFA franc zone. They use quantitative measures of convergence and, based on recent growth robustness exercises, compare the experience of WAEMU and CEMAC not only with sub-Saharan Africa as a whole but also with other subregional arrangements within sub-Saharan Africa. Their results suggest that neither WAEMU, CEMAC, nor the CFA zone as a whole is growing faster than the whole of sub-Saharan Africa or the other subregions. However, the authors find that low inflation in the two monetary unions has had a greater positive impact on growth than it has for sub-Saharan Africa as a whole. On the other hand, improvements in investment and policy variables that emerge as robust growth determinants from these recent robustness exercises do not appear to have contributed as much to improvements in growth in WAEMU or CEMAC as in the fastest growing countries in sub-Saharan Africa. The findings have important policy implications and underscore the need to deepen regional integration further and reduce domestic constraints on investment, diversification, and growth.

Since the devaluation, efforts have been under way to facilitate regional trade, which is seen as the cornerstone of regional integration. In Chapter 12, Martjin and Tsangarides provide an update on the main elements of the CEMAC trade reform agenda and make a preliminary quantitative assessment of how certain options would affect tariff revenues and trade patterns. They argue that eliminating nontariff barriers and other obstacles to intraregional trade that are in violation of the regional agreements adopted since the devaluation will require renewed political commitment to regional integration. They also find that problems in applying the customs union and the need for major improvements in the regional transportation infrastructure will have to be addressed before the region can fully benefit from the arrangement. Martjin and Tsangarides also see a solid case for reducing tariffs against the rest of the world, with or without an EPA with the EU. They argue that trade liberalization would help boost economic growth and alleviate poverty and would limit the risks of possible trade diversion from an EPA. However, given the continued heavy reliance of CEMAC members, especially the landlocked countries, on trade-related taxes, tariff reform would need to be complemented by mobilization of more domestic revenue.

In Chapter 13, Goretti and Weisfeld undertake a similar analysis of the WAEMU trade regime. They, too, find that achieving the region's full trade potential is hampered by poor transportation infrastructure and incomplete implementation of the agreed trade regime, owing in part to the concerns of national authorities about competitiveness. The reform agenda includes plans to extend the WAEMU customs union to ECOWAS and to conclude an EPA with the EU. The tariff reduction associated with these initiatives is likely to have important trade creation effects, although it will need to be complemented by improvements in domestic revenue mobilization. Further trade liberalization on a most-favored-nation basis would also contribute to economic growth and poverty alleviation while limiting the risks of trade diversion from an ECOWAS customs union and an EPA.

Findings and Outlook

The CFA franc arrangement enjoys strong political and popular support. But the requirements for continued successful operation of the regime are stringent, given member countries' vulnerabilities to shocks. Requirements include both considerable macroeconomic discipline and a high degree of market flexibility. At present not all the prerequisites are in place; there are some shortcomings in the design of common institutions and policies, and—more important—common policies are often not implemented with sufficient vigor and consistency.

Policymakers are aware of the need for reform to overcome emerging pressures and allow the region ultimately to draw more economic benefits from monetary and economic union. The papers collected in this volume intend to encourage these reform efforts; common trends and weaknesses highlighted in several papers point to priority areas for change.

The themes and priorities that emerge from the articles in this book may be summarized as follows:

- **More depth before further widening.** A variety of efforts are under way to widen regional groupings. Yet the trade and financial links among their current members lack depth, and efforts to design structural policies that could deepen these links have not been sufficient. Administrative and other bottlenecks are likely to become more severe with premature expansion, and immediate positive returns would be few. Notwithstanding the eventual benefits of an even larger economic space, a proper sequencing of reform efforts should therefore best begin with creating the economic, political, and structural preconditions for deepening current economic links.

- **More and better markets.** In a monetary union, imbalances should resolve themselves through flows of goods, capital, and labor. Internal trade and capital flows in both subzones continue to be subject to informal restrictions, and labor mobility in particular suffers from too many limitations. For more integration within the current setting, attention in both WAEMU and CEMAC should focus first on eliminating the many obstacles to the unfettered play of regional goods and factor markets. Once removed, the effects of shocks will be less severe and the region will draw stability benefits from the common economic space.
- **Greater consistency between national and regional policies.** Obstacles to integration often arise from national policies that are inconsistent with both the spirit and the letter of regional policies. That applies to both active policies (for example, in relation to trade taxes) and a lack of national reform efforts (for example, in relation to tax harmonization or domestic revenue mobilization) that make it impossible to create a firm foundation for further integration.
- **More balanced development in the CFA franc zone as a whole.** Through the common peg to the euro CEMAC and WAEMU essentially share a currency. Yet economic structures and developments in the two unions are increasingly diverging. To preserve the benefits of a common currency, more attention to achieving balanced developments in the two unions will be needed. Such efforts could be helped by reducing the barriers between WAEMU and CEMAC (for example, through improved trade, or capital and labor mobility in the larger zone). In addition, underlying economic structures will need to become sufficiently flexible to ensure that the regime is sustainable even when economic conditions and shocks differ.

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Part I

Sustainability of Macroeconomic Policies

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2

Monetary Policy in a Currency Union? The Case of CEMAC

CORINNE DELÉCHAT, GUSTAVO RAMIREZ, AND ROMAIN VEYRUNE

Is there scope and need for monetary policy in CEMAC? Because CEMAC is a currency union with a fixed peg to the euro, at first glance the answer would appear to be "no." However, the persistence of limited de facto capital mobility provides scope for monetary policy actions.[1] As to the need, CEMAC is characterized by large real and nominal shocks, stemming for example from changes in the U.S. dollar–euro exchange rate, or from output and terms of trade fluctuations linked to oil production and world oil prices. Thus, there would be a rationale for short-term interventions to avoid potentially large and disruptive swings in consumption.

In practice, there are shortcomings in the monetary policy framework, and monetary policy of the regional central bank (BEAC) has been mostly passive. The operating framework and available instruments, designed to cope with a situation of chronically low reserves and fiscal deficits, may no longer be suited to the current environment of surging reserves and fiscal surpluses. The rapidly growing excess liquidity induced by the oil-related inflows experienced since the beginning of the decade should be more actively absorbed, because it is a threat to financial sector stability and a

[1]Although in principle the movement of capital is fairly free, a number of restrictions, actual or perceived by banks and other residents, severely limit capital mobility for the average person or company. The Technical Note on Systemic Liquidity prepared during the 2006 Financial Sector Assessment for the CEMAC region analyses in more detail de facto capital account restrictions (IMF, 2006).

potential source of inflation. Since 2004, inflation has also picked up in the region, driven in part by idiosyncratic supply shocks in some countries but also by demand pressures in the context of supply bottlenecks and, possibly, expanding money supply.

This chapter discusses the rationale and the scope for a more active monetary policy in CEMAC. It reviews the current analytical and operational monetary policy framework, as well as monetary developments and policy implementation in CEMAC.[2] In light of the changed macroeconomic environment, the chapter then proposes an adaptation of the monetary programming exercise to define tighter liquidity management objectives. To assess the scope for a more active monetary policy in the region, it also provides an empirical estimation of the determinants of inflation in the region.

The Monetary Policy Framework in CEMAC

Monetary Policy Framework and Objectives

As the regional central bank, the BEAC is responsible for issuing the common currency and conducting monetary policy.[3] The BEAC statutes and the Convention on Monetary Cooperation with France state that the BEAC "issues the common currency and guarantees its stability. Without prejudice to this objective, the Bank supports the general economic policies elaborated within the Monetary Union."[4] In particular, Article 1 of the BEAC statutes specifies that the BEAC is to (1) define and conduct monetary policy in member countries, (2) conduct foreign exchange operations, (3) hold and manage foreign reserves of member countries, and (4) promote well-functioning payment systems in CEMAC. Article 11 establishes the principle of pooling member state reserves in the operations account with France (Box 2.1), and Articles 17 and 18 specify that the BEAC can provide automatic advances to governments.

[2]The review draws on the Technical Note on Systemic Liquidity (see footnote 1) and on Banque de France (2005).

[3]A regional institution responsible for issuing currency started functioning in 1901. The BEAC's precursor, the Banque Centrale des Etats de l'Afrique Centrale et du Cameroun (BCEAC) was created in 1959. It was renamed the BEAC in 1972, and in 1973 began operating under new statutes and a new convention on monetary cooperation with France. Equatorial Guinea joined the monetary union in 1984.

[4]See Article 1 of the BEAC statutes (1973) and Article 21 of the Treaty on Central African Monetary Union (1994), available via the Internet at www.beac.int.

Box 2.1. The BEAC Operations Account with the French Treasury

Legally, the operations account is a special treasury account. Such accounts originated in 1878 when the French Treasury needed to deal with balance of payment issues between France and Algeria.[1] For the CFA franc zone, the operations account works as a current account with an overdraft facility. The account is credited with the foreign reserves of the central banks, but could become negative when the members' balance of payments situation is unfavorable. In that case, the French Treasury can in principle provide unlimited foreign reserve advances to the central banks.

The Operations Account Conventions signed between France and the BEAC are designed to avoid negative balances in the operations account, and provide corrective measures in case of a rapid decline (parallel conventions exist with the BCEAO and the Comoros):

- The central banks receive interest on their credit balances on the operations account, but they must pay a progressively increasing interest rate on the debit balances.
- Initially, the two central banks of the franc zone had to pool at least 65 percent of their foreign reserves in the operations account.
- In case of a rapid decline in the balance of the operations account, public entities are supposed to surrender their external assets to the central banks (the *ratissage*). Under the 2007 revised operations account convention, the central bank can also use the foreign exchange counterpart of the Funds for Future Generations (FFGs).

In practice, the share of reserves the BEAC keeps in the French operations account has been larger than the prescribed minimum. The interest rate has been attractive (European marginal lending facility rate), and the BEAC's own reserve management capacities have not yet been well established. In light of the rapid increase in the operations account's credit balance, France amended the operations account convention with the BEAC in January 2007 to stipulate that the minimum of 65 percent of foreign assets to be held on the operations account would be gradually reduced to 60 percent by July 1, 2007, and 50 percent by 2009, excluding the counterpart of FFGs. The rest may remain in the operations account but would receive a lower remuneration (European Union central bank money market rate).

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[1]The Bank of Algeria had an account in French francs at the French Treasury, and France an account in Algerian francs at the Bank of Algeria, with full convertibility ensured by the French Treasury at a fixed rate. Because it had a net creditor position in Algerian francs, the Treasury demanded a gradually increasing interest on its advances to the Bank of Algeria, thereby conditioning Algeria's monetary policy to the balance of the treasury account. This mechanism established a clear link between the treasury deposits and monetary policy of the beneficiary country. The first formal operations accounts were opened in various French colonies in the 1920s, and in 1959 for the CFA franc zone.

The BEAC operates within the framework of monetary cooperation conventions with France, as part of the CFA franc arrangement.[5] Key features of the arrangement are (1) fixed parity against the euro (the French franc until 1999); (2) guarantee by France of full convertibility of the CFA franc, through—in principle unlimited—drawings on the central bank's operations account at the French Treasury (see Box 2.1); (3) free capital mobility (in principle) between the region and France; and (4) the pooling of reserves at the central bank (supported by a requirement that all export receipts of member countries be surrendered to the central bank). As a counterpart, the agreement with France requires financial discipline to prevent recourse to the overdraft facility. Both the BEAC and the BCEAO must maintain at least 65 percent of their foreign assets in the operations account with the French Treasury, foreign reserves have to represent at least 20 percent of central bank's sight liabilities (the currency cover ratio), and the provision of credit to each member government is limited to 20 percent of the previous year's tax revenue.[6] In the case of CEMAC, a decline in reserve coverage below 20 percent for three consecutive months triggers emergency measures, and if the operations account is overdrawn for 30 days the scope for refinancing is reduced.[7]

Maintaining adequate foreign currency cover thus becomes an important intermediary objective of monetary policy.[8] Although the pooling of reserves would warrant compliance with this objective at the regional level, the BEAC attempts to meet currency cover ratios for each individual member. This helps ensure financial discipline and avoid free-riding, but does not make much sense in the context of the monetary union. Also, the currency cover ratio may not be relevant for determining whether region-wide reserves are adequate for balance of payments purposes. Historically, the cover ratio has been low for the zone in general and a few countries in particular, but since the 1994 devaluation there has been progressive improvement and a narrowing of country differences. At the end of 2006, the ratio stood at 96 percent for CEMAC as a whole, with Equatorial Guinea exhibiting the highest ratio (100 percent), and the Central African Republic the lowest (75 percent).

[5]The main features of the CFA franc arrangement are the same for both CEMAC and WAEMU.

[6]In WAEMU, advances by the central bank (BCEAO) were replaced in 2002 with treasury bills.

[7]Such measures, however, may not be compatible with the member country's Article VIII obligations to the IMF.

[8]Also see Chapter 5 of this volume on this issue.

Monetary Programming

The BEAC uses monetary programming to achieve domestic liquidity consistent with the net foreign asset (NFA) flows derived from balance of payments forecasts. Monetary programming is based on country-by-country forecasts of the evolution of NFAs, economic activity and money supply, and monitoring of the countries' public finances. Given estimates of NFAs and money supply, the BEAC derives the anticipated use of statutory advances from projected fiscal deficits. Credit to the private sector is determined as a residual. Country-specific ceilings for commercial bank refinancing are then defined consistent with the targeted currency reserve cover and the evolution of private sector credit. The monetary programming exercise is conducted twice a year, with quarterly refinancing objectives (Box 2.2).

Box 2.2. BEAC Monetary Programming

The BEAC makes separate balance of payments forecasts for each member state to estimate likely changes in net foreign assets (*NFAs*). Then monetary programming aims at determining a forecast for the evolution of money supply (*M*), also country by country. This is obtained by making separate forecasts for currency in circulation and sight and term deposits. As a consistency check, the resulting change in money supply has to be in line with the output projections used for balance of payments forecasts. The counterpart is the change in net domestic assets (*NDA*) or domestic credit, where the change in credit to the government (DC^G) is projected using fiscal data from member governments, which are checked for consistency with the balance of payments projections. The anticipated use of statutory advances is derived from the projected government deficit. Private sector credit (DC^P) is then determined as the residual. The ceilings on bank refinancing are established so that the evolution of credit to the private sector is consistent with the projected change in the money supply.

$$M = NFA + NDA \quad (1)$$

$$NDA = DC^G + DC^P \quad (2)$$

$$\Delta NFA = \Delta M - \Delta DC^G - \Delta DC^P \quad (3)$$

This exercise is relevant only if reserves tend to be below the currency cover objective. If so, the change in money supply has to be constrained by the limits on liquidity expansion provided by refinancing ceilings. However, if the projected change in reserves is large enough relative to the change in money supply and credit to the government, the change in private sector credit in equation (3) is fully determined, with no room left for policy.

After 1999, changes in the macroeconomic environment induced by the large oil-related inflows rendered the refinancing ceilings increasingly irrelevant. In the economic environment prevailing until the mid-to-late 1990s, characterized by current account and fiscal deficits and chronically low reserves, refinancing ceilings were binding for most countries. However, as oil-related inflows led to current account and fiscal surpluses, increasing reserves and excess liquidity in most countries (except for Chad), the refinancing ceilings became increasingly unnecessary. In 2006, central bank refinancing was not used at all by the Republic of Congo, Equatorial Guinea, and Gabon, and was used only in very small proportions (about 5 percent of the refinancing ceiling or less) by Cameroon and the Central African Republic (Table 2.1). The low volume of transactions in the interbank market also demonstrates that the little use of central bank refinancing can be attributed to the prevailing excess liquidity (also see below).

Monetary Policy Instruments

BEAC monetary policy instruments are liquidity injections and withdrawals through positive and negative auctions, interest rates, and reserve requirements (Box 2.3 and Tables 2.2 and 2.3). Auctions and interest rate changes are initiated by the BEAC on an ad hoc basis and do not necessarily reflect market pressures. Neither has been used much, so that the burden of monetary policy has fallen predominantly on reserve requirements. However, such administrative instruments are costly for banks and do not favor financial market deepening. In addition, setting differentiated requirements for CEMAC member countries runs against efforts to enhance regional money and financial market integration.

Monetary Developments and Monetary Policy Implementation

The Evolution of Monetary Aggregates

Because five out of six CEMAC countries are oil exporters, overall macroeconomic performance in the region is mostly driven by developments in the oil sector. The share of oil in regional GDP has more than doubled, from about 18 percent in 1994 to 41 percent in 2006. Not only has production risen, but oil prices have also quadrupled from $16 a barrel in 1994 to $64 a barrel in 2006, leading to significant increases in reserves,

Table 2.1. Use of Central Bank Refinancing by CEMAC Countries

(In millions of CFA francs unless otherwise indicated)

	2004				2005				2006			
	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.	Mar.	Jun.	Sep.	Dec.
Cameroon												
Refinancing ceiling	8,000	8,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Amount refinanced	0	0	113	169	180	214	231	231	297	284	315	358
Use of ceiling (in percent)	0.0	0.0	1.9	2.8	3.0	3.6	3.5	3.9	5.0	4.7	5.3	6.0
Central African Republic												
Refinancing ceiling	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Amount refinanced	0	611	1,556	3,338	2,840	290	170	0	342	0	0	0
Use of ceiling (in percent)	0.0	7.6	19.5	41.7	35.5	3.6	2.1	0.0	4.3	0.0	0.0	0.0
Chad												
Refinancing ceiling	30,000	20,000	15,000	15,000	20,000	15,000	15,000	15,000	15,000	15,000	30,000	35,000
Amount refinanced	10,425	15,829	6,760	7,813	780	11,300	11,190	15,000	18,000	22,690	14,000	8,600
Use of ceiling (in percent)	34.8	79.2	45.1	52.1	3.9	75.3	74.6	100.0	120.0	151.3	46.7	24.6
Congo, Rep. of												
Refinancing ceiling	30,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Amount refinanced	10,245	499	444	388	0	0	0	0	0	0	0	0
Use of ceiling (in percent)	34.6	8.3	7.4	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equatorial Guinea												
Refinancing ceiling	500	500	500	500	500	500	500	500	500	500	500	500
Amount refinanced	0	0	0	0	0	0	0	0	0	0	0	0
Use of ceiling (in percent)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gabon												
Refinancing ceiling	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Amount refinanced	0	0	0	0	0	0	0	0	0	0	0	0
Use of ceiling (in percent)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CEMAC zone												
Refinancing ceiling	57,500	48,500	43,500	43,500	48,500	43,500	43,500	43,500	43,500	43,500	58,500	63,500
Amount refinanced	11,387	16,939	8,873	11,708	788	11,864	11,570	15,231	18,639	22,974	14,315	8,958
Use of ceiling (in percent)	19.8	34.9	20.4	26.9	1.6	27.3	26.6	35.0	42.9	52.8	24.5	14.1

Source: BEAC.

Box 2.3. BEAC Monetary Policy Instruments

BEAC auctions. The BEAC's *Guichet A* can be used for both short-term (up to 7 days) positive auctions and negative auctions (7, 28, and 84 days). *Guichet B* can be used to refinance old medium-term credits and new investment credits approved by the BEAC. Both *Guichets A* and *B* are available only to eligible banks and are not standing facilities. Liquidity injections and withdrawals are for the most part initiated by the BEAC. Bank refinancing takes place within the refinancing ceiling.

Interest rates. The BEAC uses four key interest rates, to which other rates are mostly indexed (see Table 2.2):

- The positive auctions rate (TIAO), also the main rate on statutory advances to governments.
- The negative auctions rate (TISP), which varies according to length (7, 28, or 84 days); the 7-day rate is equal to the rate on special deposits by governments (up to March 2006).
- The discount rate (TIPP), which equals the TIAO plus a 150–300 basis point margin.
- The bank penalty rate (TSP), equal to twice the TIAO.
- BEAC remuneration of government deposits is indexed to the return on BEAC reserves deposited in the French operations account. In March 2006, a new remuneration policy was adopted that provides higher rates of return on longer-term government oil savings (FFGs).

Reserve requirements. These have been in use since 2001. The BEAC Board decided in July 2002 to set differentiated reserve requirements for CEMAC countries to take into account the wide variations in liquidity conditions. They are remunerated at the TISP rate minus a margin (see Table 2.3).

exports, and fiscal revenue. Most of the increase has taken place in recent years: oil exports were higher by some 11 percentage points of regional GDP in 2003–06 than in 1999–2002, and oil revenues were up by about 5 percentage points.

Large oil-related inflows also dominated developments in monetary aggregates. The evolution of overall and BEAC NFAs since the 1994 devaluation mirrors oil prices. However, between 1996 and 2003, NFA growth was somewhat erratic, with net domestic credit, in particular credit to governments, making overall positive contributions to broad money

Table 2.2. CEMAC: Interest Rates
(In percent)

	1/7/02–4/10/02	4/11/02–12/17/02	12/18/02–4/1/03	4/2/03–5/8/03	5/9/03–6/17/03	6/18/03–7/27/03	7/28/03–11/2/03	11/3/03–12/1/03	12/2/03–1/19/05	1/20/05–9/15/05	9/16/05–3/2/06	3/3/06– . . .
I. Instruments for governments												
Rate on statutory advances	6.5	6.4	6.3	6.3	6.3	6.3	6.3	6.3	6.0	5.8	5.5	5.3
Treasury penalty rate	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.0	10.0	10.0	10.0
Rate on government deposits	3.4	3.0	2.7	2.6	2.5	2.2	2.1	2.0	2.0	1.7	1.6	1.6
II. Money market												
A. Liquidity injections												
1. *Guichet A*												
Rate on positive auctions (TIAO)	6.5	6.4	6.3	6.3	6.3	6.3	6.3	6.3	6.0	5.75	5.5	5.25
Discount rate (TIPP)	8.5	8.4	8.3	8.3	8.3	8.3	8.3	8.3	7.8	7.50	7.3	7.00
Rate on punctual interventions (TISIP)	8.5–15.0	8.4–15.0	8.3–15.0	8.3–15.0	8.3–15.0	8.3–15.0	8.3–15.0	7.8–15.0	7.8–15.0	7.5–15.0	7.3–15.0	7.0–12.0
Rate on advances except certificates of deposits (TACP)	6.5	6.4	6.3	6.3	6.3	6.3	6.3	6.3	6.0	5.8	5.6	5.3
Banks' penalty rate (TPB)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.0
2. *Guichet B*												
Rate on new productive investments B52	6.7	6.4	6.4	6.4	6.4	6.4	6.3	6.3	6.0	5.8	5.8	5.8
Rate on old irrevocable medium-term loans	4.3–6.5	4.3–6.4	4.3–6.4	4.3–6.4	4.3–6.4	4.3–6.4	4.3–6.4	4.3–6.4	4.3–6.4	4.3–6.4	4.3–6.4	4.3–6.4
B. Liquidity absorption (negative auctions)												
Rate on 7-day deposits (TISP)	3.4	3.0	2.7	2.6	2.5	2.2	2.1	2.0	2.0	1.7	1.6	1.6
Rate on 28-day deposits (TISP)	3.5	3.1	2.8	2.7	2.6	2.3	2.1	2.0	2.0	1.8	1.7	1.6
Rate on 84-day deposits (TISP)	3.5	3.1	2.8	2.7	2.6	2.3	2.2	2.1	2.1	1.8	1.7	1.7
III. Banking system												
A. Maximum lending rate (TDM)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.00	17.00	15.00
B. Minimum deposit rate (TCM)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.00	4.75	4.25

Source: BEAC.

Table 2.3. CEMAC: Required Reserve Coefficients and Remuneration

(In percent)

	9/1/01–12/30/01	12/31/01–7/31/02	8/1/02–12/11/02	12/12/02–3/10/03	3/11/03–6/30/04	7/1/04–1/19/05	1/20/05–3/2/06	3/3/06– . . .
Required reserve coefficient								
Group I: Countries with abundant liquidity[1] (Equatorial Guinea)								
1. Coefficient on sight deposits	. . .	. . .	. . .	. . .	. . .	. . .	7.75	10.00
2. Coefficient on term deposits	. . .	. . .	. . .	. . .	. . .	. . .	5.75	7.00
Group II: Countries with satisfactory liquidity (Cameroon, Republic of Congo, and Gabon)								
1. Coefficient on sight deposits	1.00	2.50	3.50	6.00	7.75	7.75	7.75	7.75
2. Coefficient on term deposits	0.50	1.50	2.50	4.00	5.75	5.75	5.75	5.75
Group III: Countries with tight liquidity (Chad)								
1. Coefficient on sight deposits	. . .	. . .	2.00	3.00	5.00	5.00	5.00	5.00
2. Coefficient on term deposits	. . .	. . .	1.00	1.75	3.00	3.00	3.00	3.00
Rate of remuneration of required reserves	1.20	1.10	1.10	0.80	0.70	0.55	0.40	0.30

Source: BEAC.

Note: As of May 22, 2006, banks from the Central African Republic were exempted from the reserve requirement.

[1]As of March 3, 2006, a third group was created.

growth. Starting in 2004, however, the trend noticeably changes, with rapidly accelerating NFA growth accompanied by a substantial buildup of government deposits at the BEAC. In 2005 and 2006, the contribution of NFA growth to broad money growth was about 50 percent, while the buildup of government deposits at the BEAC was a negative 30 percent; broad money grew at close to 20 percent in both years (Figure 2.1 and Table 2.4).

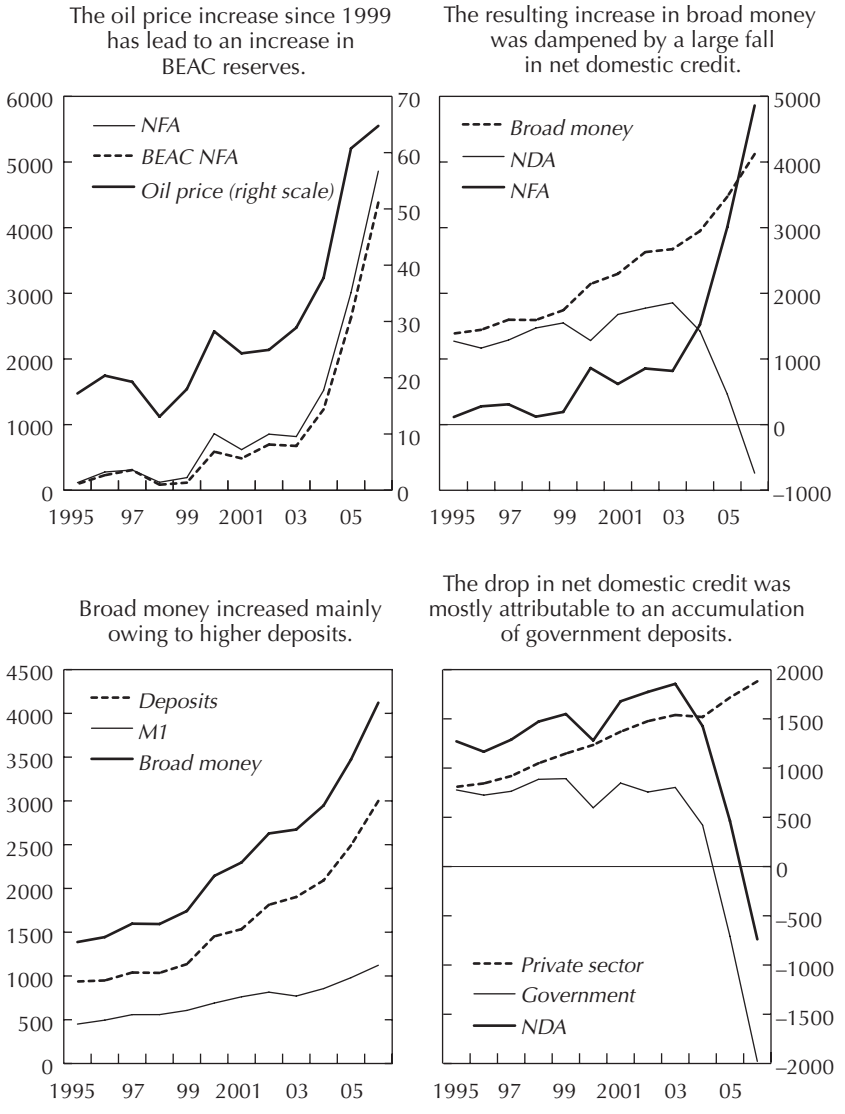
Banking Sector Liquidity

The excess liquidity of commercial banks has risen significantly in recent years. High structural excess liquidity has prevailed in the whole CFA franc zone since the 1994 CFA franc devaluation: capital that had flown the region before the devaluation was repatriated, but structural obstacles have been hindering private sector credit growth (IMF, 2006). However, overall excess liquidity in the CEMAC region has almost doubled since 2004, whereas it declined in WAEMU. Liquidity growth was particularly significant in Cameroon, where debt relief in 2006 under the Heavily Indebted Poor Countries Initiative made it possible to repay government domestic arrears, which banks deposited at the BEAC. Liquidity growth also accelerated in Equatorial Guinea and Gabon.

Improvements in the fiscal position of CEMAC governments are largely responsible for the liquidity growth. Government deposits in commercial banks have been accumulating since fiscal balances improved due to higher oil revenue. As a result, deposits in the banking system have kept increasing almost in step with excess liquidity; at the end of 2006 they represented about 36 percent of total deposits (excess liquidity was at about 3.6 percent of GDP for the region).

Weak cash management by governments adds to the liquidity problem and complicates BEAC monetary policy. Full implementation by member countries of single treasury accounts at the BEAC would help reduce some of the banks' excess liquidity, and clarify the governments' net position vis-à-vis the banking system and the central bank. In spite of positive balances in commercial banks and growing deposits at the BEAC, governments still rely to some extent on central bank statutory advances, of which CFAF 375 billion was outstanding at the end of 2006 (1.4 percent of regional GDP). Consolidation of these credit and debit balances would help BEAC liquidity management and would also allow for fiscal savings, given the interest differential between the advances and the deposits (Figure 2.2).

Figure 2.1. CEMAC: Evolution of Monetary Aggregates
(In billions of CFA francs, unless otherwise indicated)



Sources: BEAC and IMF staff calculations.
Note: NFA = net foreign assets; NDA = net domestic assets.

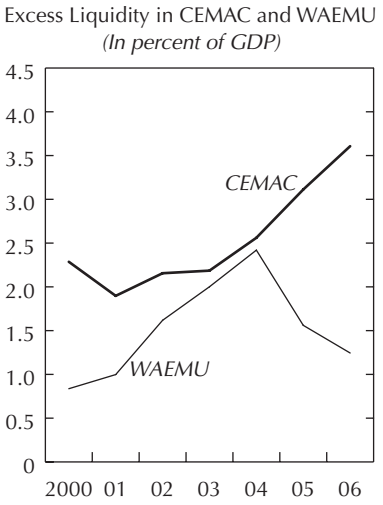
Table 2.4. CEMAC: Monetary Survey

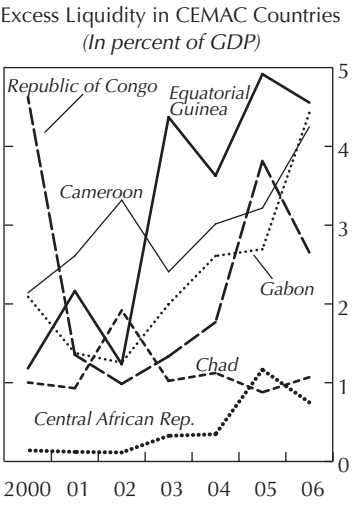
(Contribution to the annual broad money growth, in percent)

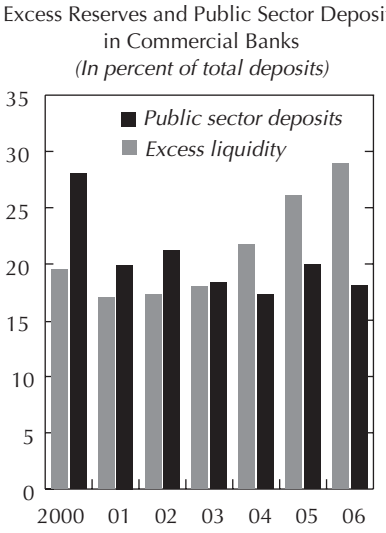
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Net foreign assets	11.7	2.2	–11.8	4.5	38.4	–8.7	10.3	–1.4	24.1	50.4	53.3
BEAC	9.7	5.4	–14.0	2.0	27.1	–5.1	9.2	–0.8	19.7	47.2	50.6
Foreign assets	12.7	7.8	–13.4	4.9	31.1	40.1	8.7	–2.2	18.3	46.7	45.7
Of which											
Operations account	9.4	6.8	–12.8	4.5	30.7	–5.6	8.3	–2.1	16.2	45.5	43.7
Foreign liabilities	–3.0	–2.4	–0.6	–2.9	–4.0	–0.5	0.5	1.4	1.4	0.6	4.9
Commercial banks	2.0	–3.3	2.2	2.5	11.3	–3.6	1.1	–0.6	4.4	3.2	2.7
Foreign assets	2.2	–1.2	0.8	5.3	11.0	–2.5	3.8	–2.3	4.1	2.5	3.4
Foreign liabilities	–0.2	–2.0	1.5	–2.7	0.3	–1.1	–2.8	1.7	0.3	0.7	–0.7
Net domestic assets	–7.6	8.5	11.5	4.8	–15.4	17.4	4.2	3.1	–10.1	–32.6	–34.6
Net credit to government	–3.5	1.2	8.3	0.9	–15.4	9.7	–2.1	0.9	–10.8	–37.6	–35.3
BEAC	1.4	0.0	9.7	3.4	–7.6	9.3	–2.4	0.6	–11.8	–32	–37.5
Advances	0.7	–1.8	9.6	1.8	–2.0	11.3	1.8	0.8	0.3	–2.9	–4.1
Consolidated debt	–0.6	–1.2	–1.3	–1.4	–1.2	–0.8	–0.9	–1.1	–1.6	–0.3	–0.6
Other	3.4	1.4	1.4	2.9	3.7	0.7	–0.5	–1.7	–1.5	–0.7	–4.7
Government deposits	–2.1	1.6	0.1	0.0	–8.1	–1.9	–2.7	2.6	–9.0	–28	–28.1
Commercial banks	–4.9	1.2	–1.4	–2.5	–7.8	0.4	0.3	0.3	1.0	–5.6	2.2
Net credit to public agencies	–0.3	1.5	–0.7	–0.5	–1.6	0.9	–1.9	0.8	–0.3	–0.7	–1.3
Net credit to private sector	2.5	5.2	8.1	6.2	5.0	8.2	4.7	2.4	1.6	6.7	4.7
Other items, net	–6.3	0.6	–4.2	–1.8	–3.4	–1.4	3.4	–1.0	–0.6	–1.1	–2.8
Broad money (annual growth, percent)	4.1	10.6	–0.3	9.3	23.0	8.7	14.4	1.7	14.0	17.8	18.7
Currency outside banks	3.2	4.3	0.0	3.0	4.8	4.6	2.3	–1.7	5.0	4.2	4.1
Bank deposits	0.8	6.3	–0.3	6.3	18.2	4.1	12.1	3.4	8.9	13.5	14.6

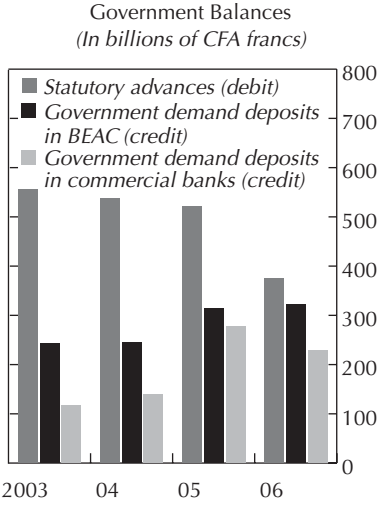
Sources: BEAC and IMF staff estimates.

Figure 2.2. CEMAC: Excess Liquidity in the Banking System









Sources: BEAC and IMF staff calculations.

Inflation

Inflation has picked up in all CEMAC member countries since 2004. In the long run, inflation in CEMAC should be aligned with inflation in the euro area. In practice, inflation in CEMAC has been much more volatile, with wide variations between countries. At the end of 2006, inflation was at its highest since 2001 and well above the euro area rate (Figure 2.3). The BEAC believes that the recent inflation in the region stems from a combination of (1) the pass-through of higher oil prices, notably in Cameroon; (2) supply bottlenecks in the Central African Republic and the Republic of Congo; (3) higher meat prices in the Republic of Congo and Gabon owing to avian flu concerns; and (4) strong domestic demand in the Central African Republic, Equatorial Guinea, and Gabon owing to salary increases.[9] However, links between money supply and inflation in the CEMAC have not been studied empirically. The BEAC argues that inflation in the region is not primarily a monetary phenomenon but mostly the result of supply shocks. Nevertheless, at the request of its board, the central bank is starting a study on the determinants of inflation in the zone, including the role of monetary and fiscal policy.

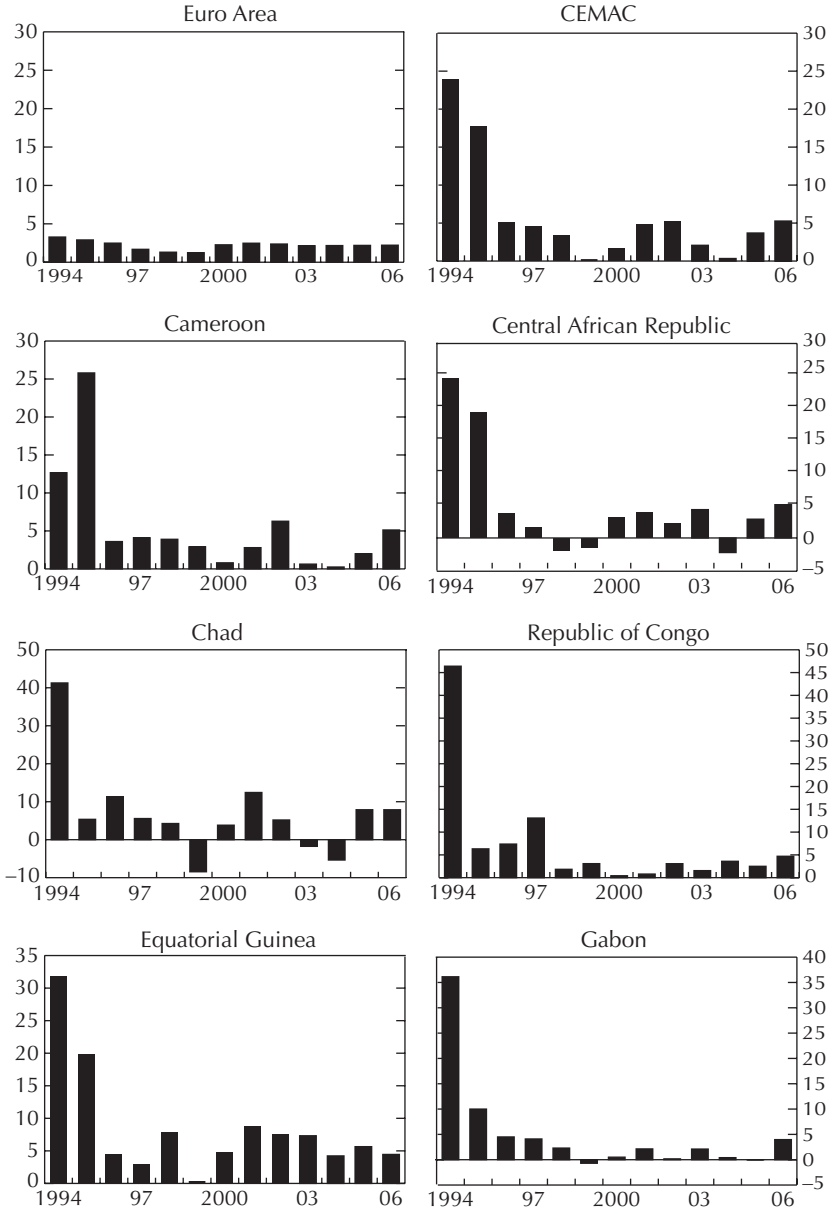
Use of Monetary Policy Instruments

In spite of the increasing excess liquidity, BEAC instruments have been either ineffective at, or not targeted to, liquidity absorption. Reserve requirements have been repeatedly increased, a development banks welcome because these reserves at least receive some interest (though it has been steadily declining), but that has not been sufficient to effectively reduce excess liquidity. At the same time, the use of negative auctions has been declining, and the interest rate on them has fallen below the comparable rate for the euro area, which is encouraging capital outflows (Figure 2.4).

Both the volume of BEAC liquidity injections and interbank transactions have been low. BEAC refinancing is used mostly by banks in the Central African Republic and Chad; the total volume of operations is extremely low. CEMAC banks not eligible for BEAC refinancing can obtain liquidity on the interbank market created in 1994. However, transactions volumes are low, both as compared with WAEMU (Table 2.5) and as a share of total banking sector assets (on average 0.3 percent between 2002 and 2006), even though interest rates have been falling.

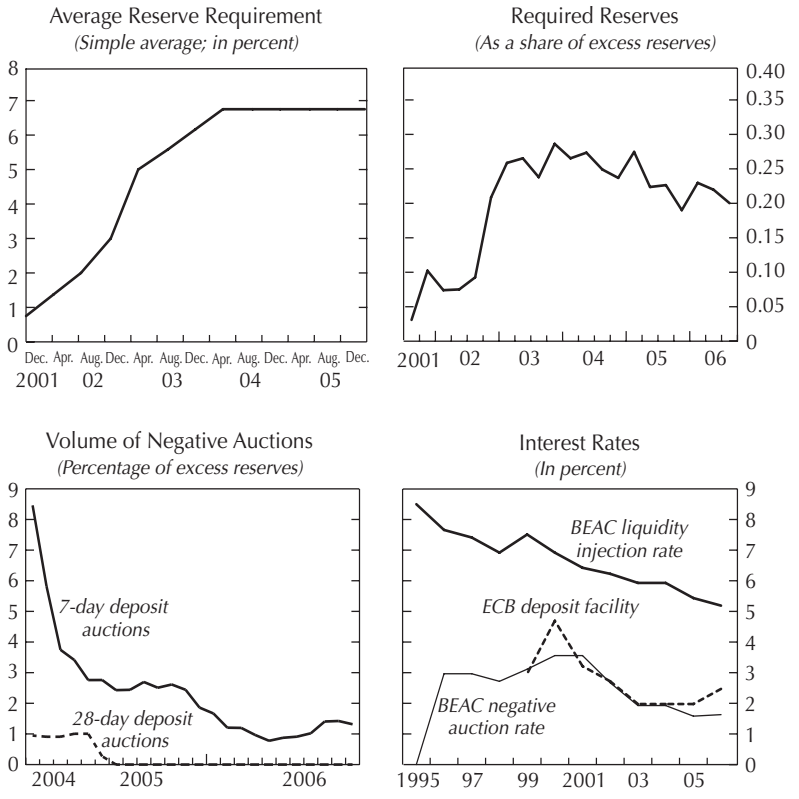
[9]Source: "Evolution of Inflation in the CEMAC as of December 31, 2006 and Short-Term Perspectives," available via the Internet at www.BEAC.int.

Figure 2.3. CEMAC: Inflation Rates
(In percent, year average)



Source: IMF, *World Economic Outlook*.

Figure 2.4. CEMAC: Monetary Policy Instruments



Sources: BEAC; IMF, *International Financial Statistics;* and IMF staff calculations.
Note: ECB = European Central Bank.

Elements of a Modified Monetary Policy Framework

More active and efficient liquidity management by the BEAC would be desirable. High excess liquidity in the banking system is a significant source of vulnerability and also calls into question the relevance of the monetary policy framework. The short-term liquidity overhang could unwind rapidly in case of a negative shock, in the form of capital outflows. It could also encourage banks to engage in risky behavior, with fast credit growth jeopardizing financial sector stability and potentially leading to inflation. From the BEAC perspective, excess liquidity has made defining refinancing ceilings largely irrelevant.

Table 2.5. CFA Franc Zone: Interbank Market Transaction Volumes
(Monthly average; in billions of CFA francs)

	2002	2003	2004	2005	2006
WAEMU	105.6	52.8	48.0	63.7	78.1
CEMAC	13.1	9.2	7.5	13.3	17.3

Sources: BCEAO and BEAC.

High inflation volatility imposes a number of costs on the economy (see, for example, Rother, 2004). Provided a stable relationship between money and prices, there would be a case for short-term smoothing. The prevalence of oil in the region implies that CEMAC member countries tend to be affected by similar (and potentially large) terms of trade shocks linked to oil prices, so that a common monetary policy response to such shocks would tend to be effective. An empirical study of the characteristics of macroeconomic shocks in the CFA franc zone finds that price shocks for oil exporters tend to be large and persistent (Fielding, Lee, and Shields, 2004).

Monetary policy in CEMAC is no longer adapted to the macroeconomic environment and the economic structure of the zone. In the presence of large foreign exchange inflows and excess liquidity, monetary programming becomes merely a passive projection exercise: the foreign currency cover remains well above the 20 percent limit and the refinancing ceilings are nonbinding. With no active sterilization by the BEAC, the only reason money growth has been somewhat contained is that the oil-related inflows have been partly offset by an accumulation of government deposits. If instead of saving most of the inflows, governments had decided to spend the additional revenue, the money supply would have grown much faster, perhaps leading to higher inflation and faster appreciation of the real exchange rate.

The potential cost of more active liquidity absorption by the BEAC does, however, set limits on the share of the foreign inflows that can be actively sterilized. "Quasi-sterilization" in the form of government deposits will therefore continue to play an important role, though at present the BEAC has no control over the share of the inflows that governments choose to save or spend. One option would be for the BEAC to entice governments to place more of their oil savings in long-term funds that would be delinked from monetary reserves, thus limiting liquidity creation.[10] The limit to such long-term savings would be the need to preserve adequate

[10]This would suppose that the BEAC was willing to offer a positive real return on these funds, which is currently not the case and is a reason why CEMAC oil producers do not much use Funds for Future Generations at the BEAC.

monetary reserves in support of the currency union. Once the BEAC and member governments agree on what would constitute adequate reserves, monetary programming could then be modified to define more operational liquidity management objectives, based, for example, on an indicative short-run reserve money target. The BEAC would commit to intervene in cases of both tight and excessive liquidity.

To be credible and effective, such central bank interventions should be conducted using market-based instruments. The CEMAC Council of Ministers is currently considering a plan prepared by the BEAC to phase out statutory advances and introduce government treasury bills. Phasing out statutory advances would have the advantage of eliminating another source of liquidity creation (although for CEMAC countries other than Equatorial Guinea, which does not use advances, and for the Central African Republic, which still relies on central bank financing, the importance of statutory advances has been declining since 2002). The BEAC could also consider introducing marketable central bank bills. Because treasury bills would be country-specific and thus have different risk profiles, both types of instruments would not be good substitutes, and central bank bills would be more appropriate to conduct regional monetary policy. The use of market-based instruments would also have advantages for deepening financial markets.

The Scope for Monetary Policy Interventions

Assessing the scope for a more active monetary policy requires better knowledge of the empirical relationship between money supply variables and inflation in CEMAC. There is little previous empirical work at the regional level, but a model similar to the one used here has been estimated individually for the WAEMU countries (see Chapter 3). Among other studies, Rother (1999) estimates money demand for the WAEMU countries, and for the whole of sub-Saharan Africa Barnichon and Peiris (2007) look at the determinants of inflation and Saxegaard (2006) at excess liquidity and monetary policy effectiveness. On individual CEMAC countries, Nachega (2001) estimates a money demand function for Cameroon. For WAEMU Diop, Dufrénot, and Sanon (see Chapter 3 of this volume) find that, although money supply still plays a nonnegligible role, other factors such as supply-side constraints (measured as value added in the primary sector) and the pass-through effects also play a significant role. This finding is consistent with the result of similar studies of inflation (see, for example, Sacerdoti and Xiao, 2001; Koffie, 2005; and Williams and Adedeji, 2004).

An Empirical Model of the Long-Run Determinants of Inflation in the CEMAC Region

The estimation uses a traditional monetary model for an open economy (Williams and Adedeji, 2004; and Koffie, 2005). The price level, p_t, is defined as a weighted average of nontradables prices, p_t^N, and tradables prices, p_t^T:

$$p_t = \alpha p_t^N + (1 - \alpha) p_t^T. \tag{2.1}$$

The parameter, α, is the share of nontradable prices in the price index. The price in local currency depends on the foreign currency price, p_t^f, and the exchange rate, e_t:

$$p_t^T = e_t + p_t^f. \tag{2.2}$$

The price of nontradable goods is assumed to be determined in the domestic money market as the difference between the actual money stock and the real demand for money:

$$p_t^N = m_t - m_t^d. \tag{2.3}$$

The demand for money m_t^d traditionally depends upon the level of income y_t, the relative return on domestic and foreign assets $(r_t - r_t^f)$, and the expected exchange rate depreciation Δe_t:

$$m_t^d = b_1 y_t + b_2(r_t - r_t^f) - b_3 \Delta e_t. \tag{2.4}$$

Consequently,

$$p_t = \alpha(m_t - (b_1 y_t + b_2(r_t - r_t^f) - b_3 \Delta e_t)) + (1 - \alpha)(e_t + p_t^f). \tag{2.5}$$

The inflation equation can be interpreted as an error correction model and written as equation (2.6). Note that this equation is a reduced form that can be derived from various models of inflation, such as a simple quantity theory of money model as estimated, for example, in Chapter 3 of this volume:

$$\Delta p_t = c_i + c_t + \alpha_1 \sum_{i=1}^{k-1} \Delta p_{t-1} + \alpha_2 \sum_{i=1}^{k-1} \Delta m_{t-1} - \alpha_2 \sum_{i=1}^{k-1} \Delta y_{t-1} + \alpha_3 \sum_{i=1}^{k-1} \Delta p_{t-1}^f$$
$$+ \alpha_4 \sum_{i=1}^{k-1} \Delta(r_{t-1} - r_{t-1}^f) + \alpha_5 \sum_{i=1}^{k-1} \Delta e_{t-1} + \alpha_6 [ECM_{t-1}] + \upsilon_t \tag{2.6}$$

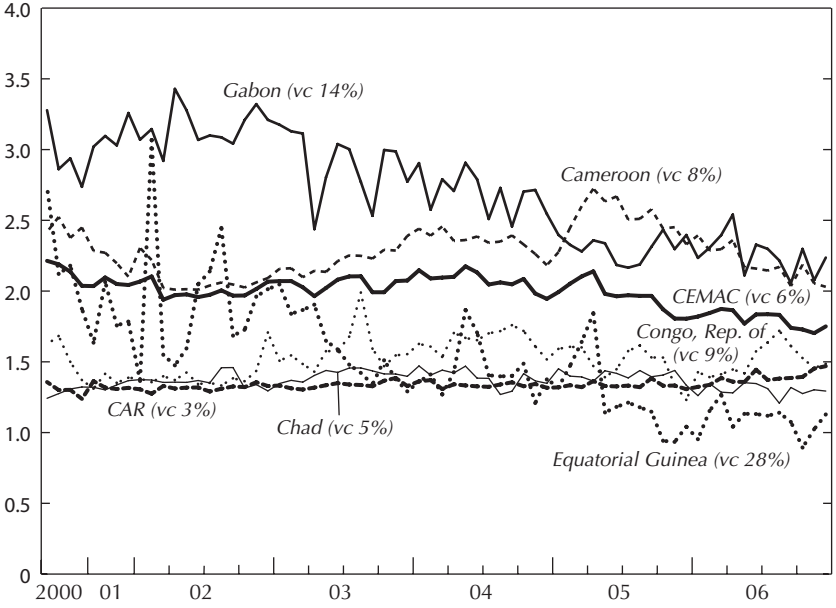
with $ECM_{t-1} = p_{t-1} - \beta_1 m_{t-1} + \beta_2 y_{t-1} + \beta_3 r_{t-1} - r_{t-1}^f - \beta_4 p_{t-1}^f - \beta_5 e_{t-1}$ measuring deviations of prices from their long-run level. In contrast with previous

studies (Koffie, 2005; Sacerdoti and Xiao, 2001; and Williams and Adedji, 2004), who estimate separately two error correction terms, one representing long-run money demand and the other purchasing power parity, this specification explicitly focuses on long-run equilibrium prices (as in equation (2.5)), where both the money and external markets are simultaneously in equilibrium.

The empirical estimation focuses on CEMAC aggregate variables. Because CEMAC is a monetary union with a common currency and a common monetary and exchange rate policy, the use of regional aggregates as a first step here is justified. Monthly data for 1994–2006 are being used to estimate the model. The variables in the estimation are described below. A description of data sources and plots of the variables can be found in the Appendix (Figure A2.1).

- For the price level we use the aggregate CPI for the region.
- For money supply we use M1. A closer look at the money multiplier confirms that, due to the low level of financial intermediation and financial sector development in the region, there is a fairly stable relationship between base money and the money supply (M1) (Figure 2.5). As the estimation focuses on the role of the central bank, M1 is used for the money supply. The expected sign of the coefficient is positive.
- Real income is proxied by imports (import value in CFA francs; expected sign: negative). For a given money supply an increase in imports is expected to increase money demand and thus push prices down.
- Foreign prices are proxied by the French consumer price index (CPI). Although the CFA franc has been pegged to the euro since 1999, France has continued to be the main trading partner of the region and movements in the French CPI are driven by those of the euro. The expected coefficient sign is positive.
- The nominal effective exchange rate is also introduced to assess pass-through effects from countries other than France. The expected coefficient sign is negative.
- The interest differential is the difference between the rate on positive auctions, which is also the rate on statutory advances to governments, and the French interest rate. An increase in the domestic interest rate relative to the foreign interest rate would increase demand for domestic assets, leading to capital inflows. The expected coefficient sign is positive.

Figure 2.5. CEMAC: Money Multplier
(Ratio, M1/base money)



Sources: IMF, *International Financial Statistics;* and authors' calculations.
Note: vc = variation coefficient.

Unit root tests confirm the nonstationarity of all the variables in levels (see the Appendix). The Johansen cointegration test indicates the presence of a unique cointegrating vector for all the variables (using 10 lags). All variables except the interest rates are estimated in logarithms.

Estimation results for this basic equation are in line with the theory. All long-run coefficients have the expected sign and are significant: in the error correction presentation the sign is inverted (Table 2.6). The size of the coefficients shows a fairly strong pass-through effect of the nominal effective exchange rate and of foreign prices, consistent with other studies. Yet money supply still plays a nonnegligible role in determining inflation in CEMAC, which suggests a role for the BEAC in smoothing inflation volatility. The error correction term on the CPI is negative and significant, indicating a stable process. Residuals are white noise (Figure A2.2).

Table 2.6. CEMAC Inflation[1]

Cointegrating Equation: dependent variable: $\ln(CPI_{CEMAC})$						
	$\ln(CPI_{CEMAC})$	$\ln(CPI_{France})$	ln(NEER)	ln(IMPORTS)	ln(M1)	$R_{CEMAC}-R_{France}$
	1	–0.44*	0.33***	0.05**	–0.26***	–0.01**
		[–1.39]	[4.54]	[1.91]	[–3.98]	[–2.25]
Error correction: Variables in first differences:						
	–0.3***	–0.10***	0.17	–2.22	0.43	2.09
	[–3.41]	[–3.36]	[0.97]	[–1.01]	[0.96]	[0.65]
R^2	0.45492					

Source: Authors' estimates.

[1]Coefficient estimates in the first row—the sign is inverted in the error-correction presentation, *t*-statistics between brackets. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Conclusions

Monetary policy plays a role in CEMAC and there seems to be both a rationale and some scope for reform. Considering the challenges the BEAC faces in the current environment of fiscal surpluses and high foreign inflows, the chapter has discussed the building blocks of a revised approach to monetary programming, showing through a preliminary empirical study that there would indeed be some scope for a more active monetary policy. Although the pass-through effect of the nominal effective exchange rate is strong, inflation is still to some extent a monetary phenomenon in the region. In turn, money creation remains predominantly driven by member governments, both through direct BEAC financing and through the spending of oil-related revenues. Therefore, implementing the BEAC proposal to phase out statutory advances and to sterilize in a more predictable way foreign inflows through better-remunerated Funds for Future Generations should help strengthen the BEAC's independence and ability to conduct monetary policy. However, coordination between monetary and fiscal policy would remain critical, as excessive spending would put too large a burden on monetary policy.

Additional empirical work could usefully look in more detail at the determinants of inflation and the impact of monetary policy in CEMAC countries. The results presented here should be considered preliminary: the stability and robustness of the empirical specification would need to be examined further. In addition, given the heterogeneity of CEMAC countries, cross-country differences related to the sources of inflation in gen-

eral and the relative effectiveness of monetary policy in particular would deserve further examination. Further research will therefore look into panel data techniques, in order to take advantage of the common regional factors while being able to test for the degree of homogeneity in the relation between money and inflation among CEMAC member countries.

Appendix

Data Sources

Data on CPI, nominal effective exchange rate (NEER), and monetary aggregates (M1 and reserve money) are taken from the IMF, *International Financial Statistics* (*IFS*). The CEMAC interest rates are provided by the BEAC, and refer to the rate on positive auctions (TIAO). France's interest rate is the short-term rate as in IMF, Global Data Source. Imports are from IMF, *Direction of Trade Statistics*, in millions of dollars, and converted to CFA francs with the average exchange rate from *IFS*.

Unit Root Tests (Augmented Dickey-Fuller)

Variable	ADF	*P*-Value	Conclusion
$\ln(CPI_{CEMAC})$	–1.41	0.41	I(1)
$\ln(CPI_{France})$	0.58	0.99	I(1)
ln(NEER)	–1.79	0.38	I(1)
ln(IMPORTS)	–0.58	0.87	I(1)
ln(M1)	3.03	1.00	I(1)
R_{CEMAC}–R_{France}	–1.63	0.47	I(1)

Source: Authors' estimates.

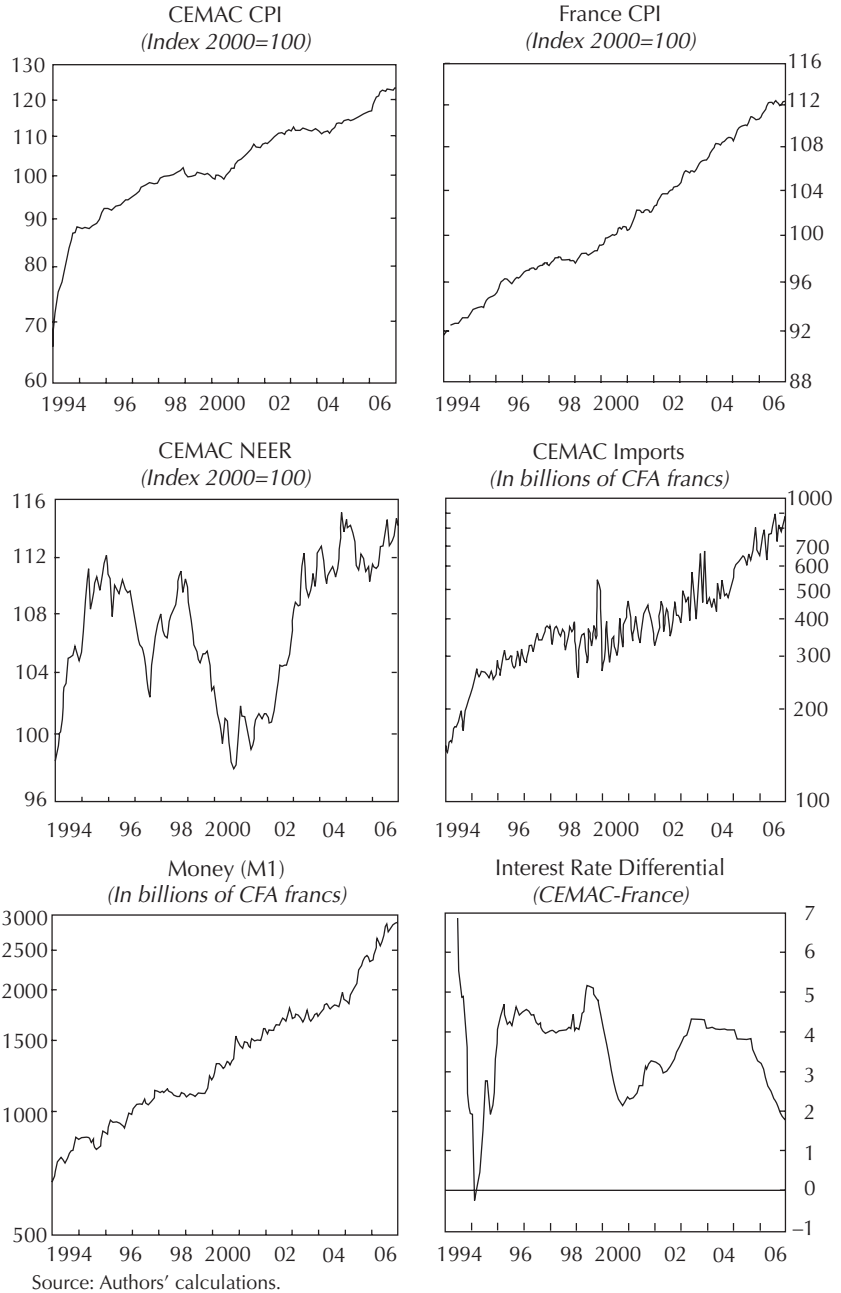
Cointegration Tests, Variables, and Residuals Plots

Number of Hypothesized Cointegrating Equations	Trace Statistic	*P*-value**	Max-Eigen Statistic	*P*-value**
None*	118.66	0.00	48.94	0.00
At most 1	69.72	0.05	24.76	0.40
At most 2	44.95	0.09	21.81	0.23
At most 3	23.14	0.24	12.58	0.49
At most 4	10.56	0.24	10.54	0.18
At most 5	0.02	0.90	0.02	0.90

Source: Authors' estimates.

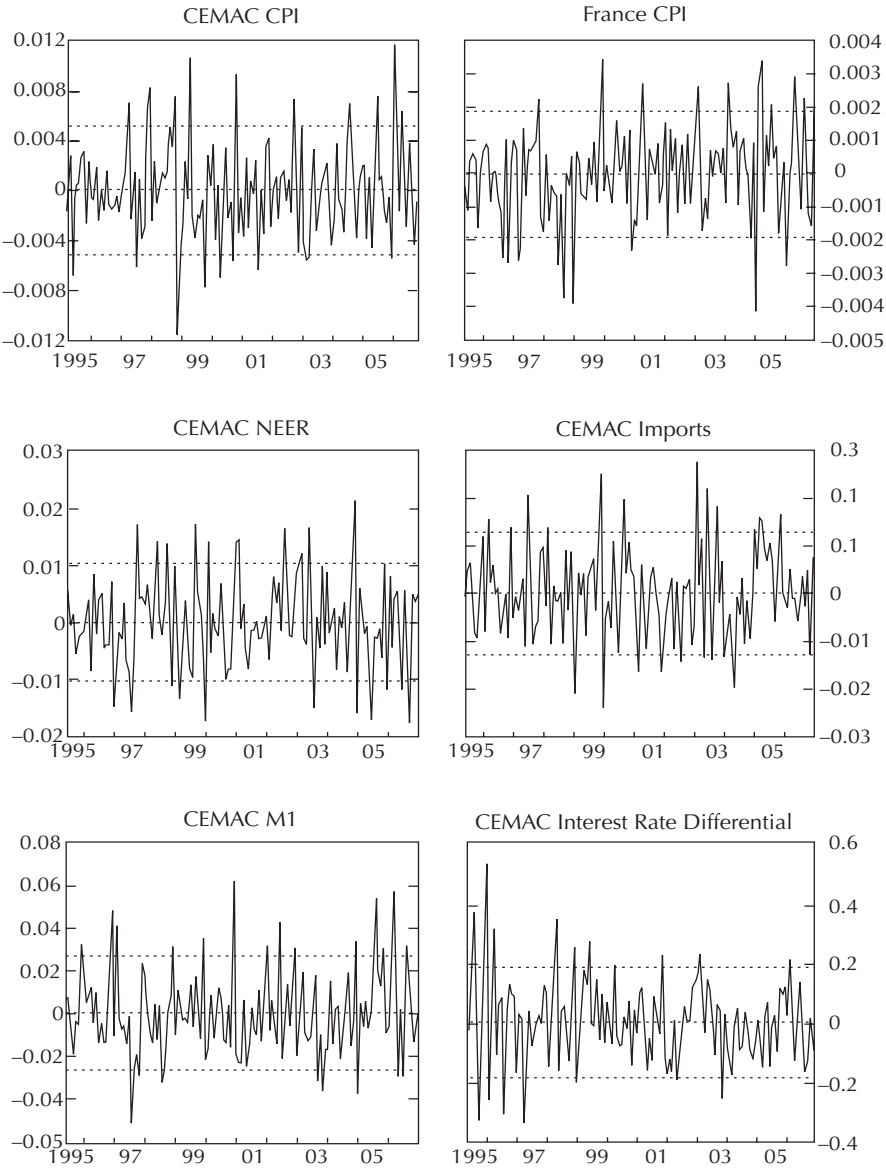
* denotes rejection of the hypothesis of no cointegrating equation at the 0.05 level. ** MacKinnon-Haug-Micehlis (1999) *p*-values. Trace test and maximum eingenvalue tests both indicate 1 cointegrating equation at the 0.05 level.

Figure A2.1. CEMAC: Variables in the Inflation Model
(Scale in logs, except for the interest rate differential)



Source: Authors' calculations.

Figure A2.2. CEMAC Inflation: Cointegration Residuals



Source: Authors' calculations.

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3

Long-Run Determinants of Inflation in WAEMU

ABDOULAYE DIOP, GILLES DUFRÉNOT, AND GILLES SANON

In this chapter, we propose an empirical model of the long-run determinants of the inflation rate in WAEMU member countries. Understanding the economic processes that drive inflation is important because prices are an element of the competitiveness of economies. Using an econometric test that allows us to select appropriate macroeconomic variables that induce inflationary pressures, we find that in the WAEMU countries money supply is not the sole determinant of inflation in the long run. Other factors such as supply-side constraints and pass-through effects also play a significant role.

We document the impact of such variables on long-run inflation by proposing an empirical model of determinants of inflation in the WAEMU countries. We employ the Pesaran, Shin, and Smith (2001) (PSS) approach, which yields conclusions that are more robust than the traditional Engle-Granger approach, especially when applied to samples as small as ours.

The authors are with the West African Economic and Monetary Union (Ouagadougou) and ERUDITE (Paris XII), GREQAM (Marseille), and the WAEMU Commission, respectively. They gratefully acknowledge comments from Bruno Cabrillac, Anne-Marie Gulde, Joachim Ouadraogo, Charalambos Tsangarides, and two referees. The views expressed in this chapter are those of the authors and do not necessarily represent those of their institutions.

The chapter first presents the background for our arguments. Next, it describes the methodology and data, followed by the main empirical results. The final section presents the conclusions.

Background

Whether or not an increase in the money supply is a major cause of inflation in sub-Saharan African countries is still debated in the literature.[1] Chhibber and Shafik (1990) and Sowa and Kwakye (1991) find that money expansion is the backbone of long-term price changes in Ghana. Elbadawi (1990) gets the same result for countries in Southern Africa. The findings from other studies are mixed: they also find significant roles for such macroeconomic fundamentals as exchange rates, real income, nominal interest rates, foreign prices, real money, and output gaps (see, for instance, London, 1989; Atta, Jefferis, and Mannathoko, 1996; and Barnichon and Peiris, 2007).

In this chapter we focus on the WAEMU countries. For several reasons we believe that long-run inflation is not solely a monetary phenomenon in these countries:

(1) These countries are members of the CFA franc zone.[2] Two important characteristics of this zone are the free convertibility of the CFA franc into euros guaranteed by the French Treasury, and an open capital account with no financial repression between the African countries and France. Theoretically, in this context a domestic expansion of credit mainly affects the balance of payments, with a weak effect on money and domestic inflation. This is indeed the case with regard to demand for tradable goods: excess demand spills over into higher demand for foreign manufactured goods. The implication is that in the WAEMU countries the pass-through effects of foreign prices are substantial; they are

[1]See, for instance, Chhibber and others (1989), London (1989), Chhibber and Shafik (1990), Canetti and Greene (1991), Boccara and Devarajan (1993), Lowrey (1995), Odedokun (1995), and Atta, Jefferis, and Mannathoko (1996).

[2]The franc zone is characterized by monetary agreements between France and 15 African countries that make the CFA franc freely convertible into euros guaranteed by the French Treasury at a fixed parity. The amount that can be withdrawn is limited: the central bank must keep 50 percent of its foreign assets in an operations account and a cap is imposed on the amount of credit extended to each country (credits are equivalent to 20 percent of the country's public revenue in the preceding year).

channeled by the prices of manufactured goods imported from European countries, which account for 60 percent of WAEMU trading volume. Historically, average inflation in the union closely tracks inflation in Europe, especially in France. Moreover the central bank for the union has no way of reacting when the U.S. dollar appreciates or depreciates against the euro, because the exchange rate of the CFA franc is fixed against the euro.[3] Thus, WAEMU countries also face exchange rate pass-through effects when importing from dollar zones.

(2) The CFA franc zone effectively separates monetary from fiscal policy. Indeed, to gain credibility, the central bank has avoided implementing expansive monetary policies in response to national fiscal deficits. The agreements with the French Treasury impose a cap on the amount of credit extended to each country of 20 percent of the country's public revenue in the preceding year. As a consequence, inflation in the franc zone is not likely to come from monetization of fiscal deficits.

(3) Inflation accounts for supply-side constraints in the agriculture sector. This happens not only through supply-side shocks, such as rainfall or locust invasion, but also through the permanent component of food production. Indeed, the trend appreciation in the consumer price index (CPI) is associated with low productivity in the primary sector; food items comprise nearly 70 percent of the total weight of the CPI.

As a consequence of factors like these, a suitable model for long-run inflation in the WAEMU countries must go beyond the quantity theory vision, mainly because inflation reflects the economic structures and the institutional framework in which monetary policy operates. The operations account mechanism and free capital movements in the franc zone imply that domestic credit policy does not necessarily have lasting effects on money supply and thus on inflation.[4] We expect the following variables to be determinants of the long-run inflation rate, along with nominal money: (1) food production or any variable capturing supply-side constraints in locally produced goods sectors and (2) the exchange rate pass-through and foreign prices.

[3]The CFA franc moves up and down against the U.S. dollar in the same proportion as the euro.

[4]For an empirical analysis, see Honohan (1990).

Temporary deviations from the long-run level may also be observed due to demand- or supply-side shocks related to the same variables (for example, droughts, differences in pass-through of imported inflation to nontraded goods prices, wage push).

Methodology and Data

Model Specification

Inflation dynamics is modeled as an error-correcting mechanism, where it is assumed that the price level returns to its long-run equilibrium when the effects of transitory shocks have dissipated:

$$\Delta p_{t+1} = (1 - \lambda)\Delta p_t + \lambda \Delta p_t^* - \alpha(p_{t-1} - p_{t-1}^*). \quad (3.1)$$

Equation (3.1) shows that the price change depends on the transitory shocks affecting prices and their determinants and on an innovation reflecting the discrepancy of the prices from their target level in the preceding period. p_t^* denotes the long-run price, and we assume that

$$p_t^* = \beta_0 + \beta_1 m_t + \beta_2 y_t^s + \beta_3 s_t + \beta_4 pforeign_t + \Theta' DUM_t + \omega_t, \quad (3.2)$$

where ω_t is an independently identically distributed (iid) error term; y_t^s represents the volume of locally produced goods and accounts for the impact of supply-side constraints on domestic prices; s_t is the nominal exchange rate against foreign currencies; $pforeign_t$ denotes the foreign prices; and DUM_t is a vector of dummies that captures the effects of exogenous shocks (considerable devaluation and sociopolitical factors).

We expect the following signs on the coefficients: $\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 > 0$, and $\beta_4 > 0$. Indeed, the reduced-form equation (3.2) is representative of different approaches to inflation. The choice of money as an explanatory variable is compatible with the monetarist view that inflation is a monetary phenomenon. Usually, the output variable is present in Keynesian models, where inflation is attributable to demand pressures. In this case, output variables measure an output gap, and one would expect a positive sign on the output coefficient. Yet in developing countries, more specifically in small economies with high trade openness, inflationary pressures owing to domestic demand are attenuated by high demand for tradable goods. Supply-side constraints affect domestic prices more significantly because of the low productivity of locally produced goods sectors. We thus expect the coefficient of the output to carry a negative sign, indicating that a decline in the value added of the primary sector would appear to

constrain the supply side of the economy and consequently raise the price level. In the WAEMU countries, imported goods account for a sizable share of domestic demand. As a consequence, pass-through effects on inflation must also be considered. These effects are captured by the nominal exchange rate and foreign price variables. An increase in the nominal exchange rate (a depreciation of the local currency) increases the prices of the imported goods. Similarly, higher foreign prices are transmitted to domestic prices.

The Econometric Methodology

Our results draw on the bound-testing approach of level relationships proposed by PSS. This approach has an advantage over the Engle-Granger methodology because it makes it possible to test for the existence of a long-run relationship between a dependent variable and a set of explanatory variables when it is not clear whether the regressors are $I(1)$ or $I(0)$. The Engle-Granger cointegration test assumes that all variables are $I(1)$, but, as is generally known, the unit root often yields mixed results, notably when they are applied to small samples. For purposes of clarity, let us summarize the PSS methodology.

Define Δy_t, Δp_t, $x_t' = (m_t, y_t^s, s_t, pforeign_t)$ the tth-row of the matrix of the explanatory variables and $z_t = (y_t, x_t')'$.

We consider the following conditional error correction model (ECM) equations with unrestricted intercept and trend:

$$\Delta y_t = c_0 + c_1 t + \pi_{yy} y_{t-1} + \pi_{yx,x} x_{t-1} + \sum_{i=1}^{p} \Psi_i' \Delta z_{t-i} + \delta' \Delta x_t + u_t, \qquad (3.3)$$

where u_t is an error term.[5] The procedure amounts to testing two assumptions: (1) the dependent variable has a unit root and (2) there is a relationship in levels between the dependent variable y and the independent variables x_{t-1}. The test is formulated as follows:

$$H_0 : \pi_{yy} = 0 \text{ and } \pi_{yx,x} = 0' \text{ against } H_1 : \pi_{yy} \neq 0 \text{ or } \pi_{yx,x} \neq 0'.$$

The restricted model is tested by computing a Fisher statistic, as is usually done to test restrictions in an econometric regression. However, when the regressors consist of a mixture of $I(0)$ and $I(1)$ variables, the asymptotic distribution of the Fisher statistic is nonstandard under the null. The Monte Carlo simulations done by PSS yield two critical values, say, L1 (for the lower bound) and L2 (for the upper bound) that provide a range cover-

[5]The deterministic components are introduced in several ways: unrestricted intercepts and trends and cointegrated intercepts and/or trends.

ing all possible configurations of the regressors into purely $I(0)$, purely $I(1)$, or mutually cointegrated. The conclusions are as follows:

- If the computed F-statistic lies below the lower bound, there is no level relationship between the variables.
- If the computed statistic is higher than the upper bound, the null of no level relationship between the variables is rejected.
- If the statistic lies between the two bounds, we cannot reach any conclusion about cointegration.

PSS show that the critical bounds vary with the specification of the deterministic components—the constant term and the trend in equation (3.3). In particular, it is necessary to take into account the possibility of level relationships between the deterministic components of the variables. Such relationships yield some restrictions in the regressions. PSS accordingly distinguish five cases: no intercepts and no trends, restricted intercepts and no trends, unrestricted intercepts and no trends, unrestricted intercepts and restricted trends, and intercepts and trends that are both unrestricted.

In practice, the test is implemented in several steps.

Step 1. We estimate equation (3.3) to obtain a parsimonious specification. This means that we need to find the optimal lag p, select the variables that enter the regression with a significant coefficient, and apply some misspecification tests on the residuals. In this effect the optimal lag p is selected according to the usual information criteria (Akaike, Schwarz) and the following misspecification tests are applied on the estimated residuals: the Durbin-Watson test for first-order autocorrelation, the Breusch-Godfrey serial correlation LM test, the Jarque-Bera tests for normality, and the ARCH LM test.

Step 2. We use the model selected in step 1 to apply the PSS test. At this step several versions of the model are estimated by taking into account different specifications of the deterministic components if a constant, a trend, or both are significant in the regressions.

Data

Our sample consists of the following WAEMU countries: Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal, and Togo. The countries and the years were selected according to data availability. Data are not available for Guinea-Bissau before the mid-1990s.

Data are collected from the WAEMU Commission for 1970 to 2005 and from the IMF's International Financial Statistics (IFS) database. We

consider both supply-side (notably foreign price pass-through and output) and demand-side factors (such as the money growth). The definitions of the different variables used are the following:

p_t: consumer price index (at 1985 = 100);

m_t: for robustness, we consider three alternative definitions of money, namely, the monetary base, M0; the money aggregate, M1; and broad money, M2;

$pforeign_t$: index of prices of manufacturing goods imported from France. This variable is chosen as a proxy for foreign prices. Indeed, because imports into WAEMU countries from the euro area represent on average 70 percent of their total imports, WAEMU area inflation closely tracks inflation in European countries. Choosing a trade-weighted average of all European manufacturing prices does not modify our results, because France is the main European trading partner for WAEMU countries;

s_t: nominal exchange rate of the CFA franc against the U.S. dollar; and

y_t^s: value added in the primary sector (at 1985 constant prices and expressed in billions of CFA francs).

All variables are transformed in logarithmic form.[6]

Empirical Results

Selection of the Long-Run Models

Table 3.1 gives the *F*-statistics for testing the existence of a long-run inflation equation under different scenarios for the deterministic components (constant and trends). These statistics should be compared with the critical value bounds, L1 and L2. This step is very important, because

[6]We also tried other explanatory variables that proved not to be significant in our regressions. For instance, the price of oil was not statistically significant, which can be explained by the fact that the energy problems encountered by the WAEMU countries are recent in comparison to the 36 years under examination. The French CPI is used as a proxy of foreign prices given the structure of trade of the WAEMU countries with France (their first trade partner during the period under examination). A 1994 dummy was also included in some regressions to account for the devaluation shock. However, such a dummy was not needed across all countries because the increase in the domestic prices that followed the devaluation came from an increase in the prices of imported goods and mark-up behaviors in the domestic markets. When the foreign price channel appears to be the main cause of higher domestic inflation, the 1994 dummy variable appears to be nonsignificant in the regression because its effect is already captured by the foreign price variable.

Table 3.1. Test of the Existence of a Long-Run Relationship Between Inflation and Its Determinants

Money Indicator	Country	Model	*F*-stat	L1	L2	Conclusion	Long-Run Determinants of the CPI
Monetary base	Benin	(5)	1.04	11.64	11.64	No long-run relationship	. . .
		(4)	1.16	6.29	6.29	No long-run relationship	. . .
	Burkina Faso	(3)	5.45	4.94	5.73	Inconclusive	. . .
		(2)	6.94	3.62	4.16	Long-run relationship	s_t
	Côte d'Ivoire	(5)	8.85	4.01	5.07	Long-run relationship	$M0_t$, $pforeign_t$, s_t
		(4)	5.17	3.38	4.23	Long-run relationship	$M0_t$, $pforeign_t$, s_t
	Mali	(5)	4.06	4.01	5.07	Inconclusive	. . .
		(4)	3.96	4.68	5.15	No long-run relationship	. . .
	Niger	(1)	2.55	3.15	4.10	No long-run relationship	. . .
	Senegal	(3)	10.59	3.23	4.35	Long-run relationship	s_t, $pforeign_t$
		(2)	5.20	2.79	3.67	Long-run relationship	s_t, $pforeign_t$
	Togo	(3)	20.46	3.23	4.35	Long-run relationship	y_t, s_t, $pforeign_t$
		(2)	17.32	2.79	3.67	Long-run relationship	s_t, $pforeign_t$
M1	Benin	(5)	39.89	4.01	5.07	Long-run relationship	y_t, s_t, $pforeign_t$
		(4)	19.72	3.88	4.61	Long-run relationship	y_t, $pforeign_t$
	Burkina Faso	(5)	17.97	4.01	5.07	Long-run relationship	$M1_t$, y_t, s_t
		(4)	7.78	3.38	4.23	Long-run relationship	$M1_t$, y_t, s_t
	Côte d'Ivoire	(3)	13.55	3.79	4.85	Long-run relationship	$M1_t$, $pforeign_t$
		(2)	6.69	3.10	3.87	Long-run relationship	$M1_t$, $pforeign_t$
	Mali	(1)	4.38	2.45	3.63	Long-run relationship	y_t, $pforeign_t$, s_t
	Niger	(3)	3.60	2.86	4.01	Inconclusive	. . .
		(2)	1.73	2.56	3.49	No long-run relationship	. . .
	Senegal	(1)	23.58	2.72	3.83	Long-run relationship	s_t, $pforeign_t$
	Togo	(1)	20.35	3.15	4.11	Long-run relationship	$pforeign_t$

Table 3.1 ***(concluded)***

M2	Benin	(4)	15.83	3.38	4.23	Long-run relationship	y_t, s_t, $pforeign_t$
		(5)	25.82	4.01	5.07	Long-run relationship	y_t, s_t, $pforeign_t$
	Burkina Faso	(3)	7.26	3.23	4.35	Long-run relationship	$M2_t$, y_t, s_t
		(2)	7.04	3.62	4.16	Long-run relationship	$M2_t$, y_t, s_t
	Côte d'Ivoire	(3)	16.37	4.94	5.73	Long-run relationship	$M2_t$
		(2)	56.00	3.63	4.16	Long-run relationship	$M2_t$
	Mali	(5)	6.39	4.87	5.85	Long-run relationship	$M2_t$, $pforeign_t$
	Niger	(1)	2.55	2.72	3.83	No long-run relationship	. . .
		(2)	3.10	3.10	3.87	No long-run relationship	. . .
	Senegal	(1)	23.97	2.45	3.63	Long-run relationship	$M2_t$, $pforeign_t$
	Togo	(1)	18.90	2.72	3.85	Long-run relationship	y_t, $pforeign_t$

Source: Authors' calculations.

Note: (1) model with no intercepts and no trends, (2) model with restricted intercepts and no trends, (3) model with unrestricted intercepts and no trends, (4) model with unrestricted intercepts and restricted trends, and (5) model with unrestricted intercepts and unrestricted trends. *F*-stat = Fisher statistic, L1 = Lower bound, L2 = Upper bound, s_t = nominal exchange rate, $pforeign_t$ = foreign CPI, y_t = value added (primary sector), and $M0_t$ = monetary base. The explanatory variables were selected using the criterion in Table A3.1 and by reestimating the equations until all the regressors were statistically significant.

it avoids estimating spurious regressions by using the standard Engle-Granger (EG) methodology, especially when there is doubt about the degree of integration of the explanatory variables (in our case, the latter are a mix of $I(0)$ and $I(1)$ variables).[7]

The results show the worth of considering alternative indicators of money: the conclusions vary according to whether M0, M1, or M2 is used. With the monetary base, a long-run inflation equation is found for four countries and money has an impact on long-run inflation only in Côte d'Ivoire. With M1, the test concludes in favor of a long-run relationship for five countries and money has a significant effect on inflation in Burkina Faso and Côte d'Ivoire. With M2, there is a long-run inflation equation for all the countries except Niger and the impact of money is significant for Burkina Faso, Côte d'Ivoire, Mali, and Senegal.

The fact that the effect of money on long-run inflation increases when a broad money aggregate is used indicates that monetary policy affects inflation through the behavior of economic agents. The extent of the effect depends upon the desire of commercial banks to expand credit and upon broad money demand. Care must be taken to avoid choosing a too narrow definition of the monetary aggregate.

What Are the Determinants of Long-Run Inflation?

The conditional ECM regressions associated with the long-run relationships are given in Tables 3.2, 3.3, and 3.4. In Table 3.5, we give the values of the long-run coefficients. They are computed by dividing the elasticities of the variables expressed in level (with one lag) by the absolute value of elasticity of the lagged CPI. Table A3.1 shows the results of misspecification tests on the residuals.

In the restricted models, it is assumed that the constant and trend components of the explanatory variables are colinear; in the unrestricted

[7]We tested the null of unit root using a battery of tests, including the Augmented Dickey-Fuller (ADF); Phillips and Perron (PP); the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS); and Zivot and Andrews. To avoid a glut of tables, the unit root test results are not reported here but are available upon request from the authors. The results were contradictory: the KPSS tests usually led to accepting the null of no unit root, whereas the ADF and PP tests led to accepting the unit root hypothesis. To investigate the presence of structural breaks in the independent variable, we also used Zivot and Andrews' modification of Perron's procedure, taking potential breakpoints as endogenous. The conclusions were mixed, because the unit root hypothesis was rejected for some countries and not for others. Facing these conflicting results we cannot apply the EG methodology to test the null of no cointegration between inflation and its determinants.

Table 3.2. ECM Inflation Equations with the Monetary Base

	Burkina Faso		Côte d'Ivoire		Senegal		Togo	
	(2)	(3)	(4)	(5)	(2)	(3)	(2)	(3)
CPI_{t-1}	–0.11	–0.12	–0.47	–0.17	–0.24	–0.25	–0.59	–0.51
	(–3.14)	(–3.22)	(–4.39)	(–3.58)	(–3.07)	(–3.77)	(–7.67)	(–7.92)
$M0_{t-1}$	. . .	. . .	0.11	0.12	. . .	. . .	. . .	. . .
	. . .	. . .	(2.89)	(2.92)	. . .	. . .	. . .	. . .
$pforeign_{t-1}$	. . .	. . .	0.24	. . .	0.22	0.46	0.60	0.62
	. . .	. . .	(3.81)	. . .	(2.55)	(2.74)	(6.61)	(8.53)
s_{t-1}	0.11	0.09	–0.04	–0.05	0.11	0.46	0.17	0.15
	(3.72)	(2.95)	(–1.89)	(–2.19)	(4.51)	(2.74)	(4.32)	(4.53)
y_{t-1}	. . .	. . .	. . .	. . .	. . .	. . .	. . .	–0.17
	. . .	. . .	. . .	. . .	. . .	. . .	. . .	(–2.63)
$dm0_t$	. . .	. . .	0.08	0.11	. . .	. . .	. . .	. . .
	. . .	. . .	(1.76)	(2.25)	. . .	. . .	. . .	. . .
$dpforeign_t$	3.11	2.98	. . .	. . .	0.97	1.01	. . .	. . .
	(6.29)	(6.01)	. . .	. . .	(9.63)	(1.88)	. . .	. . .
ds_t	0.22	0.21	0.14	0.1	. . .	0.28	0.15	0.14
	(6.64)	(6.47)	(2.77)	(2.05)	. . .	(4.68)	(3.51)	(3.92)
dy_t	. . .	. . .	. . .	. . .	. . .	. . .	–0.202	. . .
	. . .	. . .	. . .	. . .	. . .	. . .	(–2.31)	. . .
$dCPI_{t-1}$	. . .	. . .	0.69	0.24	. . .	. . .	. . .	. . .
	. . .	. . .	(7.41)	(1.94)	. . .	. . .	. . .	. . .
$dpforeign_{t-1}$	. . .	–2.59	. . .	. . .	. . .	. . .	2.22	1.22
	. . .	(–5.50)	. . .	. . .	. . .	. . .	(11.79)	(4.19)
ds_{t-1}	0.06	0.07	. . .	. . .	. . .	. . .	. . .	. . .
	(1.97)	(2.21)	. . .	. . .	. . .	. . .	. . .	. . .
dy_{t-1}	. . .	. . .	. . .	. . .	. . .	. . .	. . .	–0.59
	. . .	. . .	. . .	. . .	. . .	. . .	. . .	(–2.62)
constant	. . .	–0.52	. . .	. . .	. . .	–0.99	. . .	–0.59
	. . .	(–2.80)	. . .	. . .	. . .	(–2.51)	. . .	(–2.62)
trend	. . .	0.02	. . .	0.01	. . .	. . .	. . .	. . .
	. . .	(1.80)	. . .	(2.37)	. . .	. . .	. . .	. . .
Dummies	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
1977	. . .	. . .	0.09	0.08	. . .	. . .	. . .	. . .
	. . .	. . .	(2.15)	(2.37)	. . .	. . .	. . .	. . .
1982–93	. . .	. . .	. . .	. . .	. . .	. . .	–0.16	. . .
	. . .	. . .	. . .	. . .	. . .	. . .	(–7.03)	. . .
1994	. . .	. . .	. . .	. . .	0.25	0.25	. . .	. . .
	. . .	. . .	. . .	. . .	(6.84)	(5.97)	. . .	. . .

Source: Authors' calculations.

Note: (1) model with no intercepts and no trends, (2) model with restricted intercepts and no trends, (3) model with unrestricted intercepts and no trends, (4) model with unrestricted intercepts and restricted trends, and (5) model with unrestricted intercepts and unrestricted trends. s_t = nominal exchange rate, $pforeign_t$ = foreign CPI, y_t = value added (primary sector), and $M0_t$ = monetary base. The numbers in parentheses are the *t*-ratios of the estimated coefficients. These regressions make sense for the countries for which we conclude in favor of the existence of a long-run relationship between inflation and its determinants (see Table 3.1). When there is no long-run relationship, estimating an error correction mechanism would yield spurious regressions.

Table 3.3. ECM Inflation Equations with M1

	Benin		Burkina Faso		Côte d'Ivoire		Mali	Senegal	Togo
	(5)	(4)	(5)	(4)	(3)	(2)	(1)	(1)	(1)
CPI_{t-1}	–0.36	–0.30	–0.98	–0.40	–0.25	–0.36	–0.66	–0.59	–0.27
	(–7.19)	(–7.43)	(–8.40)	(–5.16)	(–6.07)	(–3.93)	(–3.58)	(–6.75)	(–5.53)
$M1_{t-1}$	. . .	. . .	0.36	0.14	0.22	0.18	. . .	. . .	. . .
	. . .	. . .	(5.65)	(2.57)	(6.05)	(4.30)	. . .	. . .	. . .
$pforeign_{t-1}$	0.28	0.25	. . .	. . .	0.22	0.23	0.86	0.19	0.27
	(5.31)	(3.72)	. . .	. . .	(3.24)	(2.97)	(3.27)	(2.36)	(5.68)
s_{t-1}	0.05	. . .	0.21	0.11	. . .	. . .	0.09	0.28	. . .
	(1.94)	. . .	(6.39)	(2.99)	. . .	. . .	(1.79)	(7.12)	. . .
y_{t-1}	–0.44	–0.53	–1.70	–0.29	. . .	. . .	–0.25	. . .	. . .
	(–4.42)	(–3.73)	(–7.07)	(–4.68)	. . .	. . .	(–2.28)	. . .	. . .
$dm1_t$	. . .	. . .	0.08	. . .	0.13	1.86	. . .	. . .	. . .
	. . .	. . .	(2.42)	. . .	(3.50)	(3.90)	. . .	. . .	. . .
$dpforeign_t$	0.97	1.24	. . .	. . .	. . .	1.86	. . .	. . .	. . .
	(3.68)	(4.67)	. . .	. . .	. . .	(3.90)	. . .	. . .	. . .
ds_t	0.14	. . .	0.15	0.18	. . .	. . .	. . .	0.07	0.19
	(4.74)	. . .	(5.39)	(4.59)	. . .	. . .	. . .	(1.90)	(4.25)
dy_t	–0.39	–0.39	–0.74	–0.32	. . .	. . .	–0.31	. . .	. . .
	(–4.43)	(–2.97)	(–8.02)	(–3.32)	. . .	. . .	(–2.50)	. . .	. . .
$dm1_{t-1}$	. . .	. . .	–0.15	. . .	. . .	. . .	. . .	. . .	0.06
	. . .	. . .	(–3.62)	. . .	. . .	. . .	. . .	. . .	(1.85)
$dpforeign_{t-1}$	. . .	. . .	1.60	0.95	–1.32	–1.14	. . .	. . .	0.50
	. . .	. . .	(5.89)	(5.81)	(–3.44)	(–2.35)	. . .	. . .	(3.19)
ds_{t-1}	. . .	. . .	. . .	. . .	0.09	0.07	. . .	. . .	0.08
	. . .	. . .	. . .	. . .	(2.78)	(1.69)	. . .	. . .	(1.74)
dy_{t-1}	. . .	. . .	0.39	. . .	. . .	. . .	. . .	. . .	. . .
	. . .	. . .	(3.51)	. . .	. . .	. . .	. . .	. . .	. . .
constant	1.62	0.05	4.90	. . .	–0.55	. . .	. . .	. . .	. . .
	(3.22)	(3.01)	(3.51)	. . .	(–4.02)	. . .	. . .	. . .	. . .
trend	0.02	. . .	0.05	. . .	. . .	. . .	. . .	. . .	. . .
	(3.98)	. . .	(6.00)	. . .	. . .	. . .	. . .	. . .	. . .
Dummies	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
1977	–0.15	–0.13	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	(–5.73)	(–3.38)	. . .	. . .	. . .	. . .	. . .	. . .	. . .
1982–93	–0.17	–0.19	. . .	. . .	. . .	. . .	. . .	. . .	–0.11
	(–14.48)	(–8.70)	. . .	. . .	. . .	. . .	. . .	. . .	(–6.30)
1994	. . .	. . .	. . .	0.06	0.16	0.15	. . .	0.19	. . .
	. . .	. . .	. . .	(1.78)	(4.64)	(3.48)	. . .	(6.11)	. . .

Source: Authors' calculations.

Note: (1) model with no intercepts and no trends, (2) model with restricted intercepts and no trends, (3) model with unrestricted intercepts and no trends, (4) model with unrestricted intercepts and restricted trends, and (5) model with unrestricted intercepts and unrestricted trends. s_t = nominal exchange rate, $pforeign_t$ = foreign CPI, y_t = value added (primary sector), and $M1_t$ = money. The numbers in parentheses are the *t*-ratios of the estimated coefficients. These regressions make sense for the countries for which we conclude in favor of the existence of a long-run relationship between inflation and its determinants (see Table 3.1). When there is no long-run relationship, estimating an error correction mechanism would yield spurious regressions.

Table 3.4. ECM Inflation Equations with M2

	Benin		Burkina Faso		Côte d'Ivoire		Mali	Senegal	Togo
	(5)	(4)	(3)	(2)	(3)	(2)	(5)	(1)	(1)
CPI_{t-1}	–0.40	–0.41	–0.71	–0.79	–0.21	–0.20	–0.45	–0.39	–0.32
	(–6.44)	(–5.20)	(–5.09)	(–4.80)	(–5.63)	(–8.12)	(–4.15)	(–3.75)	(–6.69)
$M2_{t-1}$	. . .	. . .	0.40	0.47	0.17	0.16	0.34	0.11	. . .
	. . .	. . .	(5.20)	(5.13)	(5.16)	(9.79)	(3.61)	(2.20)	. . .
$pforeign_{t-1}$	0.30	0.42	. . .	. . .	. . .	. . .	0.22	0.22	. . .
	(4.67)	(6.93)	. . .	. . .	. . .	. . .	(3.07)	(4.04)	(6.57)
s_{t-1}	0.08	0.10	0.18	0.21	. . .	. . .	. . .	. . .	. . .
	(2.52)	(2.39)	(3.51)	(3.51)	. . .	. . .	. . .	. . .	. . .
y_{t-1}	–0.47	–0.16	–0.56	–0.64	. . .	. . .	. . .	. . .	–0.13
	(–4.11)	(–3.40)	(–3.99)	(–4.07)	. . .	. . .	. . .	. . .	(–4.35)
$dm2_t$	. . .	. . .	0.20	0.20	0.22	0.22	0.22	. . .	. . .
	. . .	. . .	(1.81)	(1.86)	(3.65)	(3.92)	(2.32)	. . .	. . .
$dpforeign_t$	1.12	1.57	1.42	1.48	. . .	. . .	. . .	. . .	. . .
	(3.44)	(4.20)	(4.18)	(3.63)	. . .	. . .	. . .	. . .	. . .
ds_t	0.11	0.13	. . .	. . .	. . .	. . .	0.23	. . .	0.13
	(3.55)	(3.71)	. . .	. . .	. . .	. . .	(3.42)	. . .	(3.12)
dy_t	–0.36	–0.17	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	(–3.50)	(–1.80)	. . .	. . .	. . .	. . .	. . .	. . .	. . .
$dCPI_{t-1}$	. . .	. . .	–0.27	–0.33	. . .	. . .	. . .	0.58	. . .
	. . .	. . .	(–2.22)	(–2.82)	. . .	. . .	. . .	. . .	. . .
$dm2_{t-1}$	. . .	. . .	–0.21	–0.25	. . .	. . .	. . .	. . .	. . .
	. . .	. . .	(–2.00)	(–2.47)	. . .	. . .	. . .	. . .	. . .
$dpforeign_{t-1}$	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.65
	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	(4.89)
ds_{t-1}	. . .	. . .	0.11	0.09	. . .	. . .	0.19	. . .	0.11
	. . .	. . .	(2.04)	(1.89)	. . .	. . .	(3.24)	. . .	(2.85)
dy_{t-1}	. . .	. . .	0.29	0.35	. . .	. . .	. . .	. . .	–0.26
	. . .	. . .	(2.31)	(3.04)	. . .	. . .	. . .	. . .	(–3.05)
constant	1.79	0.09	3.26	–0.42	–0.26	. . .	. . .	. . .	. . .
	(3.02)	(4.50)	(4.27)	(–5.35)	(–2.90)	. . .	. . .	. . .	. . .
trend	0.02	. . .	. . .	. . .	. . .	. . .	–0.03	. . .	. . .
	(3.76)	. . .	. . .	. . .	. . .	. . .	(–4.04)	. . .	. . .
Dummies	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
1977	–0.14	–0.11	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	(–4.82)	(–3.40)	. . .	. . .	. . .	. . .	. . .	. . .	. . .
1982–93	–0.17	–0.17	. . .	. . .	. . .	. . .	0.19	. . .	–0.16
	(–11.55)	(–9.10)	. . .	. . .	. . .	. . .	(3.49)	. . .	(–7.49)
1994	. . .	. . .	0.19	0.17	0.14	0.14	. . .	0.19	. . .
	. . .	. . .	(4.06)	(3.88)	(5.79)	(5.83)	. . .	(3.71)	. . .

Source: Author's calculations.

Note: (1) model with no intercepts and no trends, (2) model with restricted intercepts and no trends, (3) model with unrestricted intercepts and no trends, (4) model with unrestricted intercepts and restricted trends, and (5) model with unrestricted intercepts and unrestricted trends. s_t = nominal exchange rate, $pforeign_t$ = foreign CPI, y_t = value added (primary sector), and $M2_t$ = money and quasi-money. The numbers in parentheses are the *t*-ratios of the estimated coefficients. These regressions make sense for the countries for which we conclude in favor of the existence of a long-run relationship between inflation and its determinants (see Table 3.1). When there is no long-run relationship, estimating an error correction mechanism would yield spurious regressions.

Table 3.5. Long–Run Elasticities–Dependent Variable: Consumer Price Index (CPI)

Money Indicator		Benin	Burkina Faso		Côte d'Ivoire		Mali	Senegal		Togo	
		...	(2)	(3)	(4)	(5)	...	(2)	(3)	(2)	(3)
Monetary base	Money	...	...	...	0.23	0.69	...	...	...	...	...
	Value added (primary sector)	...	...	...	...	...	...	...	...	...	–0.35
	Nominal exchange rate	...	1.00	0.79	0.08	0.29	...	0.48	1.82	0.30	0.29
	Foreign CPI	...	...	...	0.51	...	...	0.93	1.81	1.02	1.21

		Benin		Burkina Faso		Côte d'Ivoire		Mali	Senegal	Togo
		(5)	(4)	(5)	(4)	(3)	(2)	(1)	(1)	(1)
M1	Money	...	...	0.36	0.35	0.90	0.50	...	...	...
	Value added (primary sector)	–1.22	–1.76	–1.73	–0.74	...	...	–0.38	...	...
	Nominal exchange rate	0.13	...	0.21	0.28	...	...	0.14	0.48	...
	Foreign CPI	0.77	1.20	...	...	0.88	0.64	0.33	1.02	...

		Benin		Burkina Faso		Côte d'Ivoire		Mali	Senegal	Togo
		(5)	(4)	(3)	(2)	(3)	(2)	(5)	(1)	(1)
M2	Money	...	...	0.56	0.59	0.80	0.80	0.75	0.29	...
	Value added (primary sector)	–1.17	–0.39	–0.79	–0.80	...	...	...	...	–0.39
	Nominal exchange rate	0.19	0.24	0.26	0.29	...	...	...	...	...
	Foreign CPI	0.74	1.02	...	...	...	...	0.45	0.56	1.34

Source: Authors' calculations.

Note: (1) model with no intercept and no trend, (2) model with restricted intercepts and no trends, (3) model with unrestricted intercepts and no trends, (4) model with unrestricted intercepts and restricted trends, and (5) model with unrestricted intercepts and unrestricted trends.

models, they are not. The significance of the coefficients is generally robust to the assumptions made on the deterministic components, and the long-run coefficients are quite stable when M2 is used as an indicator of money (see Table 3.5).

As the tables show, money is not the sole determinant of long-run inflation. In the WAEMU countries, it appears that long-run inflation is also the result of supply-side effects, the nominal exchange rate, and the long-term dynamics of foreign prices. In terms of magnitude, we find that the effects of a monetary expansion outweigh the impact of nominal exchange rate variations, but they can be as important as foreign price effects, though not always. In all cases, money supply has a less significant effect on long-run prices than supply-side constraints, reflected here in production in the primary sector.

Inflation is partly a monetary phenomenon. Indeed, both short- and long-run coefficients are statistically significant in the regressions for Burkina Faso, Côte d'Ivoire, Mali, and Senegal—half the countries in WAEMU. We do not find a unitary relationship between money supply and the price level, as monetarist theory would predict. A 1 percent increase in broad nominal money supply leads at most to a 0.47 percent increase in price (in Burkina Faso) and an average 0.20 percent increase in short-run inflation. This partial effect of money on long-run inflation may have several elements. In some countries, other factors are at play, as we discuss below. Another explanation is the institutional environment described above.

Pass-through effects are also significant in determining domestic prices in the long run. We find significant coefficients for the nominal exchange rate of the CFA franc against the U.S. dollar. The inflationary impact is channeled through the prices of energy and manufactured goods, which in turn affect overall consumer prices. An appreciation of the CFA franc against the dollar tends to bring long-run inflation down. It first reduces the bill for imported goods and then the appreciation leads to a loss of competitiveness, especially in exports of raw materials and primary goods. This causes a decline in activity and a fall in productivity utilization, which in turn pushes down inflation.

Foreign prices show the strongest influence in many countries; their impact is statistically significant. In the long run, 50 to 70 percent of the increase in domestic prices is explained by increases in foreign prices. We even find coefficients that are statistically near 1. The influence of French prices is not surprising because France is a major WAEMU trading partner, but other foreign prices can also affect the domestic price. Their effect is channeled to long-run prices through the nominal exchange rate.

The estimate of the total pass-through effect (by combining nominal exchange rate and foreign price variations) shows definite heterogeneity across countries. When M2 is used as the money indicator, the estimated long-run elasticities for the pass-through vary between 0.22 for Mali and Senegal and 0.52 for Benin. We find stronger effects for coastal Benin and Togo than for landlocked Mali.

The volume of production in the primary sector in some countries tends to have an effect on the long-term dynamics of the CPI. As expected, supply-side constraints have no influence in the countries that have the highest capacity to expand local production, namely Côte d'Ivoire and Senegal.

Our results can be compared to other previous studies on the determinants of inflation in the WAEMU countries. To our best knowledge, the most complete study is BCEAO (2002). Their results are based on the Engle-Granger methodology. As indicated before, this methodology yields spurious regressions when there is a suspicion that the explanatory variables are not all I(1). Despite this, we compare their long-run elasticities with ours. The authors find four variables to have a significant impact on long-run inflation:

- The money aggregate M2 has an impact on the price level in four countries—Côte d'Ivoire, Niger, Senegal, and Togo—with an average elasticity of 0.27 in WAEMU. Our estimates are higher than those of BCEAO (2002). For instance, the BCEAO finds a long-run elasticity of 0.23 for Côte d'Ivoire, whereas our regressions yield a coefficient of 0.80 for this country. Similarly, we find high significant values for Burkina Faso (0.59) and Mali (0.75), whereas the elasticities are zero in the BCEAO study. These differences may come from specification problems in their regressions, as indicated for instance by the Durbin-Watson statistics obtained for Mali and Togo (1.58 and 1.61, respectively), suggesting the presence of negative autocorrelation in the residuals).
- Production in the agriculture sector is significant in two countries only, namely Burkina Faso and Mali, with an average elasticity of –0.12 for WAEMU. Again, our elasticities are higher than the BCEAO finds. For instance, for Burkina Faso, we find a coefficient of –0.80.
- The price of oil is found to have an impact in five countries (the exceptions being Côte d'Ivoire and Senegal), but the average elasticity for WAEMU is small and equal to 0.04.
- The general level of prices in France is found to have the more significant impact in six countries, with the highest average elasticity equal to 0.47.

We compute structural inflation using the estimated long-run coefficients and the trend in the explanatory variables as obtained from a Hodrick-Prescott filter. The actual and fitted structural inflations are shown graphically when M2 is the monetary aggregate used in the regressions (see Figures 3.1–3.6). The graphs describe a downward trend for prices, which is in line with the idea that the anchor to the euro area (either through the nominal exchange rate regime or the trading relationship with France) has helped the WAEMU countries to import disinflation. The domestic prices have been close to prices prevailing in Europe, though the euro and WAEMU areas have had different long-term dynamics in terms of macroeconomic fundamentals (fiscal and external deficits, indebtedness, production capacities). This is in sharp contrast with the situation in West African countries where the currency regime is characterized by floating and nonconvertible currencies, as in Ghana and Nigeria, and where episodes of upward-trending inflation have been observed historically, as might be expected from the dynamics of their fundamentals.

Conclusion

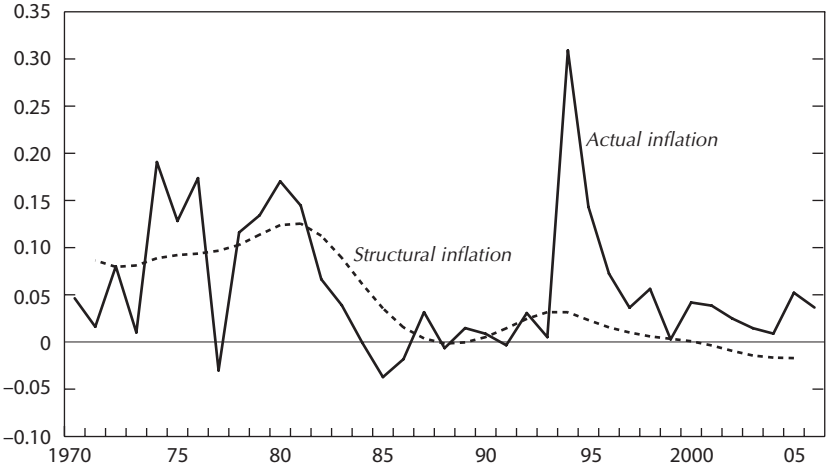
In this chapter, we provide new estimates of the determinants of long-run inflation in the WAEMU countries. The short period defined by our data call imposes a need to be very careful about the econometric methodology used. In particular, regressions based on the Engle-Granger approach may not be robust if there is uncertainty about how well integrated the explanatory variables are. For this reason, we rely on a newer time series approach, the PSS approach.

We present evidence that money is one determinant of price changes in the long run, but not the only one. There are other variables, such as pass-through effects. Even the impact of supply-side constraints is larger than that of money.

This finding has several policy implications. Not only can monetary policy be used to keep inflation under control, countries also have other instruments available. For instance, they can make their economies more competitive through deflation-adjustment policies.

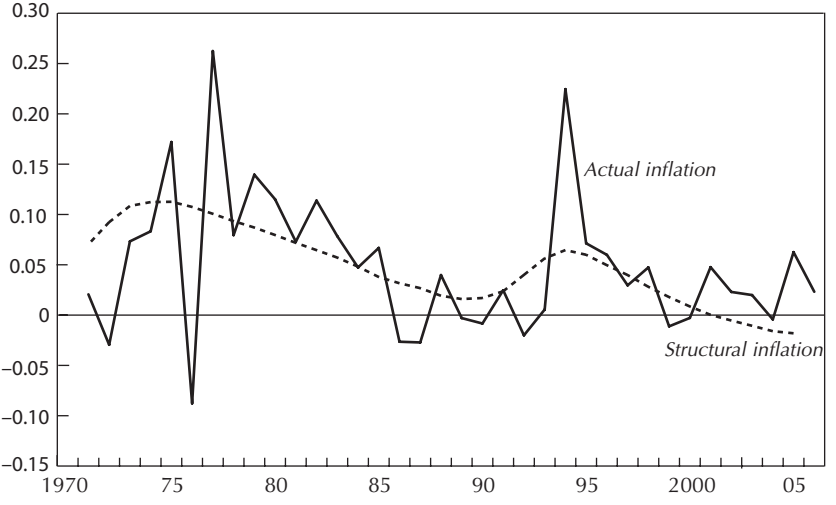
This study could be extended in at least two directions. First, it would be interesting to do a similar exercise for the ECOWAS countries for purposes of comparison. This would raise questions not addressed in this chapter, such as the possibility of nonlinear effects from the study of larger changes in how monetary aggregates affect long-run inflation.

Figure 3.1. Actual and Structural Inflation in Benin
(In percent)



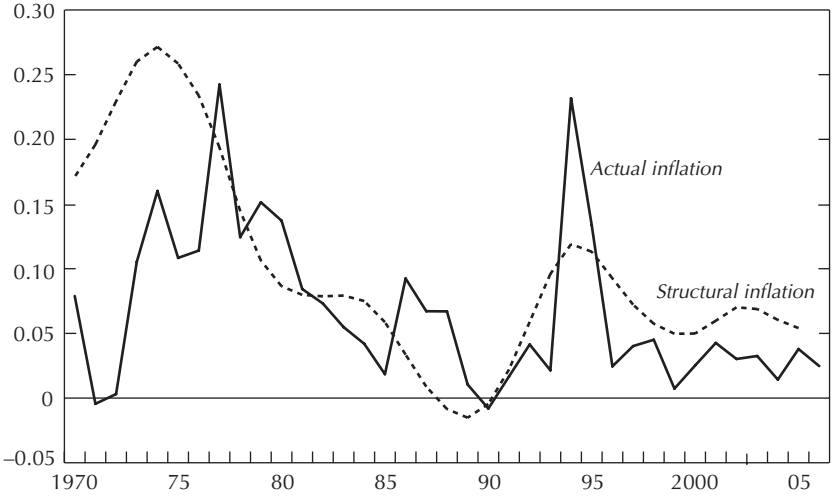
Sources: Authors' calculations; and IMF, *International Financial Statistics.*

Figure 3.2. Actual and Structural Inflation in Burkina Faso
(In percent)



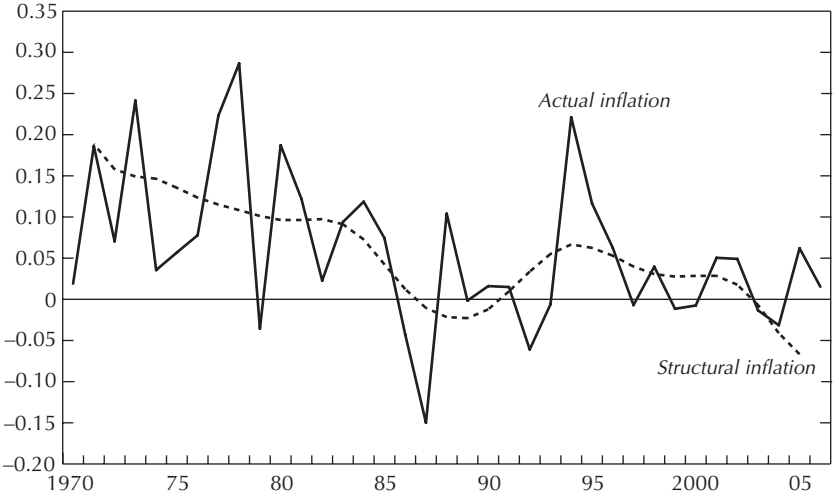
Sources: Authors' calculations; and IMF, *International Financial Statistics.*

Figure 3.3. Actual and Structural Inflation in Côte d'Ivoire
(In percent)



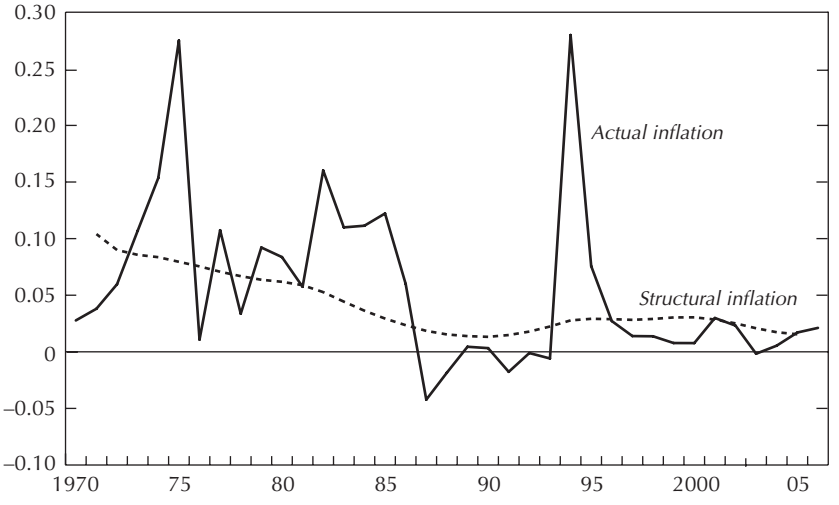
Sources: Authors' calculations; and IMF, *International Financial Statistics.*

Figure 3.4. Actual and Structural Inflation in Mali
(In percent)



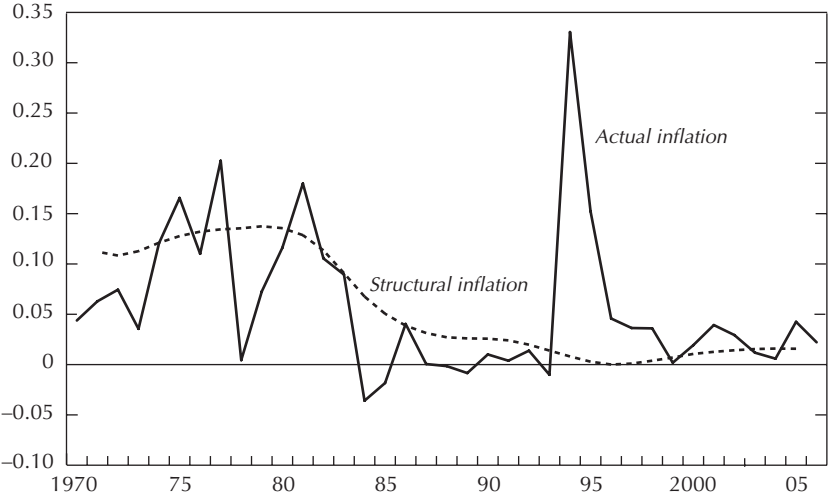
Sources: Authors' calculations; and IMF, *International Financial Statistics.*

Figure 3.5. Actual and Structural Inflation in Senegal
(In percent)



Sources: Authors' calculations; and IMF, *International Financial Statistics.*

Figure 3.6. Actual and Structural Inflation in Togo
(In percent)



Sources: Authors' calculations; and IMF, *International Financial Statistics.*

Second, it would be useful to conduct similar regressions by replacing the CPI variable with a core inflation variable. The core inflation measure recently suggested by the WAEMU Commission would not be easy to apply because obtaining historical values for core inflation is difficult, but measures of structural inflation can be obtained, for instance by using filters such as the Hodrick-Prescott filter or moving average filters.

Appendix. Models Selected Using Misspecification Tests on the Residuals

Money Indicator	Country	Maximum Lag	DW	AIC	SBC	GB(4)	JB	ARCH (4)	Trend
Monetary base	Benin	0	1.96	–3.00	–2.42	0.18 (0.94)	3.57 (0.16)	0.48 (0.74)	yes
	Burkina Faso	1	2.03	–4.35	–3.52	1.37 (0.36)	0.39 (0.82)	0.73 (0.58)	no
	Côte d'Ivoire	1	2.14	–3.96	–3.18	0.50 (0.73)	0.72 (0.69)	1.50 (0.23)	yes
	Mali	1	2.10	–3.01	–2.20	2.12 (0.15)	0.86 (0.64)	0.27 (0.89)	yes
	Niger	0	2.00	–2.74	–2.19	0.25 (0.90)	1.38 (0.50)	0.67 (0.61)	no
	Senegal	0	1.93	–4.26	–3.71	0.13 (0.96)	0.29 (0.86)	0.19 (0.94)	no
	Togo	1	1.84	–4.07	–3.30	2.20 (0.13)	1.74 (0.41)	1.41 (0.26)	no
M1	Benin	0	2.08	–4.36	–3.77	1.70 (0.19)	0.27 (0.87)	0.58 (0.67)	yes
	Burkina Faso	1	1.98	–4.62	–4.06	1.20 (0.35)	0.49 (0.78)	1.58 (0.22)	yes
	Côte d'Ivoire	1	1.96	–3.69	–3.77	0.93 (0.46)	1.30 (0.52)	1.01 (0.42)	no
	Mali	0	1.94	–2.21	–1.72	0.87 (0.49)	1.56 (0.45)	0.85 (0.50)	no
	Niger	0	1.72	–3.19	–2.83	0.38 (0.81)	2.42 (0.29)	0.42 (0.79)	no
	Senegal	0	1.80	–2.89	–2.63	0.69 (0.60)	1.22 (0.76)	0.10 (0.17)	no
	Togo	1	1.91	–3.61	–3.29	0.92 (0.47)	1.22 (0.54)	1.79 (0.16)	no

Appendix *(concluded)*

Money Indicator	Country	Maximum Lag	DW	AIC	SBC	GB(4)	JB	ARCH (4)	Trend
M2	Benin	0	2.03	–4.28	–3.73	1.04 (0.41)	1.17 (0.55)	0.39 (0.81)	yes
	Burkina Faso	1	1.62	–3.46	–2.92	0.67 (0.62)	3.23 (0.19)	0.60 (0.66)	no
	Côte d'Ivoire	0	2.11	–3.80	–3.48	0.24 (0.91)	1.48 (0.47)	0.35 (0.84)	no
	Mali	1	2.11	–2.66	–2.26	1.30 (0.30)	0.91 (0.64)	0.66 (0.62)	yes
	Niger	0	1.83	–3.07	–2.58	0.73 (0.91)	0.43 (0.80)	0.96 (0.44)	no
	Senegal	1	1.90	–3.38	–2.98	0.26 (0.90)	0.94 (0.62)	0.64 (0.64)	no
	Togo	1	2.02	–3.69	–3.30	1.51 (0.23)	2.33 (0.32)	1.78 (0.16)	no

Note: DW = Durbin-Watson, AIC = Akaike, SBC = Schwarz, GB = Godfrey-Breusch, and JB = Jarque-Bera.

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4

Fiscal Reaction Functions in the CFA Franc Zone

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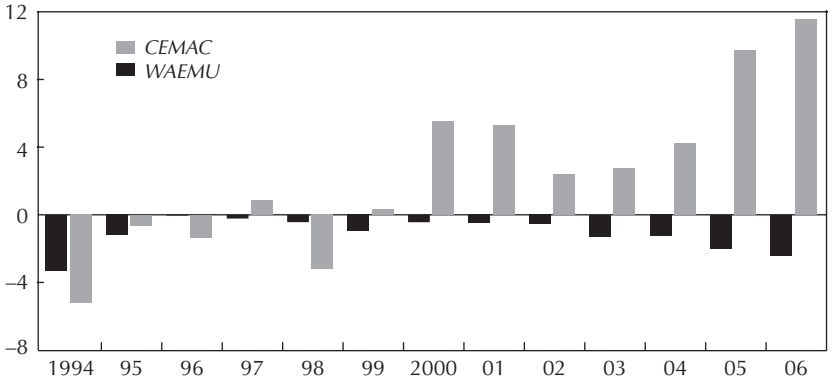
The two monetary unions in the CFA franc zone conduct their national economic policies within the framework of macroeconomic convergence criteria. The CFA franc zone includes WAEMU and CEMAC member countries. We attempt to establish the main factors responsible for fiscal performance in these two unions and use this as a basis to assess the appropriateness of the fiscal indicator being used to assess fiscal performance (basic fiscal balance).[1]

An understanding of the determinants of fiscal performance is critical for fiscal policy design and implementation. First, a quantitative assessment of fiscal performance could help establish factors driving fiscal performance in relation to primary convergence criteria (Figure 4.1 and Table 4.1). Second, while the regional convergence pact reinforces the framework for fiscal discipline, a question arises as to whether it might also constrain the scope for countercyclical fiscal policy, given the limited roles of monetary policy for dealing with asymmetric shocks (Box 4.1). In this regard, adjusting the basic balance in both WAEMU and CEMAC for exogenous factors, such as the terms of trade, could prove useful in the development of supplementary indicators to the main convergence criteria. Finally, regional integration is gaining popularity in Africa with greater emphasis on monetary union. For countries interested in monetary unions, it would be important to establish

[1]Basic balance is defined as revenue (excluding grants) minus expenditure (excluding foreign-financed capital expenditure).

Figure 4.1. Comparison of the Basic Fiscal Balance in CEMAC and WAEMU
(In percent of GDP)



Source: IMF staff calculations.

fiscal policy lessons from the existing ones, especially the design of the fiscal framework underpinning the monetary framework.

The chapter examines fiscal reaction functions for the CFA franc zone during 1990–2006 using the system of generalized method of moments (GMM) estimator that is more efficient in addressing misspecification issues. This chapter adopts a fiscal indicator that reflects the fiscal effort of the countries under investigation.[2] It extends the analysis of Clément and others (1996), which evaluated the impact of the 1994 CFA franc devaluation on economic performance by extending the period under review.[3] It also builds on the initial attempts by Doré and Masson (2002) to explore the role of output and terms of trade on fiscal performance.

The chapter finds the following results: (1) the stance of fiscal policy in CEMAC and WAEMU is strongly influenced by fiscal efforts in the previous period; (2) the stock of debt matters in that the coefficient on lagged debt to GDP in both zones were positive and comparable in magnitude; (3) per capita GDP, a proxy for the tax base, was estimated to impact positively on the fiscal stance in both zones; (4) the impact of terms of trade shocks on basic primary fiscal balance was significant and positive in CEMAC but

[2]The measure of fiscal stance takes into consideration the fact that the countries being considered receive a significant amount of aid, thus interest payments were taken out of basic balance to arrive at basic primary fiscal balance.

[3]The CFA franc was devalued by 50 percent in 1994. See Chapter 1 for more details.

Table 4.1. CEMAC and WAEMU: Compliance with Selected Fiscal Convergence Criteria[1]

(In percent of GDP, unless otherwise indicated)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006 Est.
CEMAC													
Basic fiscal balance (criterion: nonnegative)[2]													
Cameroon	–7.5	–2.3	–3.8	–2.6	–2.4	–1.0	2.0	3.3	0.8	1.1	0.0	3.4	3.2
Central African Republic	–5.8	–2.3	–3.1	–1.9	–0.7	–1.8	–1.9	–1.0	–0.5	–3.3	–3.9	–4.5	0.4
Chad	–5.3	–2.8	–1.4	–1.0	–0.4	–2.0	–3.1	–2.4	–3.2	–3.4	–0.2	1.1	2.5
Congo, Republic of	–12.4	–7.1	–6.9	–6.1	–15.9	–0.6	7.1	8.9	–0.8	5.2	9.2	20.6	32.6
Equatorial Guinea	–2.7	–5.0	–5.0	2.9	–0.5	4.1	9.5	15.5	11.5	–1.7	9.9	22.3	15.7
Gabon	1.8	6.5	6.0	11.0	–1.3	4.3	13.9	7.7	6.8	10.8	11.0	12.5	15.1
Number of countries violating	5	5	5	4	6	4	2	2	3	3	2	1	0
Total debt/GDP (≤ 70 percent)													
Cameroon	145.6	90.3	85.4	86.9	81.1	83.3	80.4	73.2	50.1	47.1	44.2	36.4	3.1
Central African Republic	94.8	77.5	89.9	93.1	83.9	82.4	80.3	93.9	91.4	93.9	93.6	92.4	82.3
Chad	62.3	57.4	54.3	60.1	54.2	62.3	72.3	57.5	57.2	50.3	35.0	27.0	23.7
Congo, Republic of	270.2	262.8	212.2	220.0	264.4	231.6	164.9	192.8	200.9	215.6	229.6	98.7	82.5
Equatorial Guinea	218.1	140.1	92.9	46.7	59.7	61.1	36.3	24.8	10.2	10.1	6.2	3.6	2.7
Gabon	86.4	79.2	71.1	71.3	84.9	79.7	57.0	64.2	65.6	59.0	40.1	29.5	34.2
Number of countries violating	5	5	5	4	4	4	4	3	2	2	2	2	2
WAEMU													
Basic fiscal balance (criterion: nonnegative)[2]													
Benin	–0.9	–0.7	1.3	1.5	3.3	2.7	1.9	0.4	0.1	–0.3	–0.4	–1.6	0.1
Burkina Faso	–2.7	–0.6	0.6	0.1	–0.5	–0.6	–1.4	–2.5	–3.7	–2.9	–3.1	–3.5	–4.3
Côte d'Ivoire	–3.0	–2.1	–0.4	–0.8	–0.8	–1.7	–0.3	1.1	–0.4	–2.4	–1.3	–1.6	–2
Guinea–Bissau	–7.9	–0.1	–4.3	–0.3	–16.4	–9.3	–16.8	–13.1	–9.0	–10.6	–13.7	–24.6	–15.9
Mali	–3.1	–1.1	0.8	–0.5	0.2	–0.9	–0.6	–1.7	–1.3	–0.2	–0.7	–1.3	–0.6
Niger	–7.0	–3.7	–1.7	–3.0	–3.3	–4.8	–3.0	–3.4	–1.8	–2.0	–2.2	–1.5	–1.8
Senegal	–2.3	0.1	1.5	2.0	0.9	0.9	1.2	–1.4	1.8	0.5	–0.7	–1.2	–3.5
Togo	–8.3	–4.0	–3.6	–1.5	–3.0	–1.4	–2.7	1.5	0.3	2.6	1.4	–1.5	–2.7
WAEMU	–3.7	–1.6	–0.2	–0.3	–0.7	–1.1	–0.8	–0.8	–0.7	–1.1	–1.3	–2.0	–2.4
Number of countries violating	8	7	4	5	5	6	6	5	5	6	7	8	7

Table 4.1 ***(concluded)***

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006 Est.
Total debt/GDP (≤70 percent)													
Benin	82.0	65.7	65.7	69.9	65.8	66.2	71.8	71.9	66.6	54.5	49.8	47.8	22.1
Burkina Faso	51.6	45.4	44.6	49.5	46.4	52.0	63.0	48.9	51.4	41.7	34.8	33.1	8.9
Côte d'Ivoire	176.1	146.1	133.2	120.5	84.9	88.8	108.0	106.0	88.9	90.2	88.7	75.3	177.4
Guinea-Bissau	378.2	10.4	326.1	321.7	449.0	352.4	353.8	390.4	419.4	387.9	379.4	332.8	326.2
Mali	116.4	97.0	101.3	108.9	100.3	98.6	99.5	88.7	90.2	63.8	66.9	63.7	27.7
Niger	101.9	84.6	76.6	85.5	77.9	79.5	94.5	91.7	81.0	68.3	55.6	49.5	14.6
Senegal	84.1	79.4	80.4	79.3	85.2	74.8	76.2	74.3	82.2	72.4	67.3	59.9	44.9
Togo	121.1	93.9	85.6	73.8	79.7	73.3	98.2	94.4	93.9	89.7	79.6	73.0	67.8
WAEMU	122.0	97.7	97.7	95.1	83.2	81.8	93.4	88.6	83.9	74.3	69.6	62.2	70.2
Number of countries violating	7	5	6	6	6	6	7	7	6	4	3	3	2

Sources: IMF, World Economic Outlook database, July 2004; and IMF staff estimates and projections.
[1]Revised set of criteria as valid from 2002 onward.
[2]Overall budget balance, excluding grants and foreign-financed investment.

Box 4.1. Institutional Arrangements

WAEMU and CEMAC use a combination of monetary and fiscal rules to influence policy design and to anchor expectations of government's commitment to fiscal discipline.

Convertibility

The French Treasury guarantees convertibility of the currency and participates in the executive boards of the two regional central banks. As a counterpart to the guarantee, each central bank is obliged to maintain 65 percent of its official reserves in the operations account. However, recently this has been reduced to 50 percent for WAEMU and will be gradually phased in over three years in CEMAC.

Financing

To prevent excessive recourse to central bank financing of budget deficits, both central banks have incorporated two monetary rules in their respective agreements. Both central banks restrict outstanding credit to governments up to 20 percent of fiscal revenues of the previous year. The second rule states that gross foreign assets for each central bank must be maintained at more than 20 percent of sight liabilities.

Convergence criteria

In 1999, WAEMU members adopted a regional "Pact of Convergence, Stability, Growth, and Solidarity," establishing a set of convergence indicators that emphasize constraints on public deficit and public debt sustainability. These convergence criteria are as follows:[1]

Primary criteria

- The ratio of the basic fiscal balance to nominal GDP must be in balance or in surplus;
- The ratio of outstanding domestic and foreign debt to nominal GDP must not exceed 70 percent;
- Average annual inflation rate should not exceed 3 percent a year; and
- There should be no accumulation of domestic and external arrears.

Secondary criteria

- The ratio of the wage bill to tax revenue cannot exceed 35 percent;
- The ratio of domestically financed public investment to tax revenue must be at least 20 percent;
- The ratio of external current account deficit, excluding grants to GDP, cannot exceed 5 percent; and
- The tax-to-GDP ratio must be greater than or equal to 17 percent.

[1]CEMAC has adopted the primary criteria, whereas WAEMU has adopted both the primary and secondary criteria.

negative in WAEMU; and (5) openness was favorable to fiscal performance despite dependence on primary commodities. Because fiscal performance seems to be strongly affected by both real GDP growth and terms of trade fluctuations, there appears to be a need to develop supplementary fiscal-related criteria that take into account the influence of output and the terms of trade. Given the role of oil in CEMAC member countries, the non-oil primary balance may be a more appropriate measure of fiscal performance.

The next section presents a short review of the literature on the macroeconomic and institutional determinants of fiscal performance, followed by an overview of compliance with fiscal convergence criteria and the econometric methodology. The empirical results and conclusions and their policy implications are presented in the final section.

Literature Review of the Determinants of Fiscal Performance

Economic activity has been established in the literature as one of the principal determinants of primary balance. In view of the established consensus on the efficacy of fiscal policy for macroeconomic stability, the optimal policy stance would not be expected to be procyclical, because such a fiscal framework tends to exacerbate economic and market volatility. However, a number of studies have found that for developing countries, fiscal policy is procyclical (Talvi and Végh, 2002; Lane, 2003; Akitoby and others, 2004; and Kaminsky, Reinhart, and Végh, 2004). Procyclical fiscal policy has been found to be rooted in political-economy considerations, institutional constraints, and limited access to international financial markets.

The impact of changes in the terms of trade on fiscal performance is ambiguous. A terms of trade improvement tends to positively affect capital-intensive sectors of the economy and increase fiscal revenues. On the other hand, it might hurt labor-intensive industries and lead to higher social spending, for example, unemployment benefits. Although much of the literature has focused on the relationship between the terms of trade and economic growth (Ramey and Ramey, 1995; Martin and Rogers, 2000; Fatás, 2002; and Hnatkovska and Loayza, 2005), few have analyzed its impact on fiscal performance.

The existing stock of debt has been used as one primary determinant of fiscal performance. A government may choose to borrow and accumulate debt to fund spending that contributes to improving physical infrastructure, with positive impact on the rate of return on private capital, and higher

spending on education or health care may enhance a nation's human capital. However, there are a number of potential risks associated with high public debt including adverse impact on economic performance, debt crises, and the resulting economic adjustment. In view of this, the connection between current policy actions and long-run solvency lies in the assumption that the primary balance systematically responds to past changes in the public debt. Bohn (1998) argues that debt is sustainable if primary surpluses are a strict positive function of the debt-to-income ratio. Along the lines of Bohn, IMF (2003) estimated fiscal policy reaction functions for emerging and industrial economies, with debt as an explanatory variable. A key finding is that primary surpluses respond to increasing debt levels and this response is stronger at high debt levels for industrial economies, whereas for emerging economies there is less response to an increasing debt ratio.

Trade openness can also affect fiscal performance through a number of channels. Openness could be favorable to growth through its impact on total factor productivity (TFP), thereby enhancing revenue performance as it tends to facilitate specialization in export products resulting in a more efficient allocation of resources. However, openness could increase a country's exposure to and vulnerabilities to external shocks, with an adverse impact on revenue. According to Savvides (1998), trade openness can increase income inequalities and increase the demand for public goods, with an adverse impact on fiscal performance. Combes and Saadi-Sedik (2006) indicate that in oil- and mineral-producing countries that tend to be more open, the existence of rent-seeking behavior and corruption could possibly have an adverse impact on fiscal performance.

Compliance with Fiscal Convergence Criteria

Progress in compliance with basic fiscal balance, one of the main primary criterion, has been stronger in CEMAC compared with WAEMU, reflecting in large part the current oil boom.

- The basic fiscal balance in WAEMU improved substantially after the devaluation, achieving balance in 1996. During the period 1995–99, WAEMU countries' real revenues grew faster than expenditures. However, since 2000 there has been an uptick in the rate of real spending that has outpaced the growth in revenues, and as a consequence, the basic fiscal balance has deteriorated to a deficit of 2 percent of GDP by end-2005. In 2000, six countries violated this criterion, but by 2005 all eight members were in noncompliance (see Table 4.1).

- In CEMAC, the basic fiscal balance (with the exception of 1995, 1996, and 1998) has been positive, averaging 3 percent of GDP since devaluation, and reaching a record 11.5 percent of GDP at end-2006 (see Figure 4.1). In 2000, with the onset of the current oil boom, only the Central African Republic and Chad, the non-oil producers, were in violation of the basic fiscal balance rule (see Table 4.1). By end-2005, after the emergence of Chad as an oil producer, the Central African Republic was the sole violator of the basic fiscal balance rule.

Econometric Framework

Model Specification

Along the lines of Bohn (1998) and IMF (2003), the following equation was estimated:

$$y_{it} = \sum_{j=1}^{k} \alpha_j x_{it}^j + \rho b_{it-1} + \mu_{it}\,, \tag{4.1}$$

where y represents the basic primary fiscal balance as a ratio of GDP; X_{it}=jth explanatory variable, j=1,. . .K, a vector of macroeconomic variables explaining changes in the fiscal indicator of interest; α_j are the parameters to be estimated; b_{it-1} represents the debt-to-GDP ratio lagged by one period; $\mu_{it}=\alpha_i+\varepsilon_{it}$,$\alpha$=country-specific effects (country-specific intercept) accounting for heterogeneity in the group of countries under consideration; ε=error term; i=1. . .N (country index); and t=1. . .T (time index).

To address endogeneity between the the basic primary fiscal balance and some of the explanatory variables, especially growth and correlation between the lagged dependent variable and the error term, we use the GMM estimator. In particular, we use the system GMM estimator that is more efficient in addressing misspecification issues than are the difference estimators of Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) by combining them into one system—regressions in first difference and in levels.

The main independent variables are as follows:

- *The lagged dependent variable* to ascertain the degree of persistence.
- *Debt-to-GDP ratio.* This variable is introduced to capture the response of fiscal stance to debt. Because the CFA franc zone limits the debt-to-GDP ratio for its members, it would be important to establish the extent to which either the basic primary fiscal balance has been responding to the level of public debt.

- *Terms of trade*. Based on a review of the literature, the impact of changes in the terms of trade and levels of the terms of trade on fiscal performance were explored. The main advantage of using the terms of trade is that it can be considered to be exogenous, because members of WAEMU and CEMAC are price takers in export markets for primary commodities and their imports are mostly manufacturing goods produced by industrial countries.
- *Output*. Different measures of output, real GDP growth, and per capita GDP are considered.
- *Openness*. Defined as the ratio of exports of goods and services plus imports of goods and services to GDP.

Data

Data on revenues, expenditures, debt, GDP, and terms of trade were sourced from the IMF's World Economic Outlook (WEO) database and cover the period 1990–2006. Disaggregated data on revenues and expenditures were used to derive the basic primary fiscal balance defined as total revenues less grants minus total expenditures less interest outlays and foreign-financed capital.

Analysis of Results

Regarding the choice of estimator, consistency hinges on the validity of the explanatory variables as instruments. Based on the Sargan test, we do not reject the overall validity of the instruments; however, the high *p-value* suggests some degree of overfitting. The second specification test pertains to serial correlation of the residuals in that the null hypothesis of no first-order serial correlation of the differenced residuals was rejected, whereas the null of no second-order serial correlation of the differenced residuals was not rejected. This suggests the orthoganality conditions hold.

The coefficient of the lagged basic primary fiscal balance was positive and significant in the fiscal reaction functions for both CEMAC and WAEMU and suggesting a high degree of persistence of the basic primary fiscal balance implying that the current fiscal performance is strongly determined by that of the previous year (Table 4.2). In the face of supply or demand shocks, fiscal adjustment is not immediate and in the absence of automatic stabilizers, the reaction of the fiscal authorities is likely to be procyclical. The

Table 4.2. Explaining the Basic Primary Fiscal Balance

	CEMAC	CEMAC	WAEMU
Intercept	–0.28 (–6.87)***	–0.20 (–3.49)***	5.50 (0.48)
Basic primary balance (*t*–1)	0.60 (23.78)***	0.68 (10.71)***	0.62 (14.26)***
Debt/GDP (*t*–1)	0.03 (10.0)***	0.03 (4.93)***	0.01 (2.35)**
Per capita GDP	0.02 (3.55)***		
Real GDP growth		–0.28 (–3.06)***	0.13 (2.01)**
Level terms of trade	0.09 (5.22)***	0.1 (3.57)***	
Terms of trade growth			0.01 (0.53)
Openness	0.06 (0.65)	0.02 (4.54)***	0.02 (2.08)**
Year 1992	–0.05 (–5.43)***	–0.06 (–4.00)***	
Year 1994	–0.06 (–1.74)*	–0.08 (–1.67)*	
Year 1998		–0.05 (–1.70)*	
Year 2001		–0.02 (–1.77)*	
Year 2002	–0.03 (–1.70)*	–0.04 (–1.99)**	
Number of observations	96	96	112
Sargan test: *p*-value	0.99	0.99	0.96
AR(1) test: *p*-value	0.04	0.03	0.06
AR(2) test: *p*-value	0.27	0.23	0.60

Note: The basic primary fiscal balance is defined as revenues excluding grants minus total expenditures excluding interest payments and foreign-financed capital spending. *t*-statistics are in parentheses. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. The coefficient on the lagged dependent variable for CEMAC and WAEMU lies within the range for OLS and Fixed Effects estimators.

coefficient for CEMAC fell within the range for β_{OLS} 0.76 and $\beta_{fixed\ effect}$ 0.49 and for WAEMU β_{OLS} 0.70 and $\beta_{fixed\ effect}$ 0.56.

We find a positive relationship between basic primary fiscal balance and debt. The coefficient on lagged debt to GDP in both zones were comparable in magnitude suggesting that for a 10 percent increase in

the debt stock, the basic primary fiscal balance has to improve between 1 percent and 3 percent. The size of the estimated coefficient was at the lower bound of that estimated by Abiad and Baig (2005) for emerging markets and may reflect the highly concessional nature of the debt contracted by these low-income developing countries. In addition, CFA franc zone members have received debt relief over the period under investigation, thus creating fiscal space.

Different measures of the level of economic activity point to a significant impact of economic performance on fiscal performance. In CEMAC and WAEMU, per capita GDP (which proxies for the tax base) was positive, significant, and comparable in magnitude. However, the coefficient of real GDP growth was negative in CEMAC but positive in WAEMU, despite comparable average growth over the period. This may suggest that in CEMAC there has been a higher response of public expenditure to growth.

In CEMAC, the estimated coefficient of the level of the terms of trade was positive and significant, suggesting an improvement in the basic primary fiscal balance. Given the role of oil in CEMAC member countries, and the positive and significant impact of the terms of trade on fiscal performance, the non-oil primary balance may be an appropriate measure of fiscal performance. In contrast, the estimated coefficient in the WAEMU equation, although significant, was negative as the terms of trade deteriorated notably since 2000. The estimated coefficient in the CEMAC equation was larger relative to that in WAEMU, perhaps reflecting the significant role of oil in CEMAC economies.

The coefficient on openness was positive in both WAEMU and CEMAC equations, suggesting that it has been more favorable to growth through its impact on TFP, thereby enhancing fiscal performance.

Conclusions and Policy Implications

In both CEMAC and WAEMU, fiscal performance in the previous period had a large and significant impact on fiscal outcomes in a given year. This suggests a strong degree of persistence, which could give rise to procyclical fiscal policy when these economies face adverse terms of trade shocks. In addition, the coefficient on the lagged debt-to-GDP ratio in both zones was positive, comparable in magnitude, and consistent with the theory that higher levels of debt warrant greater fiscal effort. There was econometric evidence that the terms of trade significantly impacted the basic primary fiscal balance in both monetary unions. The impact on fis-

cal performance was larger in CEMAC countries. The impact of openness on fiscal performance was positive in both monetary unions despite being vulnerable to external shocks.

In light of the observed econometric results, there seems to be merit to evaluate fiscal-related convergence rules in light of vulnerabilities to external shocks. Given data challenges, and difficulties in constructing measures of the output gap in developing countries, the development of supplementary convergence criteria should be indicative. Assessment of fiscal performance based on adjusted balances could be overtaken by debates on statistics and methodologies rather than on required policy measures.

In light of the response of fiscal performance to terms of trade shock, the rules should be sufficiently flexible to permit fiscal accommodation of short-term developments. Because fiscal performance seems to be strongly affected by both real GDP growth and terms of trade fluctuations, there appears to be a need to develop supplementary fiscal-related criteria that take into account the influence of output and the terms of trade. Given the role of oil in CEMAC member countries, the non-oil primary balance may be a more appropriate measure of fiscal performance. This is essential, because the degree of dependence on primary commodities would have an impact on the volatility of tax revenues, warranting fiscal prudence in the face of positive shocks by saving part of the windfall in order to smooth spending during an economic downturn. Given the role of oil in CEMAC countries, the basic fiscal balance might not be the appropriate indicator of the fiscal stance because these countries have met this convergence criterion since the advent of the most recent oil boom in 2000. The results on the response of primary balance to debt is suggestive of the need to reconsider the debt limits, in light of considerable debt forgiveness that has taken place in more recent times.

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5

Reserve Adequacy in the CFA Franc Zone

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This chapter discusses the level and adequacy of international reserves in the CFA franc zone. Reserves can be defined as foreign currency assets that are readily available to the monetary authorities for the financing of external payment imbalances.[1] Although reserves are maintained for several reasons, a key function is to act as a buffer, absorbing balance of payments shocks in case access to borrowing is limited or costly, and exchange rate adjustment is not used for ensuring adjustment. Accordingly, reserve adequacy is of particular importance in the case of fixed exchange rates. Reserves also help provide confidence in the authorities' commitment to support the value of the currency. Standard measures of reserve adequacy reflect these functions.

In the case of the CFA franc zone, the convertibility guarantee provided by the French Treasury affects both the nature and the adequacy of foreign exchange reserves. Reserves are largely maintained in the operations account of the central banks of the CFA franc zone at the French Treasury, which serves both to centralize international reserves and, in case of reserve shortfalls, to provide a line of—in principle, unlimited—credit.

The chapter first presents a brief description of the rules regarding the maintenance of international reserves in CEMAC and WAEMU, followed by general considerations regarding reserve adequacy. It then reviews the

[1]As defined in the 1993 IMF *Balance of Payments Manual.*

evolution of reserves since 1994, and assesses reserve adequacy, using standard measures and comparator data. Next, it discusses the costs of holding reserves, explores the sources of reserve accummulation, and considers the specific implications for reserves in CEMAC of its intention to save oil-related inflows for future generations. A reflection on the wider importance of the convertibility guarantee concludes the chapter.

Operating Rules

At the core of the CFA franc zone are four key principles: (1) the fixed parity between the CFA franc and the euro, (2) the guarantee of convertibility of the CFA franc into euro by the French Treasury, (3) the free movement of financial flows within each zone, and (4) the pooling of exchange reserves of each regional monetary area. The convertibility guarantee is made operational through each central bank's operations account with the French Treasury, which can have a positive or negative balance. Therefore this guarantee amounts in principle to an unlimited overdraft facility.

A number of operating rules are embedded in the statutes of the BEAC and the BCEAO, as well as in the operations account conventions both central banks have signed with the French Treasury that help support these principles, by preventing and/or limiting the occurrence of drawings on the overdraft facility:

- Both central banks are required to maintain a large share of their foreign assets in the operations account with the French Treasury, thus centralizing much or most of the reserves. Following revisions to the respective operations account conventions with France, this requirement was reduced from a 65 percent floor to a ceiling of 50 percent of total foreign assets, which became effective in September 2005 in the case of the BCEAO, and which will take effect in July 2009 for the BEAC, with a first reduction to 60 percent as of July 2007.
- Both central banks are expected to maintain a level of net foreign assets equivalent to at least 20 percent of sight liabilities. If this requirement is missed for three consecutive months, a central bank board meeting is convened to adopt appropriate remedial measures.
- The provision of credit to the governments of the member countries is limited to 20 percent of tax revenues of the country concerned in the previous year. However, this practice has been discontinued in WAEMU since 2002, when BCEAO advances were replaced by treasury bills.

- Both central banks have specified procedures for addressing shortfalls in reserves, including the transfer of other public reserve assets held outside the central banks.[2] BEAC regulations also stipulate that, if reserve coverage declines below 20 percent of sight liabilities or if the overall operations account is overdrawn for three consecutive months, the scope for refinancing is reduced.[3]

In addition, formal and informal limits on capital mobility limit the scope for capital outflows, which could otherwise represent a potentially serious source of external vulnerability. Indeed, even vis-à-vis France, the anchor country, capital transactions of WAEMU and CEMAC are subject to authorization requirements and other controls.[4]

Considerations Regarding the Appropriate Level of Reserves

Measures of reserve adequacy typically relate the level of reserves to the potential for balance of payments imbalances.[5] The standard benchmark levels of reserve adequacy for low-income countries have been developed for countries with managed exchange rates or one-sided pegs.

- The most common measure considers the level of imports of goods and nonfactor services—with a common rule of thumb requiring available reserves equivalent to at least three months of imports. This measure scales reserves in terms of the size and openness of the economy. It also indicates the period during which the import level could be sustained in case all other inflows and outflows ceased.
- Related measures compare reserves with net imports rather than gross imports or with the current account balance—indicating how long the country could go without foreign financing—or with the variability in exports or the current account balance.

[2]In particular, the BCEAO, the BEAC, and all other public institutions of CEMAC and WAEMU member countries should transfer their foreign assets (cede them for CFA francs) when the funds available in the operations account are projected to become insufficient. See BEAC Statutes, Article 11, and BCEAO Statutes, Article 18.

[3]See BEAC Statutes, Article 11.

[4]For CEMAC, see IMF (2006). The analysis in this report of capital restrictions broadly holds for WAEMU as well.

[5]See Flood and Marion (2002) for an overview, focused on countries with access to capital markets.

- Additional indicators include the ratio of reserves to broad money, as a measure of the potential for capital flight by residents. The coverage of reserves in terms of reserve money indicates the degree to which the central bank can back its liabilities, which would support its credibility under a fixed exchange rate arrangement.
- For countries with extensive private sector capital flows, the most useful measure may be reserves in terms of short-term external debt on a remaining maturity basis, given the possible serious liquidity implications of rollover problems. This measure, however, is less relevant to the CFA franc zone, given the predominance of official medium- and long-term debt. Indeed, capital controls help prevent large capital outflows, and there is little international capital market access.

Because the credit line provided by the French Treasury is in principle unlimited, judging reserve adequacy in the CFA franc zone is relatively complicated. The unique setup of the CFA franc zone requires a careful evaluation of the usefulness of reserve adequacy standards. Although contingent credit lines are not considered part of reserves, they can perform the same function.[6] Indeed, in theory, given an unlimited and fully credible convertibility guarantee, the optimal level of reserves could even be argued to be zero.

However, the 1994 experience shows that the convertibility guarantee does not rule out exchange rate adjustment. The 1994 devaluation successfully addressed a fundamental external disequilibrium that would have been hard and painful to resolve through the alternative of a sustained deflationary adjustment. But even for less severe misalignments, support provided under the guarantee should be considered as no more than a temporary relief measure. After all, structural balance of payments deficits eventually always require some form of macroeconomic adjustment, because no financing source can provide indefinite support. Nonetheless, an adequate combination of reserves and/or credit lines can effectively limit the risk of forced parity adjustments. Other adjustment policies could be effective provided that sufficient time is available for these actions to take effect. A further consideration on the degree to which the convertibility guarantee can help buy time for this purpose is that, since 1998, France is subject to limits on its deficit and thus could not inject unlimited amounts of liquidity without further consequences, and the Economic and Financial Affairs Council of the European Union (ECOFIN) has to be consulted on any change of the parity.

[6]If credit lines are truly usable, they can be used to augment the reserve level in deriving reserve indicators.

Against this background, the standard considerations regarding the assessment of reserve adequacy remain useful. First, they can signal the likelihood that the central banks of the CFA regions may need to draw on the operations account. Under the current arrangement, avoiding a need to draw on the credit facility has been a key objective. Therefore, this first consideration implies a clear operational function for indicators of reserve adequacy as a policy guide. Second, these measures could be related to the perception of devaluation risks by private sector agents, and thereby to the possibility of capital flight. Finally, indicators of reserve adequacy are indicative of the degree to which the franc zone could be maintained as a one-sided exchange rate peg—without the support of the French Treasury.

Developments in Foreign Reserves Since the 1994 Devaluation

In both regions, gross international reserves have grown strongly since 1995 (Table 5.1).[7] CEMAC reserves have grown especially rapidly since 2003, as oil-related balance of payments inflows have accelerated. Although WAEMU gross reserves used to be significantly higher, they have leveled off since end-2002. At the same time, net reserves in WAEMU kept growing through 2006, with the difference reflecting sharply declining external liabilities of the BCEAO to the IMF.[8]

The import coverage of reserves has, on balance, increased significantly in both regions over the past decade—to about 4.5 months of imports or more. In CEMAC, foreign reserves covered 5.5 months of the following year's (projected) imports of goods and services at end-2006, compared with 0.8 month in 1995 (Figure 5.1).[9] In WAEMU, foreign

[7]This paper does not evaluate developments at the level of the individual member countries. Reserve coverage varies widely across member countries.

[8]In January 2006, WAEMU's net reserves were boosted by the elimination of liabilities to the IMF in the context of the Multilateral Debt Relief Initiative (MDRI). This relief amounted to $455 million (about CFAF 250 billion) and related to earlier IMF lending to Burkina Faso, Mali, Niger, and Senegal. In addition, Cameroon qualified in May 2006, reducing BEAC liabilities to the IMF by $255 million (about CFAF 130 billion).

[9]In CEMAC, the high levels of foreign direct investment (FDI) associated with oil exploration also generate related high imports of goods and services, thus partly explaining the relatively low level of import coverage of reserves. Given the volatility of such FDI, however, it was not deemed appropriate to exclude FDI-related imports from the calculation of import coverage (this would also have been precluded by the lack of sufficiently detailed data for all CEMAC member countries).

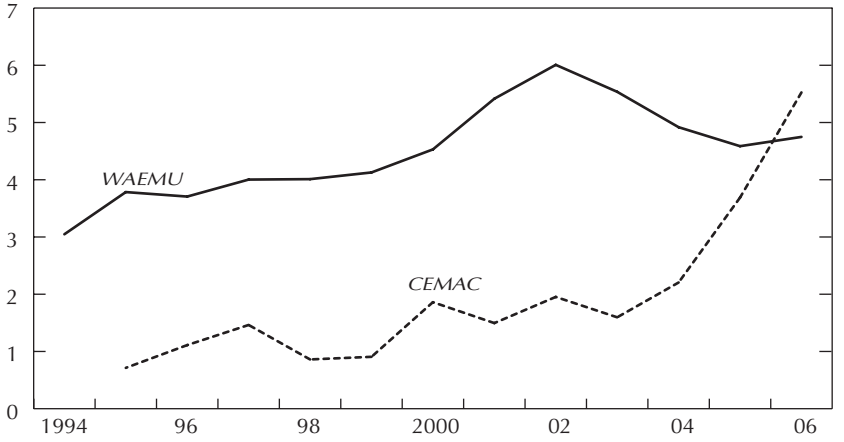
Table 5.1. CEMAC and WAEMU: Central Bank Foreign Assets

(In billions of CFA francs)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006 Est.
CEMAC												
Net foreign assets	59.60	184.26	307.76	84.55	116.06	587.74	484.44	693.95	675.39	1,232.88	2,625.80	4,382.16
Foreign assets	196.78	366.13	524.71	310.70	388.67	929.77	849.75	1,046.98	991.10	1,535.59	2,911.10	4,498.62
Operations account	163.93	288.02	385.50	180.51	251.52	786.82	680.48	867.67	814.09	1,305.62	2,647.19	4,165.94
(as a share of foreign assets)	83.31	78.67	73.47	58.10	64.71	84.63	80.08	82.87	82.14	85.02	90.93	92.60
Foreign liabilities	137.18	181.87	216.95	226.15	272.61	342.03	365.31	353.03	315.71	302.70	285.30	116.46
WAEMU												
Net foreign assets	608.74	755.16	961.82	898.20	1,049.10	1,348.20	2,000.83	2,594.72	2,894.47	3,027.56	3,195.39	3,694.24
Foreign assets	1,417.29	1,611.74	1,889.11	1,941.34	2,117.80	2,522.34	3,103.76	3,655.43	3,735.29	3,730.27	3,768.90	4,006.20
Operations account	1,142.42	1,098.55	1,369.08	1,470.76	1,812.57	2,216.15	2,613.55	3,230.10	3,343.24	3,445.31	1,821.12	1,821.13
(as a share of foreign assets)	80.61	68.16	72.47	75.76	85.59	87.86	84.21	88.36	89.50	92.36	48.32	45.46
Foreign liabilities	808.55	856.58	927.29	1,043.13	1,068.70	1,174.14	1,102.93	1,060.70	840.82	702.71	573.51	311.96

Sources: BEAC and BCEAO websites.

Figure 5.1. Gross International Reserves
(In months of next year's imports)



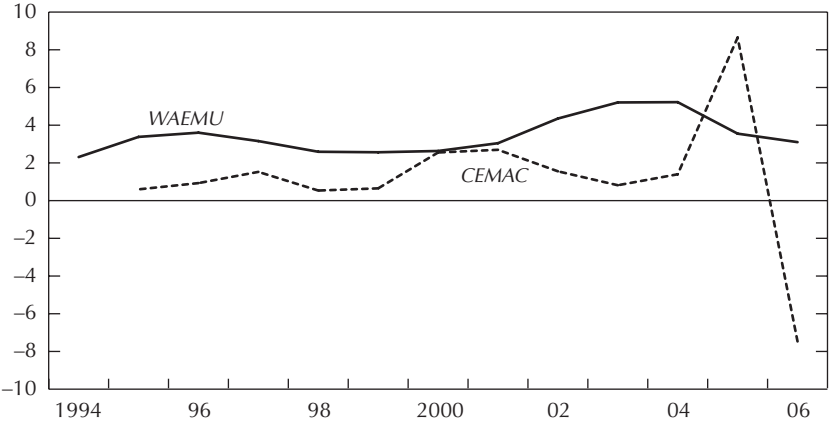
Sources: IMF, World Economic Outlook database; and authors' calculations.

reserves increased from 3.8 months to 4.7 months of imports during the same period. As a fraction of the (moving three-year average) current account deficit, foreign reserves rose from 0.6 to 8.6 during the period 1995–2005 in CEMAC (for 2006, the average past current account balance turned positive). For WAEMU, this fraction has remained more stable, at 3.2 in 1995 and 3.1 by 2006 (Figure 5.2).

Foreign reserves have comfortably met the coverage requirement in terms of reserve or base money, and have also trended upward relative to broad money. In the CEMAC region, the ratio of foreign reserves to base money rose from 0.5 in 1998 to 1.9 in 2006, and the ratio to broad money from 0.2 percent to a comfortable level of 1.1 (Figure 5.3). In the WAEMU region, these ratios have risen from 1.1 to 1.4 for base money and from 0.5 to 0.6 for broad money, during the same period. However, the high reserve coverage in terms of monetary indicators in part reflects low monetization. Short-term debt (based on a remaining maturity of less than one year) is fully covered by reserves in both regions. Reserves as a share of short-term debt rose from 0.2 in 1995 to 6.2 in 2006 in CEMAC, and from 1.7 to 10.2 percent in WAEMU (Figure 5.4).[10]

[10]Part of the recent increases stem from the reduction in short-term debt (on a residual maturity basis) as a result of debt relief. However, this measure of reserve coverage does not take into account the claim on reserves that would result if part of outstanding arrears on

Figure 5.2. International Reserves as a Share of Current Account Deficit[1]

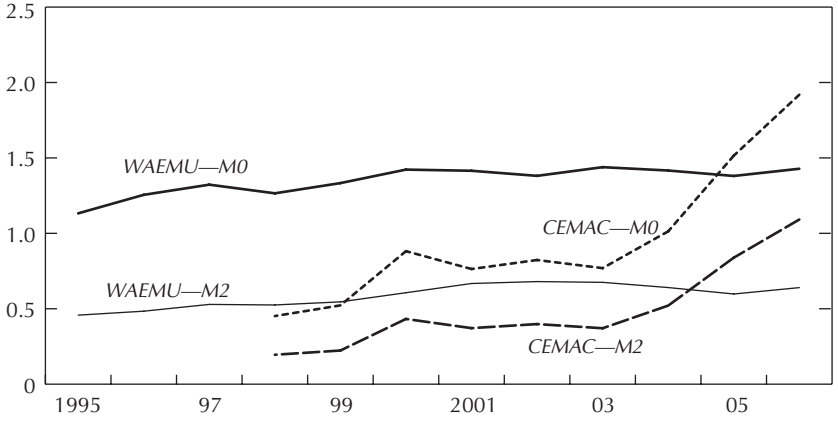


Sources: IMF, World Economic Outlook database; and authors' calculations.
[1]Based on the average current account deficit over the past three years.

Both the BCEAO and the BEAC have comfortably maintained the required balance in the operations account throughout most of the past decade (Figure 5.5). By end-2004, the ratio of the BCEAO and BEAC operations account balances to total international reserves had risen to 85 percent and 92 percent, respectively—well above the 65 percent minimum. This high share likely reflected both the limited investment capabilities and the reasonable rate of return on the operations account (European marginal lending facility rate, which is the overnight lending rate of the European Central Bank). Nonetheless, since the September 2005 reduction in the minimum requirement for the BCEAO to 50 percent, the actual share has dropped accordingly, and the same is expected for the BEAC starting in July 2007.

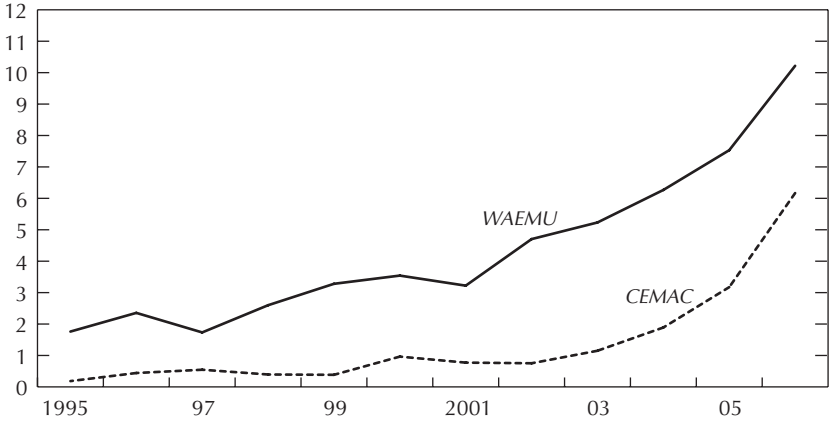
external debt service were to be cleared through government borrowing in the domestic markets. Several countries in the CFA franc zone (including Côte d'Ivoire, Guinea-Bissau, Togo, and the Central African Republic) have accumulated sizable external arrears. However, the scope for such clearance operations is limited by the depth of the local financial markets and the fiscal unsustainability of transforming sizable external arrears into costly domestic debt. Accordingly, the only viable route to arrears clearance would involve economic stabilization and debt relief, which would not affect external reserves.

Figure 5.3. International Reserves as a Share of Broad and Reserve Money



Sources: IMF, World Economic Outlook database; and authors' calculations.

Figure 5.4. International Reserves as a Share of Short-Term Debt

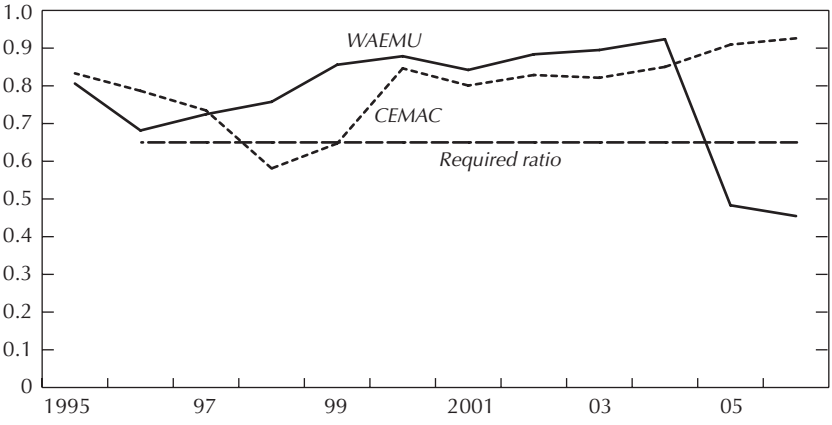


Sources: IMF, World Economic Outlook database; and authors' calculations.

Are Reserve Levels Adequate?

On balance, based on traditional measures of reserve adequacy, reserves appear to have reached comfortable levels in both regions. Following the rapid reserve buildup in CEMAC in recent years, the import coverage of reserves now well exceeds the common rule of thumb of three months.

Figure 5.5. International Reserves as a Share of Gross Reserves



Sources: IMF, World Economic Outlook database; and authors' calculations.

Table 5.2. Comparisons of International Reserves Across Regions

	In Months of Imports			2006 Ratio to:		
	1995–2004	2005	2006	Broad money	Reserve money	Short-term debt[1]
WAEMU	4.6	4.6	4.7	0.6	1.4	10.2
CEMAC	1.5	3.7	5.5	1.1	1.9	6.2
CMA (excluding South Africa)	2.9	2.0	2.7	0.3	3.7	. . .
Comoros	7.5	7.3	6.4	1.0	1.3	. . .
ECCU	2.6	2.8	3.1	0.2	1.1	5.0
Sub-Saharan Africa	3.9	. . .	. . .	. . .	. . .	. . .

Sources: Authorities' data and IMF, World Economic Outlook database.
[1]Excluding external payments arrears.

Coverage is also at least comparable with other zones (Table 5.2). The ratio of reserves to imports in the Common Monetary Area (CMA), another common currency area in Africa, was lower, at 2.7 months in 2006, while the average for African countries with a fixed exchange regime amounted to about 4 months.[11] The import coverage of reserves in the Eastern Caribbean Currency Union (ECCU), the Caribbean common

[11]The figure for the CMA refers to the combined reserves of Lesotho, Namibia, and Swaziland, which have pegged their currencies to the South African rand. The CMA is different from the franc zone, however, because it does not involve reserve pooling.

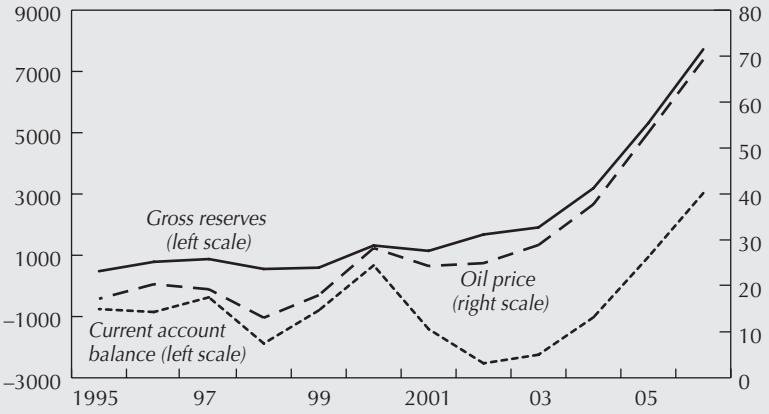
currency area, is also lower than in WAEMU and CEMAC. At more than 6 months of imports, reserves in the Comoros—which is also part of the CFA franc zone—are relatively large. However, because the Comoros has a separate bilateral agreement with France, it does not benefit from reserve pooling and thus would need larger reserves of its own.

Box 5.1. The Impact of Oil Price Fluctuations on CEMAC's Reserve Adequacy

Five out of six CEMAC member countries are oil exporters, with oil accounting for 80 percent of the region's exports, and about 35 percent of total GDP. As a result, oil price fluctuations are the single largest determinant of current account fluctuations. On the financial account side, the large swings in FDI are mostly linked to investments in the oil sector (see figures a and b).

To illustrate the vulnerability of reserves to oil price fluctuations, a one-standard-deviation decline in the oil price was assumed for 2006 (corresponding to $11.6 per barrel). Assuming further that only export revenues would adjust in the short term, the corresponding fall in reserves would be $3.35 billion. In that case, the reserves-to-imports ratio would fall by almost two months in 2006, from a projected 5.1 months to 2.9 months. At the same

a. CEMAC: Balance of Payments Flows
(In millions of U.S. dollars)



Sources: IMF, World Economic Outlook database; and authors' calculations.

Judgment remains difficult in the absence of well-supported benchmarks. The vulnerability of both the CEMAC and the WAEMU countries to terms of trade shocks argues for maintaining a relatively high level of reserves. The CEMAC region is heavily dependent on oil exports (see Box 5.1), whereas the WAEMU area's exports are concentrated in a limited

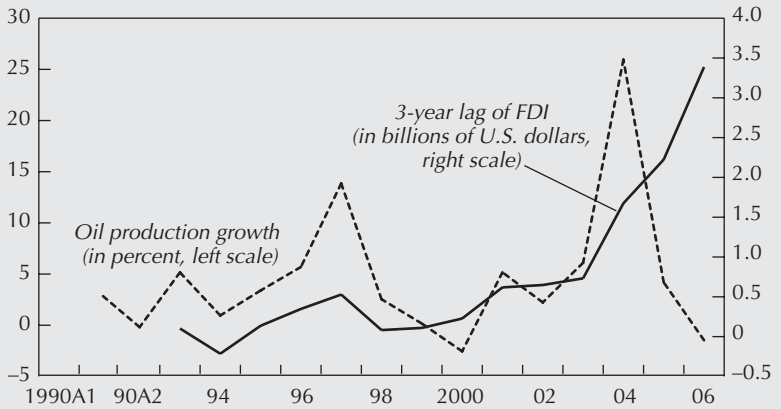
time, the ratio of reserves to short-term debt would fall by over 200 percent in 2006, from 492 to 278 percent (see table).

CEMAC: Projected Reserve Adequacy Indicators, 2006
(In percent, unless otherwise indicated)

Gross Reserves as a Percent of:	Imports	Short-Term Debt
2006 *WEO* oil price ($69.2 pb)	5.1	492.3
WEO price + 1 standard deviation[1]	7.3	706.2
WEO price – 1 standard deviation[1]	2.9	278.4

Sources: IMF, *World Economic Outlook* (*WEO*) and IMF staff calculations.
Note: pb = per barrel.
[1]Ten-year standard deviation 1996–2005 = $11.6.

b. CEMAC: FDI and Oil Production Growth
(In millions of U.S. dollars)



Sources: IMF, World Economic Outlook database; and authors' calculations.

Table 5.3. The Variability of Reserves Across Regions
(Coefficient of variation, 1995–2005)

	Reserves in Terms of		Terms of Trade
	U.S. dollars	Imports	Change
CEMAC	0.8	0.5	28.1
WAEMU	0.3	0.2	12.4
CMA	0.6	0.3	7.2
CMA (excluding South Africa)	0.1	0.2	8.4
Comoros	0.4	0.2	19.8
ECCU	0.3	0.2	6.5
Sub-Saharan Africa	. . .	0.5	15.1

Source: IMF, International Financial Statistics database.

range of primary commodities. In principle, reserve pooling helps limit the joint reserve needs. However, the high correlation of external shocks across the countries within the groups reduces this benefit. Table 5.3 provides a first look at the impact of shocks. The first two columns show the variability of reserves, and the third column shows the incidence of terms of trade shocks. These indicators seem to underscore CEMAC's vulnerability to external shocks, as its reserve variability exceeds the level in any of the other regions. However, whereas terms of trade shocks are fairly homogeneous across CEMAC oil producers and thus would indicate less benefits from pooling reserves, Fielding, Lee, and Shields (2004) also find that CEMAC area output shocks tend to be fairly heterogeneous, larger, and more persistent than in WAEMU, with the exception of the Central African Republic, the only non-oil producer in CEMAC.

Measures of reserve need based on balance of payments volatility suggest relatively large reserve needs for CEMAC, but they do not define any particular reserve requirement. Because a key function of reserves is to cover temporary adverse shocks in foreign inflows, the incidence of such shocks can provide an empirical and zone-specific measure of reserve adequacy.[12] These requirements are derived using a simple calculation, and shown in Tables 5.4 and 5.5. For each of the areas, the tables show the standard deviation of the current account and FDI inflows as

[12]These measures should be considered as illustrative. They do not relate to all motives for building up reserves, nor to all possible shocks. The size of the underlying shock (in this case, two standard deviations) is arbitrary. The degree to which the two measures of reserve needs should be added up depends on the covariance of FDI and current account shocks. Finally, if the shocks are serially correlated, larger reserves would be necessary than suggested by this measure.

Table 5.4. Comparisons of the Variability of Selected (Net) Inflows and the Implied Reserve Need—by Country

	Current Account[1]		Foreign Direct Investment[1]	
	Standard deviation[2]	Implied reserve need[3]	Standard deviation[2]	Implied reserve need[3]
CEMAC (average)	12.7	5.6	10.5	4.3
Cameroon	1.0	1.2	1.4	1.6
Central African Republic	2.4	2.6	0.4	0.5
Chad	13.8	8.0	13.8	8.0
Congo, Rep. of	15.6	7.2	8.9	4.1
Equatorial Guinnea	36.5	9.6	34.8	9.2
Gabon	6.9	4.8	3.8	2.6
WAEMU (average)	3.5	2.5	0.9	0.6
Benin	1.7	1.5	1.0	0.9
Burkina Faso	2.9	2.9	0.3	0.3
Côte d'Ivoire	4.4	3.2	1.0	0.8
Guinea-Bissau	8.8	4.8	1.2	0.7
Mali	2.3	1.7	2.0	1.4
Niger	2.4	2.4	0.1	0.1
Senegal	1.6	1.1	1.3	0.8
Togo	3.8	2.1	0.0	0.0

Source: IMF, International Financial Statistics database.
[1]As a share of GDP.
[2]Standard deviation of annual flows, 1991–2005.
[3]Reserve coverage in months of imports needed to cover a two-standard-deviation shock. Based on import shares to GDP during 1991–2005.

a share of GDP during 1991–2005.[13] The reserve coverage that would be needed to accommodate a two-standard-deviation shock is also indicated for both variables. Results from this exercise are shown in Table 5.4 for each CEMAC and WEAMU member country separately. These country indicators are relevant as policymakers seek to maintain reserve adequacy in each member country. Table 5.5 shows both the average levels for the members of the zone (as derived in Table 5.4), and the indicators for the zone as a whole, and also presents these data for the comparator zones. The indicators for the zone as a whole are derived at the central level, so they incorporate the benefits from reserve pooling. In the case of CEMAC, to cover a two-standard-deviation current account shock, import coverage should amount to about six months of imports for the average country, whereas for the zone as a whole coverage of three months would suffice. Fairly similar results are shown for FDI shocks. For WAEMU, where balance of payments variability is smaller, this exercise also suggests a significantly smaller reserve need.

[13]Current account variability largely reflects terms of trade shocks.

Table 5.5. Comparisons of the Variability of Selected (Net) Inflows, and the Implied Reserve Need

	Current Account[1]				Foreign Direct Investment[1]			
	For average member		For zone as a whole		For average member		For zone as a whole	
	Standard deviation[2]	Implied reserve need[3]	Standard deviation[2]	Implied reserve need[3]	Standard deviation[2]	Implied reserve need[3]	Standard deviation[2]	Implied reserve need[3]
CEMAC	12.7	5.6	3.8	2.8	10.5	4.3	3.7	2.8
WAEMU	3.5	2.5	1.7	1.3	0.9	0.6	0.6	0.5
CMA	4.3	1.7	. . .	. . .	2.3	0.9	. . .	. . .
CMA (excluding South Africa)	5.4	1.7	. . .	. . .	2.5	0.8	. . .	. . .
Comoros	5.8	4.3	5.8	4.3	0.3	0.2	0.3	0.2
ECCU	5.3	2.1	4.6	1.5	5.6	2.2	3.0	1.0
Sub-Saharan Africa	7.4	4.8	. . .	. . .	3.2	2.1	. . .	. . .

Source: IMF, International Financial Statistics database.

[1]As a share of GDP.

[2]Standard deviation, 1991–2001.

[3]Reserve coverage in months of imports needed to cover a two-standard-deviation shock. Based on average import shares to GDP during 1991–2003.

A more direct assessment of risks to CEMAC's oil revenues also supports the need for a substantial reserve base. In the above exercise, reserve needs reflect the past volatility of current account and FDI inflows. For CEMAC, the main source of the high standard deviations of these parts of the balance of payments has been the sharp increases in oil revenues and oil-related FDI since 1999. The CEMAC's high reserve and terms of trade variability shown in Table 5.3 also largely reflect the impact of the sharp increase in oil production and oil prices on export revenues. The key question, however, is whether these sharp increases can be considered as permanent—in which case, past variability would not signal large risks going forward, which would warrant especially high reserve coverage. Over the medium term, while oil production can still be broadly maintained, the main risk would concern a possible drop in oil prices. Accordingly, further sensitivity analysis was conducted to show the sensitivity of the current account and reserves to a possible shock in oil prices. As shown in Box 5.1, a one-standard-deviation fall in the oil price would already lead to a loss of reserves of about two months of imports in 2006.

The Cost of Foreign Reserve Holdings[14]

The cost of holding reserves could have important implications for optimal reserve holdings. The higher these costs, the more important it would be to develop alternative shock absorbers, or to limit the incidence of adverse shocks, in order to contain reserve needs. At the same time, in the absence of quantified measures of the benefits from reserve holdings, this analysis cannot yield a clear-cut assessment of what reserve level would be optimal.

The calculation of the (net) cost of holding reserves requires information on the marginal product of capital and the return on reserves. The (net) cost of holding reserves can be calculated as the difference between the opportunity cost of reserve holdings and the return available on the assets held as reserves.[15] We approximate the opportunity cost of reserve holdings by the marginal product of capital in the zone, given that a euro that is added to the zone's reserves could have been used to raise production capacities of the

[14]We thank Se-Jik Kim for important contributions to this section.

[15]These costs of holding reserves for the country as a whole should be distinguished from the fiscal cost of holding reserves. Fiscal costs occur in case of sterilization of the monetary impact of larger reserves, through the increased sale of public sector debt to the private sector (at an interest rate exceeding the return on foreign reserves).

Table 5.6. Cost of Holding International Reserves

	1999	2000	2001	2002	2003	2004	Average
CEMAC							
Return difference (percent)	2.8	7.2	9.3	7.5	9.3	15.5	8.6
Marginal product of capital	6.8	13.0	13.6	11.3	12.3	18.5	12.6
EMLFR	4.0	5.8	4.3	3.8	3.0	3.0	4.0
Average reserves (billions of CFA francs)	349.7	659.2	889.8	948.4	1,019.0	1,263.3	
Cost of reserve holding (percent of GDP)	0.08	0.33	0.56	0.45	0.56	1.00	0.50
WAEMU							
Return difference (percent)	11.3	3.9	13.3	9.4	13.8	10.9	10.4
Marginal product of capital	15.3	9.7	17.6	13.2	16.8	13.9	14.4
EMLFR	4.0	5.8	4.3	3.8	3.0	3.0	4.0
Average reserves	2,029.6	2,320.1	2,813.0	3,379.6	3,695.4	3,732.8	
Cost of reserve holding (percent of GDP)	1.27	0.49	1.89	1.53	2.34	1.79	1.55

Source: IMF staff calculations.
Note: EMLFR=European marginal lending facility rate.

member countries.[16] This approach assumes that higher gross reserves in the zone are closely associated with higher net reserves rather than higher foreign borrowing, which is indeed the case: the increase in net reserves for the last decade explains 88 percent of the accumulation of gross reserves in CEMAC and 105 percent in WAEMU.[17] The return on reserves is proxied by the rate of return on assets in the French Treasury's operations account, given that—at least until recently—a very large share of reserves has been held in the operations account. The reserves in the operations account receive the European marginal lending facility rate (EMLFR), which amounted to about 4 percent on average for the period 1999–2005.

To estimate the marginal product of capital, we use various data on production technology. Assuming a standard Cobb-Douglas or constant elasticity of substitution (CES) production function, the marginal product of capital is equal to the capital income share multiplied by the output-capital ratio. Given the lack of reliable data on the capital stock in the

[16]This association assumes that available resources are used effectively for additional investments, without serious waste—which may be a strong assumption. If domestic capital markets functioned efficiently, lending rates would provide an alternative measure of the opportunity cost. However, both lending rates and treasury bill rates are biased downward by ongoing excess liquidity within the banking system.

[17]Higher gross reserves could instead have been attained through higher foreign borrowing, leaving net foreign assets unchanged. In that case, the more relevant cost of raising reserves would be the borrowing cost. This approach has been applied, for example, in Hviding and Ricci (2006).

zone, we follow Kim's (1998) approach to approximate the output-capital ratio without information on the capital stock. More specifically, we derive the output-capital ratio from the following relation:

$$\text{Investment/output} = (\text{growth rate} + \text{rate of capital depreciation}) * (\text{capital/output}).$$

Based on some earlier studies (for example, Bigsten and others, 1998; and Kim, 1998), we assume that the capital income share in the zone is 0.32 and the depreciation rate is equal to 0.05. Then, readily available information on the investment-to-GDP ratio can be used to generate estimates of the marginal product of capital.[18]

By that measure, holding reserves appears to carry a considerable cost in both the CEMAC and WAEMU regions (Table 5.6). The estimated average marginal product of capital for the period 1999–2004 is 12.6 percent for CEMAC and 14.4 percent for WAEMU.[19] Meanwhile, the rate of return is 4.0 percent for the same period. Accordingly, the net cost of holding a unit of reserves is 8.6 percent for CEMAC and 10.4 percent in WAEMU.[20] Using average reserves calculated for each period, the total cost of holding reserves amounted on average to 0.5 percent of annual GDP in CEMAC and 1.6 percent of GDP in WAEMU for 1999–2004.[21] It

[18]Hauner (2005) estimates the internal rate of return from investment in 100 countries for which data on capital stock are available, and uses the rate of return for the calculation of the cost of holding reserves.

[19]These estimates of the marginal product of capital for the two regions are substantially lower than those estimates for some African countries made by Bigsten and others (1998) for example, 32 percent for Ghana, 35 percent for Zimbabwe, and 22 percent for Kenya. It is a well-known puzzle as to why capital does not flow from rich countries with a lower marginal product of capital to poor countries with a higher marginal product of capital (Lucas, 1990). Some proposed solutions to the puzzle include differences in human capital, external benefits of human capital, capital market imperfections, and differences in investor protection.

[20]Reflecting diminishing marginal returns on capital stock, the marginal product of capital appears to have trended downward for both regions. The average marginal products of capital for the period 1995–98 were 14.5 percent for CEMAC and 19.5 percent for WAEMU, higher than those for the period 1999–2004. Of course, a large adverse output shock (inducing a negative growth) could push the marginal product of capital down below the trend (as happened in 1999).

[21]The sensitivity of the results to changes in key parameters can also be assessed. For the capital income share parameter, we may assume 0.25, a lower value compared with that in the benchmark case. In this case, reserve holdings would cost 0.3 percent of GDP in CEMAC and 1.1 percent in WAEMU. If we assume that the capital income share is 0.4, the cost of holding reserves rises to 0.7 percent of GDP in CEMAC and 2.1 percent in WAEMU. If the rate of capital depreciation is 0.08 instead of 0.05, the cost could amount to 0.7 percent of GDP in CEMAC and 2.4 percent in WAEMU.

also follows that reducing reserve coverage by one month of imports could yield about 0.3 percent of GDP as a result of higher investments.

The Sources of Reserve Accumulation

The development of the level of international reserves is expected to depend, in particular, on external price developments, the exploitation of natural resources, financial inflows, and fiscal policies within the zone. Changes in net international reserves correspond to the overall balance of payments, in the absence of valuation changes:[22]

$$\Delta R = CA + NCFI^P + NCFI^G, \tag{5.1}$$

where CA represents the current account and $NCFI^P$ and $NCFI^G$ represent net capital and financial inflows of the private and government sectors, respectively. The current account, in turn, equals the sum of the net private sector savings and the fiscal balance including public current transfers from abroad:[23]

$$CA = (S^P - I^P) + (T - G). \tag{5.2}$$

- Changes in international commodity prices affect the current account both directly (for given trade volumes), and through the resulting volume response. The latter response is generally analyzed using import and export elasticities. However, the direct changes in net exports will only affect the current account to the extent that they are saved. In this context, two caveats are of importance. First, decisions on spending and savings are essentially intertemporal, and thus the impact of changes in foreign prices depends on whether these are deemed transitory or permanent.[24] Second, if the private sector is liquidity constrained, foreign price shocks will not affect net private sector savings.

[22]The latter have been relatively minor, as most reserves have been maintained in the operations account and thus denominated in French francs/euros. Gross reserves are affected also by changes in the BCEAO's external liabilities, in particular to the IMF.

[23]The two terms on the right-hand side include net private and government current transfers from abroad. The fiscal balance excludes capital grants.

[24]For example, in the case of a transitory improvement in the terms of trade, consumption smoothing would require part of the higher income to be saved, thereby improving the balance of payments. This is the Harberger-Laursen-Meltzer effect, which, however, could be offset by the intratemporal and intertemporal substitution effects resulting from the associated changes in relative prices and the real interest rate (see, for example, Agénor, 2000, p. 27).

- The impact of changes in commodity exports based on the exploitation of natural resources is essentially similar to that of a terms of trade improvement—boosting reserves to the extent that the proceeds are saved.
- Because the private sector has little direct access to international capital markets, capital and financial inflows in low-income countries are generally dominated by FDI flows, net foreign public borrowing, and debt relief. The resulting balance of payments impact will depend on the degree and timing of the impulse to spending generated by the resource transfer.
- Finally, changes in reserve accumulation could be linked directly to domestic government financing (which, in the absence of changes in arrears, equals $T-G+NCFI^G$). Indeed, if the private sector is liquidity constrained, the impact of commodity price shocks on the current account and the overall balance of payments would strongly depend on whether governments tend to spend the resulting windfall revenue or adopt an expenditure smoothing strategy.

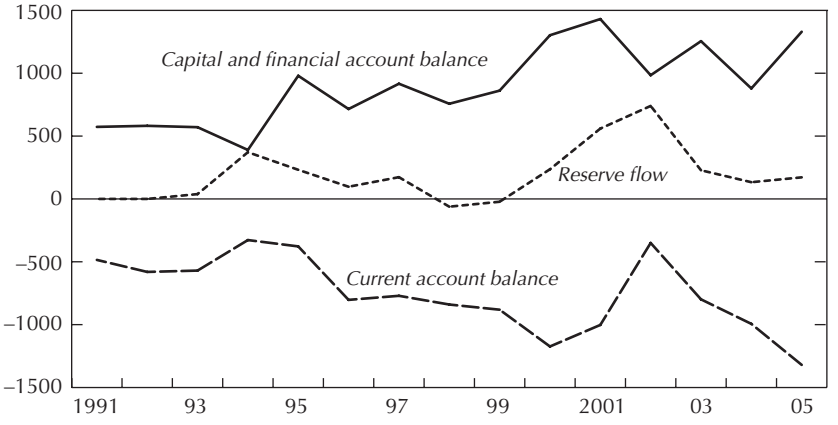
Overall balance of payments developments in WAEMU since 1994 do not show a clear trend (Figure 5.6). In nominal terms, net reserves have risen in almost every year, but the size of the annual accumulation has varied widely, associated, in particular, with changes in the current account.

The reserve path over time confirms the importance of terms of trade effects. Reserve changes do not appear to be associated strongly with the fiscal outcomes (Figure 5.7). In any case, domestic government financing has been relatively stable compared with the large swings in reserves accumulation. Although changes in the financial account also do not appear clearly related to the annual buildup of reserves, the reserve outflows shortly before the 1994 devaluation (not shown in the figure) were in part driven by a sharp shifts in financial flows.[25] The association between reserves and the terms of trade and the current account is evident from the data (Figure 5.8).[26] For example, the terms of trade and reserves accumulation increased

[25]The impact of interest rate policies on reserves is likely muted by the absence of external capital mobility and efficient domestic capital markets (that would allow for transmission to reserves through the level of spending and, thereby, (net) imports).

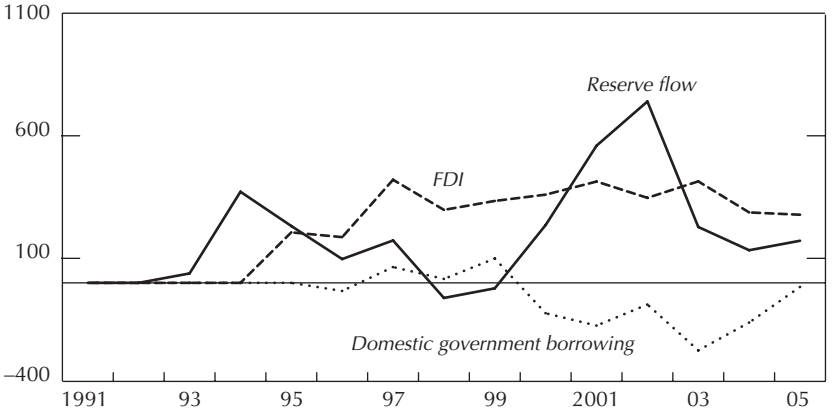
[26]More generally, as the CFA franc zone countries are heavily reliant on commodity exports (and imports), the domestic price of these commodities may be more relevant as an indicator of competitiveness than measures of (real or nominal) effective exchange rates. For goods whose prices are determined in world markets, the specific trading partners—and their exchange rates, prices, and costs—are unlikely to have much impact on the trade prices affecting importers and exporters in the CFA franc zone.

Figure 5.6. WAEMU: Balance of Payments
(In billions of CFA francs)



Sources: IMF, World Economic Outlook database; and authors' calculations.

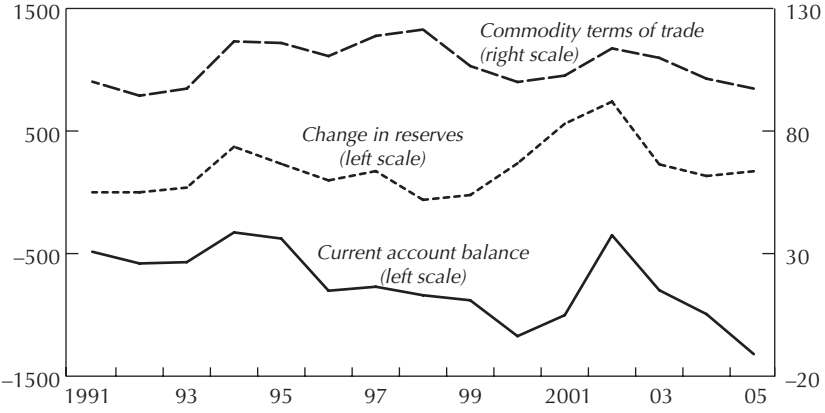
Figure 5.7. WAEMU: Financial Determinants of Reserve Growth
(In billions of CFA francs)



Sources: IMF, World Economic Outlook database; and authors' calculations.

in 1997 and 2002 with peaks in the price of cocoa—the region's largest export commodity. This result confirms the importance of considering reserve coverage in light of WAEMU's vulnerability to current account and terms of trade shocks.

Figure 5.8. WAEMU: Trade Determinants of Reserve Growth
(In billions of CFA francs)

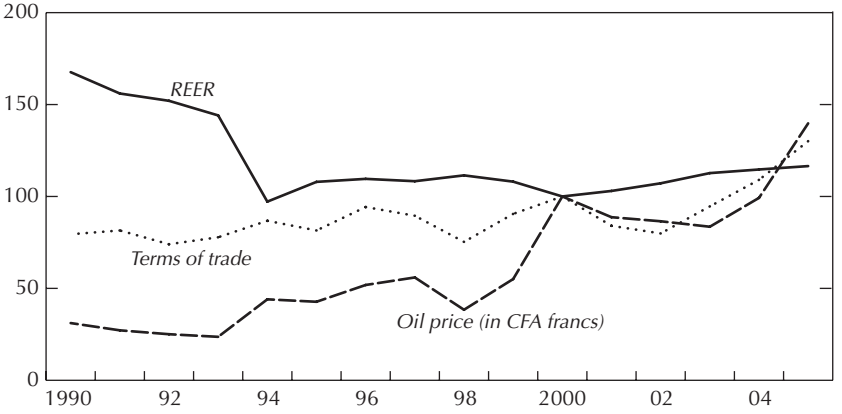


Sources: IMF, World Economic Outlook database; and authors' calculations.

For the CEMAC area, the main force behind recent developments has been the rapid increase in oil production, in conjunction with rising oil prices. About three-quarters of goods exports and more than 65 percent of exports of goods and nonfactor services consist of oil—and both ratios have gradually risen since the early 1990s. Accordingly, the terms of trade have improved significantly both at the end of the 1990s and again since 2002 (Figure 5.9), with sharply rising oil prices (measured in CFA francs). The oil price, by itself, explains about two-thirds of the variation in the terms of trade since 1991.

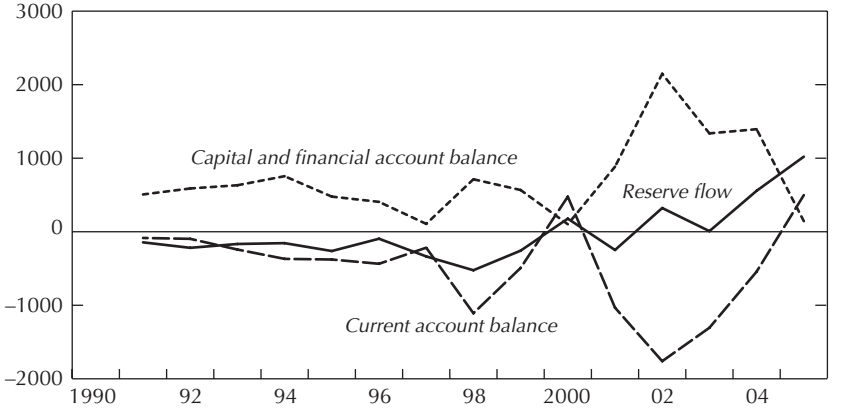
Reserve accumulation in CEMAC has been supported by the rising oil revenues and FDI inflows, and by the improved fiscal balance. The reserve inflows since the 1990s have been associated with rising oil-related inflows even though the current account has not shown a clear trend (Figure 5.10). What also stands out, and helps explain the previous point, is the current account's strong negative correlation with (oil-related) FDI. FDI has increased sharply since 2000 (shown in Figure 5.11). Spending based on FDI is reflected in sharply higher private sector net dissavings and imports, worsening the current account. On balance, the oil boom appears to have boosted reserves through two distinct channels. First, part of the fiscal windfall from the higher oil prices has been saved. Because these savings are, to a large extent,

Figure 5.9. CEMAC: Exchange Rates and the Terms of Trade
(2000 = 100)



Sources: IMF, World Economic Outlook database; and authors' calculations.

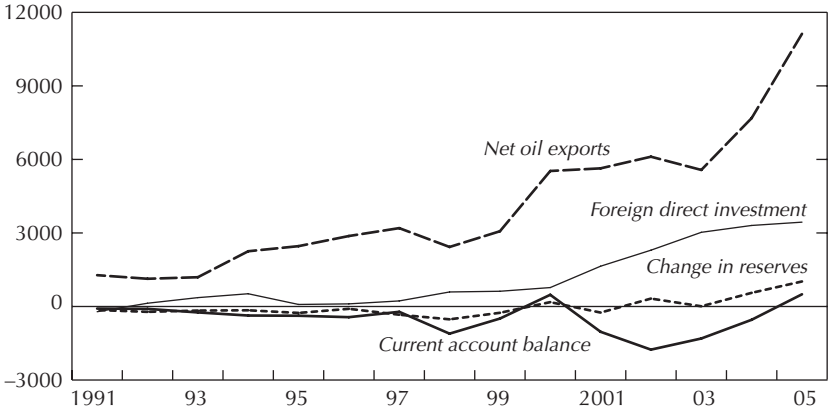
Figure 5.10. CEMAC: Balance of Payments
(In billions of CFA francs)



Sources: IMF, World Economic Outlook database; and authors' calculations.

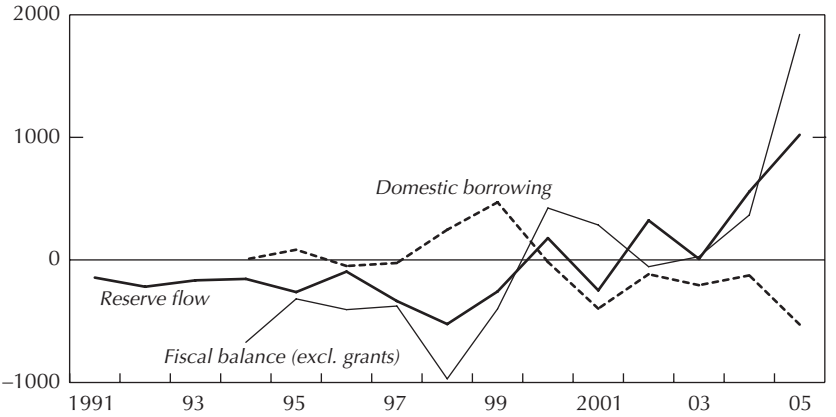
reflected in lower domestic financing (rather than in lower foreign financing), they led to higher international reserves (Figure 5.12). Second, there is a clear positive correlation between reserve accumulation and FDI, which suggests that not all of these inflows have been

Figure 5.11. CEMAC: Other Determinants of Reserve Growth
(In billions of CFA francs)



Sources: IMF, World Economic Outlook database; and authors' calculations.

Figure 5.12. Fiscal Determinants of Reserve Growth
(In billions of CFA francs)



Sources: IMF, World Economic Outlook database; and authors' calculations.

reflected in higher spending—leaving a positive net effect on the balance of payments. Unfortunately, given the short time series and the strong correlation between oil prices and FDI inflows, the relative importance of these two channels would be hard to assess.

Reserve Adequacy and CEMAC Oil Funds

For CEMAC countries, the establishment in 2006 of oil-related Funds for Future Generations (FFGs) and Oil Stabilization Funds (OSFs) at the BEAC raises further issues regarding reserve adequacy. CEMAC oil producers (all member countries except the Central African Republic) have different oil resource endowments and are at different stages in the oil production cycle. But in most countries, oil reserves are expected to be largely depleted over the coming decade or so. It therefore makes sense for each of them to set aside some portion of current oil receipts for future generations.

A framework for facilitating oil-based savings for future generations should provide adequate financial incentives for the governments in the member countries. The repatriation requirement for foreign exchange proceeds, combined with the pooling of reserves at the BEAC, implies that most of the region's oil inflows add to the BEAC's reserves. As a counterpart, CEMAC governments build up CFA franc deposits at the BEAC. However, remuneration on regular deposits is low, and as a result some CEMAC member countries had taken several ad hoc initiatives, some of them outside of the BEAC, to help ensure adequate remuneration given the need to preserve the value of their oil wealth.[27]

To increase the incentives for CEMAC oil producers to repatriate foreign exchange earnings, the BEAC has established remunerated FFGs and OSFs. In 1998, the CEMAC ministers agreed on the necessity to generate savings out of oil revenues and to establish FFGs. Chad, Equatorial Guinea, and Gabon established such funds, outside of the BEAC for Chad and Equatorial Guinea, and in the form of an account at the BEAC but with minimal contributions in the case of Gabon. Concerned about the need to maintain the principle of reserve pooling, in 1999 CEMAC ministers agreed on further implementing rules for the FFGs and on the creation of OSFs.[28] According to these rules, which were formally adopted by the BEAC's administrative board on July 12, 2001, the funds would be established at the BEAC and would

[27]Until 2006, remuneration was linked to the amount of outstanding advances provided by the BEAC (each year, member states can draw up to 20 percent of the preceding year's revenue). Only the portion of deposits in excess of these advances could be remunerated, and in practice only Equatorial Guinea and Gabon had such excesses.

[28]CEMAC Ministerial Committee, "Note d'Orientation sur la Mise en Oeuvre des Fonds de Réserve pour les Générations Futures et du Mécanisme de Stabilisation des Recettes Budgétaires," September 20, 1999.

be remunerated. In the case of Chad, the BEAC also agreed on a set of conventions establishing an OSF and an FFG. The Chadian decree specified that 10 percent of all royalties and dividends received by the state would be allocated to the FFG. This was similar to the conditions set in the 1998 Gabonese law establishing an FFG. In 2006, however, Chad's regime based on fixed savings rules was no longer tenable, and the initial savings arrangements were replaced by a new system of remunerated deposits at the BEAC.

The regime introduced in 2006 includes four types of remunerated term deposits held by the member governments at the BEAC. The funds are denominated in CFA francs and managed at the BEAC, and remunerated at a rate linked to the returns of the BEAC's operations account with the French Treasury, with penalties for early withdrawals (Table 5.7) The deposit types are: (1) deposits held in the context of a Fund for Future Generations, with a minimum maturity of five years, (2) deposits held in the context of a Stabilization Fund, with a six-months maturity, (3) regular one-month deposits, and (4) one-month deposits held by a member country that is drawing on the advances provided by the BEAC.

However, after a year or so, use of these funds, FFGs in particular, has remained low. At end-2006, FFGs for Gabon and Equatorial Guinea amounted to only 3 percent of total foreign reserves (equivalent to about $7.6 billion) and OSFs for Gabon, Equatorial Guinea, and Chad to 30 percent of total foreign assets. Member countries mention the relatively low remuneration (in comparison with CEMAC-wide average inflation of about 5 percent in 2006) and the lack of investment flexibility as reasons for the low use of FFGs.

Within the frame of the recently revised operations account convention with France, the counterpart of FFGs will be excluded from the pool of foreign assets on which the new ceiling of 50 percent that can be invested in the operations account will be calculated. In practice, this will mean that (1) the foreign-exchange counterpart of FFGs can be taken

Table 5.7. Remuneration of Government Deposits at the BEAC

	Apr. 2006	Jun. 2006	Aug. 2006	Oct. 2006	Dec. 2006	Mar. 2007
Regular government deposits	1.4	1.7	2.4	2.6	2.7	2.8
Oil Stabilization Funds	1.7	2.0	2.7	2.9	3.0	3.1
Funds for Future Generations	1.9	2.2	2.9	3.1	3.2	3.3
Memorandum item:						
Remuneration on the operations account	3.5	3.8	4.0	4.3	4.5	4.8

Source: BEAC.

out of monetary reserves and invested in longer-term assets, and (2) the remuneration on these funds no longer will need to be linked to that on the operations account.

This need to separate FFGs from monetary reserves within the BEAC's accounts has important implications for the amount of fiscal savings to be channeled to these funds. Although current reserve levels seem adequate, oil-based savings should not be detrimental to overall reserve adequacy. In addition, given that oil represents 80 percent of the region's exports, oil-related inflows will have to continue to form the bulk of reserve accumulation. Accordingly, mechanisms, including a satisfactory burden-sharing formula across CEMAC members, should be put in place to ensure that a sufficient part of the export receipts from oil will continue to be included in the BEAC's common reserve pool as a backing for the fixed exchange rate.

The Role of the Convertibility Guarantee

The effects of the guarantee of convertibility by the French Treasury are multifaceted, possibly far-reaching, and, mostly, hard to quantify. By enhancing the credibility of the exchange rate peg, and thereby its credibility as a monetary anchor, the guarantee helps anchor exchange rate and inflation expectations, affecting interest rates, capital flows, and the investment climate. Arguably, without the French convertibility guarantee, the zone would have had to build up larger reserves to maintain the peg. However, it is difficult to gauge the extent of the reserve savings due to the French convertibility guarantees.

The return on reserves does not appear to have been dampened by the requirement to hold most reserves in the operations account. Reserves in the operations account are remunerated at the EMLFR, which averaged 3 percent in 2004 and 2005. An alternative rate of return proxied by the three-month euro interbank offered rate (EURIBOR), remained on average at about three-quarters of one percentage point below the EMLFR.

The benefits from the convertibility guarantee could be substantial. As discussed earlier, if the guarantee could be quantified and credit were readily available, one could, in principle, add the contingent credit line to the reserves of the BCEAO and the BEAC to calculate adjusted reserve adequacy indicators. As a tentative illustration, we consider the case where both regions save reserves equivalent to two months of imports. So the CEMAC's reserves would have been 5.8 months of current imports in 2005 without the convertibility guarantee, instead of

Table 5.8. Benefit of Convertibility Guarantees

	Benchmark Case (Two Months of Imports)							One-Month Average	Three-Month Average
	1999	2000	2001	2002	2003	2004	Average		
CEMAC	0.17	0.44	0.62	0.54	0.57	1.01	0.56	0.28	0.84
WAEMU	0.60	0.22	0.75	0.51	0.76	0.61	0.57	0.29	0.86

Source: IMF staff calculations.

Table 5.9. Comparisons of Inflation Performance, 1997–2005[1]

	Annual Average		Standard Deviation	
	Average[2]	Median[2]	Average[2]	Median[2]
CEMAC	2.8	2.6	3.2	2.7
WAEMU	3.0	2.4	4.0	2.6
CMA (excluding South Africa)	7.3	7.3	2.5	2.5
Comoros	3.4	3.4	1.8	1.8
ECCU	1.9	1.6	1.8	1.8
Sub-Saharan Africa	16.8	6.6	14.1	3.4

Source: IMF, World Economic Outlook database.

[1]Based on the consumer price index.

[2]Unweighted average (median) for the countries in the group of the average (standard deviation) of 1997–2005 inflation per country.

3.8 months. In this case, the benefit of the convertibility guarantee is 0.56 percent of regional GDP on average for 1999–2004 in the CEMAC region and 0.57 percent of GDP for the WAEMU region (Table 5.8). In view of the above discussion, the reserve saving in CEMAC could be greater than in WAEMU.

In addition, the convertibility guarantee has likely been key to the relatively favorable inflation performance in the CFA franc zone. Inflation in the area compares very favorably with performance in sub-Saharan Africa as a whole (Table 5.9). By supporting confidence in the peg, the convertibility guarantee has likely helped anchor exchange rate and inflationary expectations.

There is little scope for an assessment of the impact of the convertibility guarantee on investor confidence. Some evidence is provided by investment ratings. A 2004 Standard & Poor's Research Note argued that

> Reflecting the strength of the arrangements backing the CFA franc and the guarantees of convertibility from the Treasury of the Republic of France, potential ratings of the zones' central banks (and with that the rating ceiling for the respective zone) could be investment grade—significantly higher than

the public ratings currently assigned to individual member states, which all are in the "B" category. That said, BEAC's and BCEAO's ratings would not be same as its guarantor, the French Treasury (AAA/Stable/A–1+) due to the limited nature of the guarantees (Standard & Poor's, 2004).

Concluding Remarks

Maintaining a fixed exchange rate in the presence of sizable terms of trade shocks requires a significant buffer in the form of foreign exchange reserves. In terms of imports of goods and nonfactor services, reserve coverage of at least four months would seem advisable for CEMAC, whereas for WAEMU slightly lower coverage could be within acceptable limits. With limited capital mobility, and in the absence of substantial private sector external debt, measures of reserve adequacy based on monetary aggregates or short-term debt seem less pertinent. Nonetheless, experience at the time of the 1994 devaluation and the 2000 introduction of the euro illustrated that capital flight does pose some risk. Against this background, WAEMU and CEMAC reserve levels seem broadly adequate.

The importance of a careful evaluation of the proper reserve level is heightened by the considerable cost attached to holding reserves. For example, the net cost of holding a unit of reserves is estimated at 10.4 percent in WAEMU. The total costs of holding reserves then amounted to 1.6 percent of annual GDP (on average for 1999–2004).

The exploitation of CEMAC's oil reserves has provided an opportunity for raising reserves to an appropriate level. Setting up designated FFGs can help provide appropriate mechanisms for further promoting and maintaining savings. However, given that savings channeled through FFGs should not be part of reserves, a sufficient proportion of savings should remain under the control of the monetary authorities for short-term use.

The importance of the convertibility guarantee is hard to assess. In principle, an (unlimited) line of credit reduces the need for reserve holdings. If it was indeed readily available, this guarantee could help explain the relatively low levels of CEMAC's reserve holdings in the past compared to traditional benchmarks. It is, however, harder to reconcile with the fact that in WAEMU (and in the Comoros), and since 2004 also in CEMAC, reserves have substantially exceeded such benchmarks. One possible interpretation is that both zones have a strong preference for avoiding any need to draw on this guarantee, and that it is best perceived as a last-resort instrument, which in practice is likely to be quite limited. Further, the

guarantee does not appear to have dampened the rate of return on foreign reserve holdings and has most likely helped anchor inflation expectations and maintain investor confidence in the zone.

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Part II

Capacity to Adjust to Changes in External Conditions

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6

Economic Fundamentals and the CFA Franc Zone Real Exchange Rates

YASSER ABDIH AND CHARALAMBOS TSANGARIDES

The debate in the literature on structural adjustment and macroeconomic stabilization has emphasized the crucial role played by the real exchange rate, given its importance for export promotion and for the generation of optimal paths of output and employment.[1] It is argued that successful developing countries owe much of their success to having maintained their exchange rate at an "appropriate" level. Further, it is believed that a distinguishing feature of East and Southeast Asia's success with sustainable growth has been the consistent avoidance of overvaluation.[2]

The CFA franc arrangement dates back to the mid-1940s and is among the longest standing fixed exchange rate regimes worldwide (Box 6.1).[3] Over the past two years the CFA franc—along with the euro to which it is pegged—appreciated by more than 25 percent in nominal terms vis-à-vis the U.S. dollar, putting additional pressure on the region's competitiveness. This has led to a renewed interest in the prospects of and the outlook for the CFA franc.

Assessing competitiveness and necessary exchange rate or other appropriate policy actions requires quantitative analysis of the actual and equi-

[1]See Mussa (1974), Edwards and van Wijnbergen (1986), and Obstfeld and Rogoff (1996). See also Acemoglu and others (2003) and Easterly and Levine (2003).

[2]See Dornbusch (1982), Harberger (1986), and Hinkle and Montiel (1999).

[3]For background on the CFA franc zone institutions see Chapter 1 of this volume, Hadjimichael and Galy (1997), and Masson and Pattillo (2004).

Box 6.1. Key Dates of the CFA Franc Zone

1945	CFA franc creation	CFA franc/French franc rate fixed at CFAF 1=F 1.70.
1948	French franc devaluation	CFAF 1=F 2.00.
1958	Institution of new French Franc	CFAF 1=F 0.02 or F 1=CFAF 50.
1959	BCEAO and BEAC creation	Benin, Burkina Faso, Côte d'Ivoire, Mauritania, Niger, and Senegal create BCEAO; Cameroon, Central African Republic, Chad, Republic of Congo, and Gabon create BEAC.
1963	WAEMU enlargement	Togo joins the West African CFA franc zone.
1973	WAEMU reduction	Mauritania leaves the West African CFA zone.
1984	WAEMU enlargement	Mali joins the West African CFA franc zone.
1985	CEMAC enlargement	Equatorial Guinea joins the Central African CFA franc zone.
1994	CFA franc devaluation	CFAF 1=F 0.01 or F 1=CFAF 100.
1997	WAEMU enlargement	Guinea-Bissau joins the West African CFA franc zone.
1999	Euro creation	Euro replaces the French franc at F6.55957= 1; CFA franc pegged to the euro at CFAF 655.957= 1.

librium exchange rates. This paper analyzes the movements of the actual real effective exchange rates (REERs) for the two monetary unions of the CFA franc zone vis-à-vis their long-run equilibrium values. We use the fundamental equilibrium exchange rate (FEER) approach based on the Edwards (1989) model and the Johansen (1995) cointegration methodology. The fundamentals approach is particularly appropriate in assessing whether a movement of the REER represents a misalignment or whether the equilibrium real effective exchange rate (EREER) itself has shifted because of changes in the economic fundamentals. Our empirical findings are summarized as follows. First, we show that the proposed fundamentals account for most of the fluctuation of the real effective exchange rates:

increases in the terms of trade, government consumption, and productivity improvements tend to cause the exchange rate to appreciate, whereas increases in investment and openness lead to a depreciation. Second, based on these fundamentals, we estimate that although both the WAEMU and CEMAC real exchange rates were slightly more appreciated than their estimated long-run equilibrium levels at end-2005, the estimated misalignments are not statistically significant. Finally, we identify a feedback effect for both CEMAC and WAEMU, which suggests that following a shock there is reversion to the time-varying long-run equilibrium, with the speed of reversion about two times faster in WAEMU than CEMAC.

The rest of the chapter is organized as follows. The next section presents some background and a brief literature review, and develops the empirical formulation of the FEER. Then the econometric methodology and the data used for the analysis are presented, followed by the empirical results including the time-series properties of the data, the long-run and short-run behavior, misalignment, and speed of adjustment. Finally, we offer some conclusions.

Background

Brief Literature Review

A number of different approaches exist in the literature for calculating the EREER.[4] These include traditional uncovered interest parity (UIP) and purchasing power parity (PPP) theories as well as more recent approaches, such as the FEER approach, the underlying internal-external balance (UIEB) approach, and the behavioral equilibrium exchange rate (BEER) approach.

The UIP and PPP arbitrage conditions are common starting points when analyzing movements in the exchange rate. The UIP condition is more informative in explaining the rate of change (or the adjustment path back to equilibrium) and not the level of the exchange rate. UIP by itself has not been successful at predicting exchange rate movements, partly because UIP estimation does not account for possible shifts in the equilibrium exchange rate. Along the same lines, the PPP theory predicts that price levels are equalized when measured in the same currency, which

[4]Driver and Westaway (2004) provide a complete taxonomy of the different empirical approaches on equilibrium exchange rates estimation used in the literature. See also MacDonald and Stein (1999).

suggests that the EREER should be constant and equal to unity. However, empirical work on testing PPP (such as Rogoff, 1996, and MacDonald, 2000) is not very supportive of the theory, suggesting that alternative approaches are needed. To explain the persistence in real exchange rates, it is possible to combine the UIP and PPP and estimate a cointegrating relationship between relative prices, nominal interest rate differentials, and the nominal exchange rate (see, for example, Johansen and Juselius, 1992). This approach is known as the capital enhanced equilibrium exchange rate (CHEER) approach, which has produced higher speed of convergence estimates than other simple PPP models.

Another popular approach used to estimate EREERs is the UIEB approach (also known as the macroeconomic balance approach). This approach defines the equilibrium real exchange rate as that rate which satisfies both internal and external balance. For the underlying balance to hold, planned output must equal aggregate demand (the sum of domestic demand and net trade), with the real exchange rate playing the role of relative price that must move to equilibrate demand and supply. The most popular variants of the UIEB approach are the FEER approach of Edwards (1989), Williamson (1994), and Wren-Lewis (1992); the desired equilibrium exchange rate (DEER); and the natural real exchange rate (NATREX) approach of Stein (1994).[5]

Finally, a method with a shorter time horizon is the BEER approach associated with Clark and MacDonald (1999). BEERs aim to use a modeling technique that captures movements in REERs over time, not just movements in the medium- or long-run equilibrium level. Partly reflecting this, the emphasis in the BEER approach is largely empirical, with variables used to represent long-run fundamentals, in the same way that they would influence FEERs.

Pertinent methodological issues central to estimating EREERs and the associated misalignment include the definition and measurement of the REER, and the theoretical and empirical determinants of the EREER, and the estimation of the EREER. As emphasized in Driver and Westaway (2004), there is no single definition of equilibrium exchange rate. The choice between the various approaches depends on the question of interest, and in particular the time horizon in question.

[5]In DEER the theoretical assumptions are as in FEER but the external balance is based on optimal policy. The NATREX is a longer time horizon than the FEER and DEER and adds the assumption of portfolio balance (so domestic real interest rate is equal to the world rate).

FEER Model Specification

The FEER approach is a well-recognized approach for calculating EREERs.[6] We follow Edwards (1989) in defining the equilibrium exchange rate that results in the simultaneous attainment of internal and external equilibrium in the economy.[7] Internal equilibrium is achieved when the market for nontradable goods clears in the present and is expected to clear in the future as price and wage flexibility ensure that the condition of internal balance (demand equal to supply) is satisfied. External equilibrium is achieved with the current account balance being at a "sustainable" level as given by a sustainable level of capital flows.

Because only real factors (the fundamentals) can influence the EREER, the model can be used to describe nominal misalignments by separating the factors that can affect the long-run equilibrium real exchange rate with permanent changes, and the short-run misalignments of the nominal exchange rate stemming from policy variables.

Edwards (1989) uses a two-period intertemporal optimization in a dynamic model with perfect foresight of a three-good (exportables, importables, and nontradables) small open economy. The economy produces exportable and nontradable goods and consumes the importable and nontradable goods. Nationals hold both domestic and foreign assets, and initially there is no international capital mobility. The government consumes importables and nontradables and uses nondistortionary taxes and domestic money creation to finance expenditures. It is assumed that neither the private sector nor the government can borrow from abroad and that the private sector has inherited a stock of foreign money. Later, capital mobility is allowed in the model, with the government not subject to capital controls and with capital flows in and out of the country. There is a dual exchange rate system (capturing the fact that in most developing countries there is a parallel market for financial transactions), characterized by a fixed nominal exchange rate for commercial transactions and a freely floating nominal exchange rate for financial transactions. There is a tariff on imports, which is handed to the public. The price of exportables is fixed in terms of the foreign currency. These assumptions give rise to equations that describe portfolio decisions, the demand and supply of nontradables, the government sector, and the external sector. When these four conditions hold simultaneously, the EREER associated is

[6]For example, see Williamson (1994); Faruqee, Isard, and Masson (1999); MacDonald and Stein (1999); and Wren-Lewis (2003).

[7]The model is discussed in detail in Williamson (1994) so we only sketch the proof here. See also Hinkle and Montiel (1999). Cerra and Saxena (2002) and Mathisen (2003) are applications of Edwards' methodology.

attained at the steady state, ensuring simultaneous internal and external balance. The instantaneous equilibrium in the nontraded goods market for given levels of some exogenous and policy fundamentals, is as follows:

$$e = e(\textit{terms of trade}, \textit{government spending}, \textit{trade controls}, \textit{productivity}, \textit{investment}).$$

The model predictions suggest the following expected signs for the fundamentals:

- *Terms of trade*. The terms of trade affect the REER through the wealth effect. A positive terms of trade shock induces an increase in the domestic demand, hence an increase in the relative price of nontradable goods, which leads to a REER appreciation. Alternatively, viewed from an internal-external balance angle, an increase in the terms of trade leads to an increase in real wages of the export sector and a trade surplus. To restore external balance, the REER must appreciate. Hence, the expected sign is positive.
- *Government spending.* This is a proxy for government demand for nontradables. Changes in the composition of government spending affect the long-run equilibrium in different ways, depending on whether the spending is directed toward traded or nontraded goods.[8] If government spending is primarily directed toward nontradable (tradable) goods, an increase in government consumption will result in an appreciation (depreciation) of the REER. The expected sign is ambiguous in the absence of a breakdown of government spending in tradable and nontradable goods.
- *Trade controls/restrictions.* As trade controls or barriers are reduced, the total amount of trade is expected to increase. The demand for imports leads to external and internal imbalances that require a depreciation to correct. Therefore, the expected sign is negative. We proxy the reduction in trade controls and restrictions with openness.[9]
- *Productivity.* This captures the Balassa-Samuelson effect. An increase in the productivity of tradables versus nontradables of one country

[8]See, for example, Montiel (1999) for a discussion on this. It is noted, however, that most empirical studies using this framework tend to find a positive relationship between the REER and government consumption.

[9]Openness as a measure of trade restrictions is used by Montiel (1999). Edwards (1989) uses two alternative measures (import tariffs as ratio of tariff revenues and the spread between the parallel and official rates), which he acknowledges to have important limitations.

relative to a foreign country raises its relative wages. This increases the relative price of nontradables to tradables and, hence, causes a REER appreciation. The expected sign is positive.

- *Investment*. Edwards suggests that inclusion of investment in the theoretical model results in supply-side effects that are dependent on the relative factor intensities across sectors, and as a result, the expected sign may a priori be ambiguous. However, given developing country evidence that investment may have a high import content, a rise in the investment share of GDP could shift spending toward traded goods and thus depreciate the REER, suggesting an expected negative sign.

The REER fluctuates around a time-varying equilibrium defined by its relationship with the long-run fundamentals. Because only real factors (the fundamentals) can influence the EREER, the model can be used to describe nominal misalignments by separating the factors that can affect the long-run equilibrium real exchange rate with permanent changes (that is, with permanent changes in the fundamentals bringing about changes in the long-run EREER), and the short-run misalignments of the nominal exchange rate stemming from policy variables.[10]

Measuring the degree of misalignment requires constructing an unobserved variable, the EREER, which requires a decomposition of the fundamentals into their "permanent" and "transitory" components. Edwards (1989) uses two methods to derive the permanent component of the fundamentals: a Beveridge-Nelson decomposition and a moving average of each of the fundamental series together with the equilibrium equation. Other potential methods for finding the permanent component of the fundamentals include the approaches of Hodrick-Prescott (1997), Quah (1992), Kasa (1992), and Gonzalo and Granger (1995). The Gonzalo-Granger method is more theoretically appealing, because (and unlike the Quah and Kasa methods), the decomposition is derived by construction so that the transitory component does not Granger cause the permanent component in the long run, which implies that a temporary shock does not have a permanent effect on the series.

[10]In addition to the long-run relationship, Edwards (1989) considers "inconsistent" macroeconomic policies (such as excess supply of domestic credit and a measure of fiscal policy) that may result in short-run misalignments, given that they generate higher domestic price levels, which in a fixed exchange rate lead to an appreciation of the REER. However, these conditions (high domestic inflation with a nominal exchange rate fixed to a low-inflation country) are not met, because inflation has remained in the low levels and nominal exchange rate adjustment outpaced adjustment through the price level. Consequently, we do not include these variables in the short-run specification of our analysis.

Methodology and Data

Econometric Methodology

The Johansen (1988, 1991, and 1995) maximum likelihood procedure is first used to test for the existence of a long-run cointegrating relationship between the exchange rate and its fundamentals. Next, the equilibrium levels of the fundamentals are computed; namely, by extracting the permanent component from the series. Then, the vector of long-run parameters (estimated from the long-run relationship between the real exchange rate and the fundamentals) and the extracted permanent component of the fundamentals are combined to calculate the equilibrium real effective exchange rate.

Cointegration

We begin by specifying a vector of variables Y_t assumed to be in vector autoregressive (VAR) form:

$$Y_t = \pi_0 + \sum_{i=1}^{p} \pi_i Y_{t-i} + \Psi D_t + \varepsilon_t, \tag{6.1}$$

where Y_t is a (6×1) vector:

$$Y_t = \begin{bmatrix} \textit{Real effective exchange rate}_t \\ \textit{Terms of trade}_t \\ \textit{Government spending}_t \\ \textit{Openness}_t \\ \textit{Productivity}_t \\ \textit{Investment}_t \end{bmatrix},$$

where π_0 is a (6×1) vector of deterministic variables; π_i are (6×6) matrices of coefficients on lags of Y_t; D_t is a vector of dummy-type variables; p is the lag length; and ε_t is a (6×1) vector of independent and identically distributed errors assumed to be normal with zero mean and covariance matrix Ω. The VAR specification in equation (6.1) provides the basis for cointegration analysis. Adding and subtracting various lags of Y_t yields an expression for the VAR in first differences:

$$\Delta Y_t = \pi_0 + \pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_t \Delta Y_{t-i} + \Psi D_t + \varepsilon_t, \tag{6.2}$$

where Δ denotes the difference operator, $\Gamma_i = -(\pi_{i+1} + \ldots + \pi_p)$ is a (6×6) coefficient matrix, and

$$\pi \equiv \left(\sum_{i=1}^{p} \pi_i\right) - I.$$

If π is a zero matrix, then modeling in first differences is appropriate. The matrix π may be of full rank or less than full rank, but of rank greater than zero. When $rank(\pi)=6$, then the original series are stationary; modeling in differences is unnecessary. But, if $0<rank(\pi)\equiv r<6$, then the matrix π can be expressed as the outer product of two full column rank $(6\times r)$ matrices α and β where $\pi=\alpha\beta'$. This implies there are $6-r$ unit roots in πY. The VAR model can then be expressed in error correction form. That is,

$$\Delta Y_t = \pi_0 + \alpha\beta' Y_{t-1} + \sum_{i=1}^{p-1}\Gamma_i \Delta Y_{t-i} + \Psi D_t + \varepsilon_t. \qquad (6.3)$$

The matrix β' contains the cointegrating vector(s) and the matrix α has the weighting elements for the rth cointegrating relation in each equation of the VAR. The matrix rows of $\beta' Y_{t-1}$ are normalized on the variable(s) of interest in the cointegrating relation(s) and interpreted as the deviation(s) from the "long-run" equilibrium condition(s). In this context, the columns of α represent the speed of adjustment to "long-run" equilibrium.[11] The estimated vector β can be used to provide a measure of the equilibrium real exchange rate and also quantify the misalignment gap between the prevailing real exchange rate and its equilibrium level. The estimated α captures the speed at which the real exchange rates converge to the equilibrium level.

Permanent and Transitory Decomposition

The presence of cointegration implies that the vector Y_t may be thought of as being driven by a smaller number of common trends or permanent components. The permanent component Y_t^P is taken to be the measure of equilibrium, whereas Y_t^T measures transitory fluctuations. There are a number of alternative methods of extracting the permanent component of the series. All of these methods attempt to determine common trends driving the real exchange rate and other identified fundamentals, and identify real shocks that are considered to be permanent, and nominal shocks that are considered to be transitory.[12]

We apply two different decomposition methods to the fundamentals time series, namely, the Hodrick-Prescott (HP) (1997) filter and the Gonzalo-Granger (GG) (1995) decomposition. The construction of the permanent component of the fundamentals series using the HP filter has become a popular choice among business cycle analysts.

[11]If the coefficient is zero in a particular equation, that variable is considered to be weakly exogenous and the VAR can be conditioned on that variable.

[12]As discussed in Maravall (1993) and Quah (1992), a unique decomposition between permanent and transitory components does not exist.

One of the virtues and downfalls of the HP filter is its flexibility: the filter depends on the choice of the smoothing parameter λ that makes the resulting cyclical component and its statistical properties highly sensitive to this choice. Further, it is not possible to calculate an approximately "optimal" λ for each series via estimation. This method produces smooth permanent component series, but it lacks sound theoretical basis. Therefore, we use it only for illustration purposes.[13]

The GG decomposition is more theoretically appealing. It is based on the assumption that shocks to the transitory component (that is, misalignments) do not affect the permanent component (that is, the equilibrium). The decomposition is derived so that first, the transitory component does not Granger cause the permanent component in the long run and second, the permanent component is a linear combination of contemporaneous observed variables. The first restriction implies that changes in the transitory component will not have an effect on the long-run values of the variables; the second restriction makes the permanent component observable and assumes that the contemporaneous observations contain all the information necessary to extract the permanent component.[14] For more technical details on the GG decomposition, see Abdih and Tsangarides (2006).

Variables and Data

As discussed in the previous sections, our VAR/VECM includes the following identified variables: the natural logarithm of the real effective exchange rate (*LREER*), the natural logarithm of terms of trade (*LTTT*), the natural logarithm of government spending as a share of GDP (*LNCGR*), the natural logarithm of real GDP per capita relative to trading partners (*LPROD*) to capture the Balassa-Samuelson effect, the natural logarithm of openness to GDP (*LOPEN*), and the natural logarithm of investment to GDP (*LNIR*). Dummy variables were used to capture the effect of the 1994 devaluation and the presence of outliers.[15]

[13]Moreover, as also discussed in Cerra and Saxena (2002), if simple smoothing processes were sufficient to arrive at the equilibrium values for the fundamental series, then, presumably, the same smoothing process could be employed to arrive at the equilibrium real exchange rate series, without the need for the VECM estimation.

[14]Other applications of the GG decomposition are Alberola and others (1999), Cerra and Saxena (2002), and Mathisen (2003).

[15]More details on this appear in the results section.

The data sets for both the CEMAC and WAEMU regions consist of annual observations for the period 1970–2005.[16] The real effective exchange rate and the fundamentals employed in the empirical analysis are plotted for the CEMAC and WAEMU regions in Figures A6.2.1a and A6.2.1b, respectively. Some interesting patterns are worth highlighting. Economic performance under the arrangement was initially favorable, with growth in line with experiences in other African countries but markedly lower inflation. However, by the 1980s and early 1990s, increasing domestic and external imbalances emerged: high current account deficits, low levels of international reserves, and pressures on the exchange rate eventually forced a devaluation of the CFA franc in 1994 by 50 percent vis-à-vis the French franc. This sole devaluation is generally seen as a success, as it restored external competitiveness in the region and supported a resumption of growth. In contrast, measures to enhance the resilience of the exchange arrangement seem to have had less of an impact. Efforts initiated in 1994 to deepen regional integration in the context of two common markets failed to increase internal trade and factor mobility. Similarly, notwithstanding free capital markets in the region, financial markets remain shallow and segmented.[17]

The 1994 devaluation was followed by a steady appreciation of the REER (see Tables A6.2.1a and A6.2.1b, and Figures A6.2.2a and A6.2.2b). First, for CEMAC, the real effective exchange rate ($REER_C$) appreciated cumulatively by about 33 percent through December 2000 and by a further 16 percent from January 2001 to December 2005 (the latest appreciation essentially owing to the strengthening of the euro to which the CFA franc is pegged). By December 2005, $REER_C$ was at 87 percent of its pre-devaluation level. For WAEMU, the real effective exchange rate ($REER_W$) appreciated cumulatively by about 22 percent through December 2000, and by a further 12 percent from January 2001 to September 2005. By December 2004, the $REER_W$ was at 76 percent of its pre-devaluation level.

We observe significant variations around the regional averages (see Figures A6.2.3a and A6.2.3b). In the WAEMU region, Benin has experienced the highest appreciation since the 1994 devaluation and Senegal the lowest, with their REERs appreciating by December 2005 and standing at between 56 percent (Senegal) and 91 percent (Benin) of their pre-devaluation levels. In the CEMAC region, there was some-

[16]More details on the variable definitions and sources are presented in Appendix 6.1.

[17]For evidence on the benefits of CFA membership see, for example, Stasavage (1997), Fouda and Stasavage (2000), Elbadawi and Majd (1996), and Masson and Pattillo (2001 and 2004).

what a wider variance of REERs compared to WAEMU partly as a result of the new oil producers. Equatorial Guinea had the highest appreciation (115 percent of its pre-devaluation level) and Gabon the lowest appreciation (70 percent of its pre-devaluation level). For both regions, we observe a persistent decline in real GDP per capita with respect to trading partners starting in the mid 1970s until the end of the sample period; we also observe an increase of investment starting in the 1990s, and a quite volatile pattern of terms of trade, with an average increase in the 2000s as a result of favorable export commodity prices: oil for CEMAC, and cotton, cocoa, and gold for WAEMU. Further, for the CEMAC region only, we observe a surge in foreign direct investment in 2000–03 associated with oil-related construction in Chad and Equatorial Guinea, while in WAEMU, there was a slowdown in that period. Next, for CEMAC, government consumption was constant until about 1990 with a slight decline since then. Finally, for WAEMU, there has been a continuous overall decline in the government consumption ratio since the mid-1980s.

There are also significant differences between the two regions. Within WAEMU some countries are semi-industrialized and more developed than others (such as Senegal and Côte d'Ivoire), and some are low-income landlocked countries close to the Sahara (Mali and Chad). WAEMU countries are net oil importers. The eight WAEMU countries had a total population of 76 million inhabitants in 2003 and a combined GDP of $37 billion. This is about the same population and GDP as Vietnam. The six CEMAC countries had a total population of 34 million inhabitants in 2003 and a combined GDP of $28 billion. This is about the same population as Tanzania, and the same GDP as Kazakhstan. With five of six CEMAC members now net oil exporters, economic developments and prospects are dominated by oil market developments. Except for Cameroon, each country has a dominant export commodity accounting for 80 percent or more of total primary exports.

Empirical Results

Modeling the Data

This section discusses the univariate and multivariate time series properties of the data. We start by testing for unit roots or the order of integration of the series. Then we formulate and estimate VAR models for WAEMU and CEMAC and test for cointegration.

Integration Analysis

Figures A6.2.1a and A6.2.1b show a somewhat trending behavior in the series and the autocorrelations were quite strong and persistent. Nelson and Plosser (1982) find that many macroeconomic and aggregate level series are shown to be well modeled as stochastic trends, that is integrated of order one, or *I*(1). Simple first differencing of the data will remove the nonstationarity problem, but with a loss of generality regarding the long run "equilibrium" relationships among the variables.

We performed the standard Augmented Dickey-Fuller (ADF) tests in both levels and first differences of the variables of interest. These tests showed that all our variables are *I*(1) in levels or, equivalently, stationary in first differences.[18]

Formulating the VAR

Our analysis of the exchange rate and its fundamentals suggests that the processes are nonstationary. This has implications with respect to the appropriate statistical methodology. Although focusing on first differences eliminates the problem of spurious regressions, it also results in a potential loss of information on the long-run level interaction of the variables (see, for example, Davidson and others, 1978). We examine the hypothesis of whether there exist economically meaningful linear combinations of the *I*(1) series: the real effective exchange rate, terms of trade, government consumption, investment, technological progress, and openness that are stationary or *I*(0). The Johansen maximum likelihood cointegration procedure discussed above is used for the analysis.

The procedure begins with the VAR specification. For both CEMAC and WEAMU, the VARs include *LREER* and the five fundamentals: *LTTT*, *LNCGR*, *LNIR*, *LPROD*, and *LOPEN*.[19] The VARs also include a constant term and dummy variables. For the CEMAC region, the VAR includes five impulse dummies for 1994, 1976, 1978, 1985, and 2001; for WAEMU, the VAR includes three impulse dummies for 1994, 1974 and 1979, and 2003.[20]

Economically, for WAEMU, the impulse dummies for 1994, 1974 and 1979, and 2003, respectively, capture the devaluation, the first and second oil price shocks, and the Côte d'Ivoire crisis. For CEMAC, the impulse dummy for 1994 captures the devaluation; the dummies for 1976 and 1978 capture large changes in real GDP growth of Gabon (40 percent and –28 percent in

[18]For more details on the ADF tests, see Abdih and Tsangarides (2006).

[19]Recall that all the variables are in natural logarithm.

[20]Impulse dummies take the value of 1 at year "X" and zero otherwise.

1976 and 1978, respectively); the dummy variable for 1985 primarily captures a favorable terms of trade effect in Cameroon right before the collapse of oil prices in 1986;[21] and the dummy variable for 2001 captures the effect of the surge in foreign direct investment relating to oil construction and investment and somewhat a terms of trade increase.

Lag-Length, Residual Diagnostics, and Testing for Cointegration

Before conducting the cointegration tests, the appropriate lag-length of the VAR must be determined and a constant model found. The lag length is not known a priori, so some testing of lag order must be done to ensure that the estimated residuals of the VAR are white noise. Initially, we started with a VAR that includes three lags on each variable, denoted VAR(3), then we estimated a VAR with 2 lags, VAR(2), and tested whether the simplification from VAR(3) to VAR(2) is statistically valid. The process was repeated sequentially down to a VAR with a single lag, VAR(1). Sequential F-tests for model reduction showed that, for CEMAC, the simplification to a VAR with two lags, VAR(2), is statistically valid, whereas the simplification to a VAR with a single lag, VAR(1), is rejected at the 5 percent significance level. For WAEMU, the simplification to a VAR with a single lag, VAR(1), is accepted at the 5 percent level. Moreover, VAR(2) for CEMAC and VAR(1) for WAEMU produced residuals that are serially uncorrelated, normal, and homoscedastic. We have also estimated these VARs recursively to test for model constancy. The recursively estimated Chow tests indicated that the VARs are statistically stable. Hence, we proceed with the analysis using the VAR(2) model for CEMAC, and the VAR(1) model for WAEMU. For a more detailed discussion on model reduction, residual diagnostics, and model stability results, see Abdih and Tsangarides (2006).

The cointegration analysis proceeds in several steps: testing for the existence of cointegration, interpreting and identifying the relationship(s), and inference tests on the coefficients from theory and weak exogeneity. Testing permits reduction of the unrestricted general model to a final restricted model without loss of information.

Table A6.2.2. presents the initial test for cointegration for the CEMAC and WAEMU samples. The table reports the trace statistic and its associated *p*-values. For both the CEMAC and WAEMU samples, the null hypothesis that there are zero cointegrating vectors versus the alternative that there are more than zero cointegrating vectors is soundly

[21]Cameroon started oil production in 1976, reaching a peak in 1985. Oil production steadily declined through the mid-1990s.

rejected. Furthermore, the null that there is at most one cointegrating vector versus the alternative that there are more than one cointegrating vector is not rejected at the 5 percent significance level. Overall, the cointegration tests indicate the presence of one cointegrating vector for each sample.

Estimation of the Equilibrium Exchange Rate

The Long-Run and Short-Run Relationships

The cointegration analysis suggests that there exists a long-run relationship between the REERs and their identified fundamentals for both the CEMAC and WAEMU regions. Table 6.1 contains the results from estimating the VARs/VECMs in equation (6.3) for the CEMAC and WAEMU samples. The table is divided into two panels, with the top panel reporting estimates for the cointegrating vectors (the β's) together with their *t*-statistics, and the bottom panel reporting the feedback coefficients estimates (the α's) and their *t*-statistics. The resulting cointegration equations are consistent with the predictions from economic theory, as the estimated coefficients (all representing elasticities) have the expected signs and are strongly significant.

The *long-run* relationship between the REER and the fundamentals variables is shown in the top panel of Table 6.1. For both the CEMAC and WAEMU samples: (1) the terms of trade are positively correlated with the REER, indicating that an improvement in terms of trade would result in an appreciation of the long-run EREER through a possible wealth effect; (2) government consumption has a positive (appreciating) impact on the REER, suggesting that most government spending is directed toward nontradables; (3) the relatively high long-term impact of technological progress (proxied by the relative real GDP per capita) confirms the Balassa-Samuelson effect; (4) investment is negatively correlated with the REER, confirming the hypothesis that investment increases spending toward traded goods; and (5) increases in openness are associated with depreciation of the REER through increases in imports.

To get an idea of the marginal impact of the fundamentals' coefficients we examine the models' elasticities and investigate the effect of a 1 percent increase in the fundamentals on the REERs of the two regions. Specifically,

For CEMAC, a 1 percent increase in

- the terms of trade is associated with a 0.70 percent appreciation of the REER;

Table 6.1. Results of Cointegration Estimation
(Dependent variable: ln(real effective exchange rate))

	Sample	
Specification:	CEMAC	WAEMU
Estimates of the cointegrating relationships		
ln(terms of trade)	0.70***	0.58***
	(9.04)	(5.16)
ln(government consumption)	0.41***	0.69***
	(2.71)	(13.24)
ln(technological progress)	0.59***	0.26***
	(15.60)	(5.08)
ln(investment)	–0.21**	–0.28***
	(2.50)	(4.35)
ln(openness)	–0.24**	–0.18***
	(2.36)	(2.72)
Constant	1.57	1.42
Estimates of the short-term coefficients		
D[ln(real effective exchange rate)]	–0.12**	–0.24***
	(1.96)	(2.93)
D[ln(terms of trade)]	0.26	–0.15
	(1.45)	(0.99)
D[ln(government consumption)]	0.26	0.51***
	(1.36)	(6.13)
D[ln(technological progress)]	–0.21	0.09
	(1.19)	(0.44)
D[ln(investment)]	0.33***	0.05
	(3.22)	(0.75)
D[ln(openness)]	–0.06	0.05
	(0.35)	(0.30)
Half-life of deviation	5.6	2.9

Source: Authors' estimations.
Note: *** and ** denote statistical significance at the 0.01 and 0.05 levels, respectively; *t*-statistics are in parentheses. The speed of adjustment coefficient is derived from the error correction model.

- the level of government consumption as share to GDP is associated with a 0.41 percent appreciation of the REER;
- technological progress is associated with a 0.59 percent appreciation of the REER;
- investment as share to GDP is associated with a 0.21 percent depreciation of the REER; and
- openness is associated with a 0.24 percent depreciation of the REER.

For WAEMU, a 1 percent increase in

- the terms of trade is associated with a 0.58 percent appreciation of the REER;

- the level of government consumption as share to GDP is associated with a 0.69 percent appreciation of the REER;
- technological progress is associated with a 0.26 percent appreciation of the REER;
- investment is associated with a 0.28 percent depreciation of the REER; and
- openness is associated with a 0.18 percent depreciation of the REER.

The bottom panel of Table 6.1 shows the feedback coefficients for the cointegrating vectors, or the *short-run* relationship of the LREER and its fundamentals. Some are estimated to be significantly different from zero which suggests that these fundamentals are not weakly exogenous with respect to the parameters of the cointegrating relationship, and in the face of any deviation from the long-run equilibrium these variables jointly respond and move the system back to equilibrium. Furthermore, the feedback coefficient for the error correction equation (DLREER) is negative and significantly different from zero (for both CEMAC and WAEMU), suggesting stability of the error correction mechanism.

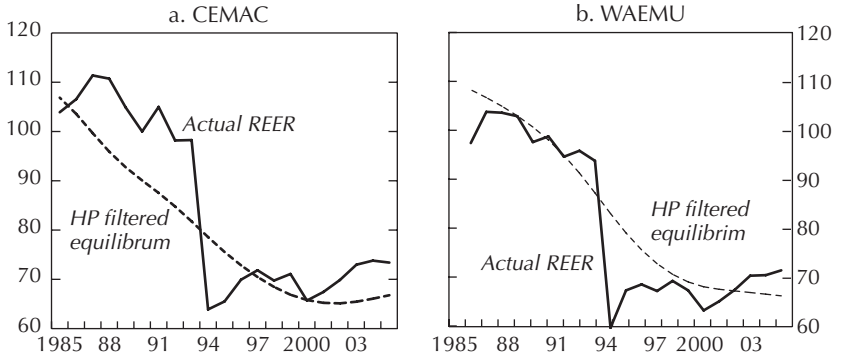
Misalignment and Speed of Adjustment

The two long-run relationships obtained by estimating the equation of the REERs with their fundamentals above permits the calculation of the EREER. Therefore, the EREER can be defined as the level of REER that is consistent in the long run with the equilibrium values of the fundamentals. Based on the results of the cointegration regressions, the equilibrium EREERs were computed using the long-term components of the fundamentals. As discussed in earlier sections, we use two methods to derive the permanent component of the fundamentals: the HP filter (used for illustrative purposes only) and the GG decomposition (which is more theoretically attractive).[22] Then, we estimate the misalignment episodes and their statistical significance using the GG decomposition.

Figures 6.1a and 6.1b display the evolution of the actual and the estimated EREER rate for the CEMAC and WAEMU regions, respectively, for the period 1985–2005 using the HP filter. Figures 6.2a and 6.2b apply the

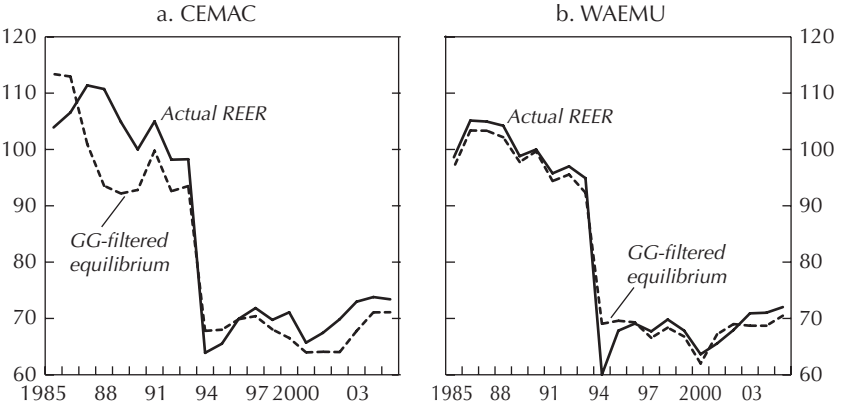
[22]As discussed, the choice of the degree of smoothing is arbitrary with larger (smaller) factors generating smoother (less smooth) equilibrium real exchange rate paths. As a robustness check, the equilibrium real exchange rates in Figures 6.1a and 6.1b are derived by applying to the explanatory variables an HP filter based on the average of five smoothing factors (10, 30, 50, 100, and 300).

Figure 6.1. Actual and HP Equilibrium Real Exchange Rates
(Index 1990 = 100)



Source: Authors' calculations.

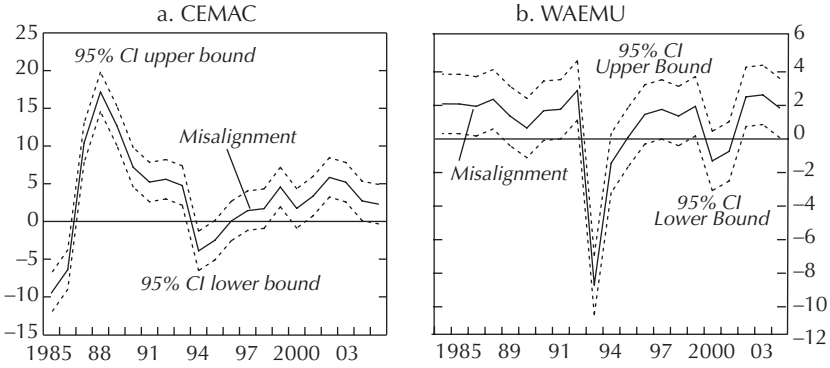
Figure 6.2. Actual and GG Equilibrium Real Exchange Rates
(Index 1990 = 100)



Source: Authors' calculations.

GG decomposition to construct the estimated EREER rate for CEMAC and WAEMU, respectively. Interestingly, although the HP filter method carries no theoretical basis, EREERs estimated using the HP method are very close to the ones estimated by the theoretically attractive GG decomposition (especially for CEMAC). Figures 6.3a and 6.3b estimate the mis-

Figure 6.3. Estimated Misalignment Episodes



Source: Authors' calculations.

alignments for CEMAC and WAEMU, respectively, along with the error bands in order to identify statistically significant misalignment episodes.

The actual WAEMU and CEMAC REERs went through a period of overvaluation prior to 1994 (with the actual REERs well above the equilibrium level in the case of CEMAC, but less so for WAEMU), which suggests that the 1994 CFA devaluation was warranted. After 1994 and a few years of "correction," both the CEMAC and WAEMU REERs remained, in principle, above their equilibrium levels for the rest of the period of analysis as a result of changes in the fundamentals, which differed for the two regions. In particular, the CEMAC REER temporarily exceeded its equilibrium level in 1999 and then again during the period 2001–04, with statistically significant misalignments during those episodes. In the case of WAEMU, there were no statistically significant misalignments after the devaluation until a short period in 2003–04. Finally, in 2005, our analysis shows that although both the CEMAC and WEAMU REERs were slightly above their estimated long-run equilibrium levels, none of these overvaluations were statistically significant. This suggests that at end-2005, both the CEMAC and WAEMU REERs were broadly in line with their long-run equilibrium values.

The real exchange rate can deviate from its equilibrium value as a result of changes in the fundamentals or of temporary factors. Depending on the cause of the misalignment, the real exchange rate will converge toward a new equilibrium level or return from its temporary position to the original equilibrium value. The estimates derived in this study suggest very different speeds of adjustment for the two regions. For the CEMAC region,

on average, about 0.12 percent of the gap is eliminated every year, which implies that, in the absence of further shocks, about half the gap would be closed within 5.6 years. However, for the WAEMU region, the adjustment is faster; with 0.24 percent of the gap eliminated every year, implying that in the absence of further shocks about half the gap would be closed within 2.9 years, almost half the time estimated for CEMAC. However, larger deviations (such as the ones caused by the 1994 devaluation) may take much longer to absorb. In comparison to other studies, both the WAEMU and CEMAC adjustment speeds are reasonable.[23]

Our analysis has pointed out that although the paths of the two regions' equilibrium exchange rates have evolved similarly, there are important differences in the marginal impacts of the fundamentals as well as the speed of adjustment to equilibrium in response to shocks. This suggests that changes in the fundamentals may have differentiated impacts on the real effective exchange rates of the two regions, and in a situation of a sustained and protracted misalignment, these differences may potentially require an exchange rate adjustment in one region and not the other. However, based on the fact that we do not find evidence for any significant misalignments, there is no need for an immediate adjustment in the level of the peg. At the same time, in the context of overall sound macroeconomic policies, strong commodity prices, increasing reserve levels, limited capital flows, and cautiously optimistic market assessments, there are no immediate macroeconomic imbalances that would call for correction through an exchange rate adjustment.

Conclusion

Using a dynamic model of a small open economy and the Johansen cointegration methodology, the WAEMU and CEMAC regions' equilibrium real effective exchange rates are analyzed and an assessment is made as to whether the movements in the aggregate real exchange rates are consistent with the underlying macroeconomic fundamentals. We show that much of the long-run behavior of the real effective exchange rates can be explained by fluctuations in the terms of trade, government consumption, investment, openness, and productivity. Based on the estimated paths of the WAEMU and CEMAC equilibrium real effective exchange rates, there is

[23]Mathisen (2003) and Cashin, Céspedes, and Sahay (2002) estimate an adjustment speed with half-life of less than a year for Malawi; MacDonald and Ricci (2003) estimate a half-life of two to two-and-a-half years for South Africa; Rogoff (1996) estimates the longer half-life of three to five years.

a clear pattern of overvaluation before 1994 (suggesting that the exchange rate adjustment was warranted). The recent real appreciation of the CFA exchange rate has brought the CEMAC and WAEMU REERs above their underlying long-run equilibrium values as evident from the short periods of temporary overvaluations in the latter part of the period. Nevertheless, in 2005, the current levels of the real effective exchange rats are in line with the estimated equilibrium real effective exchange rate paths, without any statistically significant misalignment. Finally, the analysis shows that, in the absence of further shocks, real exchange rate deviations from their equilibrium levels due to temporary factors are expected to revert to equilibrium about twice as fast in WAEMU than CEMAC.

A complete analysis of the environment that affects the short-term sustainability of the CFA franc arrangement requires an examination of possible pressures on balance of payments flows and reserve levels, losses of competitiveness, unfavorable market perceptions, and sustained deviations from equilibrium exchange rates. For the latter, fixed exchange rate regimes can be sustainable in theory, as long as actual deviations from long-term equilibrium rates are small and mean-reverting. In contrast, if deviations are one-sided and build up to longer-term significant misalignments, it is generally argued that, in addition to demand-side management policies, real exchange rate action may be needed to restore balance.[24]

Appendix 6.1. Variable Definitions and Sources

The data sets for both the CEMAC and WAEMU samples consist of annual observations for the period of 1970–2005. The regional aggregate variables for CEMAC and WAEMU were constructed using the national annual observations and GDP weights. Equatorial Guinea joined CEMAC in 1985 and was excluded from analysis (also because of poor quality data). Similarly, Guinea-Bissau was excluded from the WAEMU average as it joined the union in 1997.

The countries' real effective exchange rate prior to 1980 was unavailable in the IMF's Information Notice System (INS) database and was constructed based on consumer price indices from the *World Economic Outlook* (*WEO*) with partner weights renormalized. The "foreign" variable (used for the calculation of the productivity proxy) was calculated as the

[24]Results in the literature point to the fact that only significant misalignments that are sustained for protracted periods of time could lead to currency crises. See, for example, JP Morgan (2000) and Sarno and Taylor (2002).

renormalized weighted average of the five trading partners based on the INS weights for the real effective exchange rate. For CEMAC, the partner countries (weights) were France (0.43), the United States (0.15), Germany (0.13), Japan (0.11), Italy (0.10), and Belgium (0.08). For WAEMU, the partner countries (weights) were France (0.42), Germany (0.15), the United States (0.14), Japan (0.11), Italy (0.10), and the Netherlands (0.09).

The variables' acronyms, definitions, and sources are as follows:

LREER Natural logarithm of the real effective exchange rate. Sources: IMF INS and staff calculations.

LNCGR Natural logarithm of public consumption expenditure to GDP. Source: IMF, *WEO*.

LTTT Natural logarithm of terms of trade. Source: IMF, *WEO*.

LNIR Natural logarithm of gross capital formation to GDP. Source: IMF, *WEO*.

LPROD Natural logarithm of real per capita GDP relative to main trade partners, normalized to 1 in 2000 with weights as discussed above. Source: IMF, *WEO*.

LOPEN Sum of exports and imports to GDP. Source: IMF, *WEO*.

BFDIR Net foreign direct investment (current prices) to GDP. Source: IMF, *WEO*.

Appendix 6.2. Data, Diagnostics, and Test Results

Table A6.2.1a. WAEMU: Real Effective Exchange Rate and Its Components
(In percent)

	Jan. 1994–Dec. 1998	Jan. 1999–Dec. 2000	Jan. 2001–Dec. 2005
Period percentage change			
Real effective exchange rate	35.4	–8.8	9.4
Nominal effective exchange rate	13.2	–8.2	7.0
Relative price index	25.4	0.0	0.6
Cumulative percentage change			
Real effective exchange rate	31.0	–8.9	11.5
Nominal effective exchange rate	12.7	–8.3	8.5
Relative price index	23.0	0.9	0.5

Sources: IMF, Information Notice System and staff calculations.

Table A6.2.1b. CEMAC: Real Effective Exchange Rate and Its Components
(In percent)

	Jan. 1994–Dec. 1998	Jan. 1999–Dec. 2000	Jan. 2001–Dec. 2005
Period percentage change			
Real effective exchange rate	51.2	–11.3	13.4
Nominal effective exchange rate	15.2	–8.7	7.1
Relative price index	31.8	–2.3	5.8
Cumulative percentage change			
Real effective exchange rate	42.9	–9.8	16.3
Nominal effective exchange rate	14.4	–7.4	10.0
Relative price index	28.7	–1.8	6.2

Sources: IMF, Information Notice System and staff calculations.

Table A6.2.2 Johansen Cointegration Tests

Number of Hypothesized Cointegrating Equations: CEMAC	Eigenvalue	Trace Statistic	*p*-value
None	0.85	99.79	0.02**
At most 1	0.64	55.63	0.40
At most 2	0.50	32.34	0.60
At most 3	0.40	16.57	0.68
At most 4	0.16	4.71	0.84
At most 5	0.03	0.63	0.43

The Trace test indicates 1 cointegrating equation at the 0.05 level.

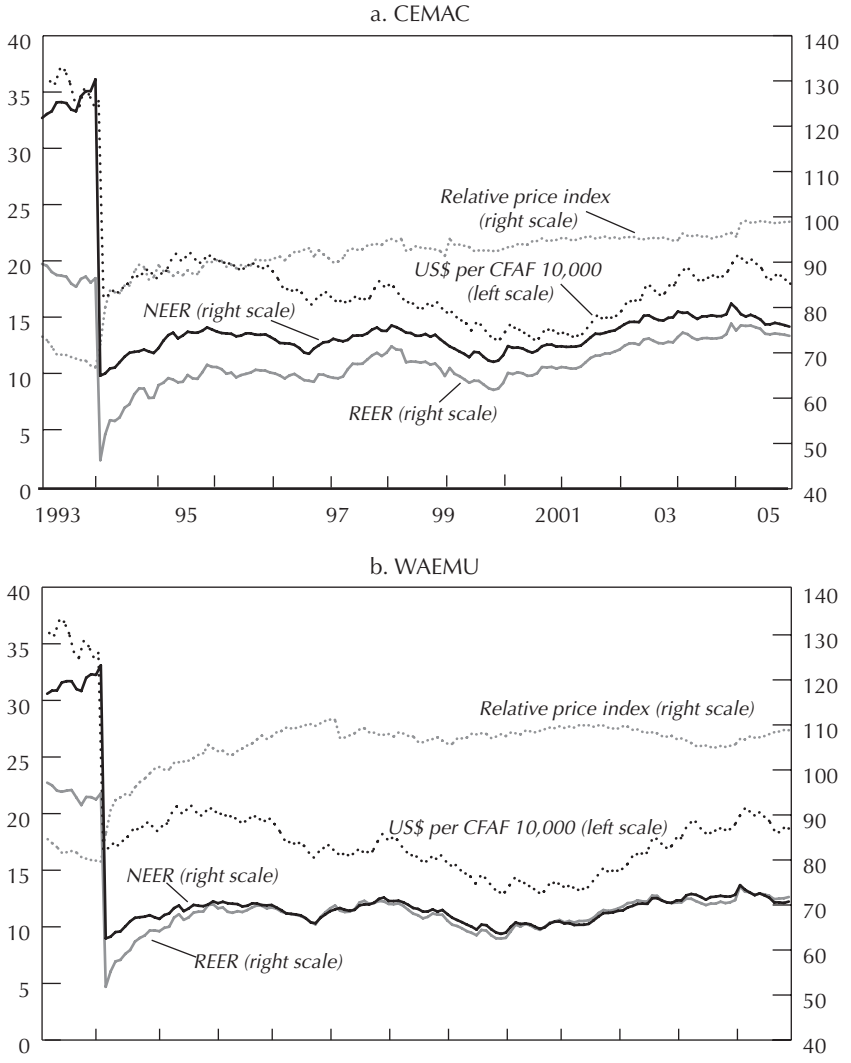
Number of Hypothesized Cointegrating Equations: WAEMU	Eigenvalue	Trace Statistic	*p*-value
None	0.83	99.82	0.02**
At most 1	0.54	49.03	0.68
At most 2	0.38	26.73	0.86
At most 3	0.26	12.78	0.90
At most 4	0.12	4.17	0.88
At most 5	0.01	0.31	0.58

The Trace test indicates 1 cointegrating equation at the 0.05 level.

Source: Authors' estimations.

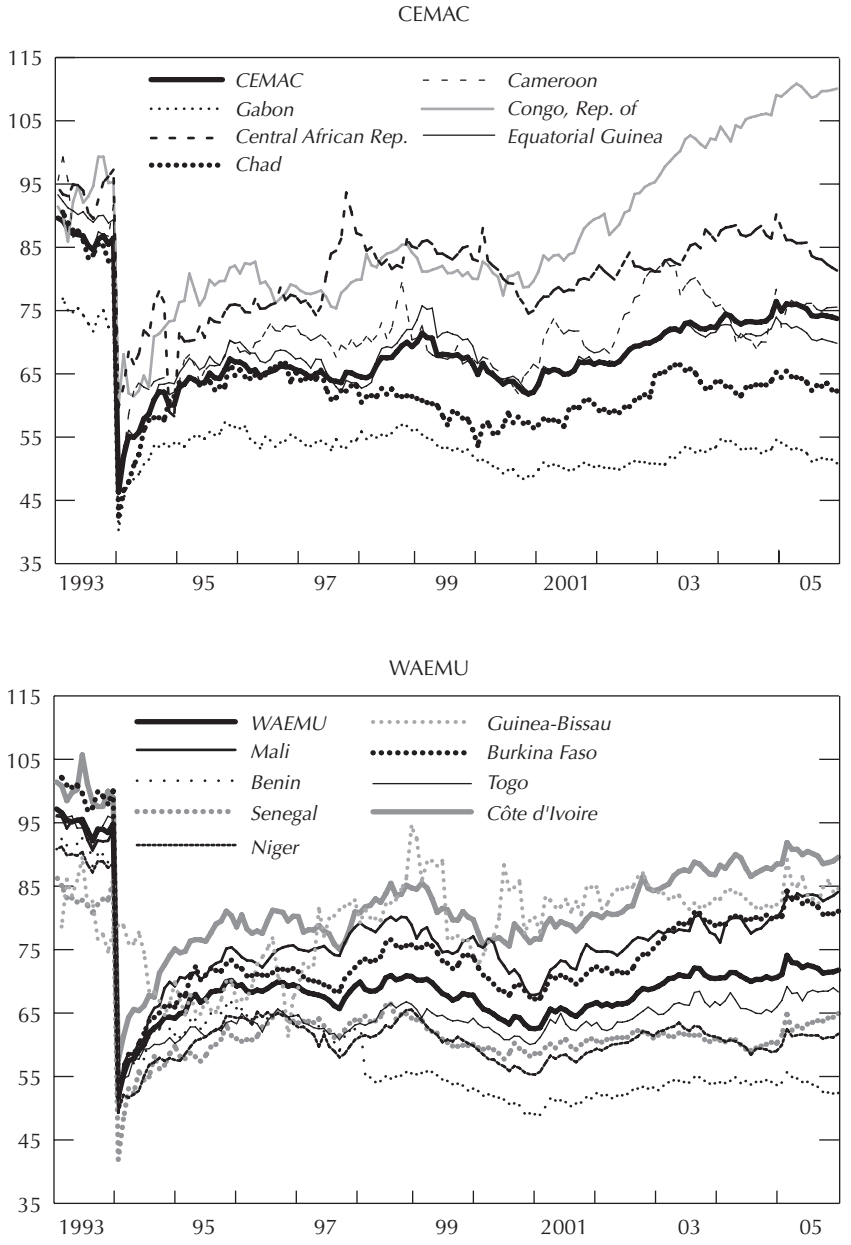
Note: The CEMAC VAR includes two lags on each variable (*LREER, LTTT, LNCGR, LNIR, LPROD, LOPEN*), a constant, and five dummy variables for 1994, 2001, 1978, 1976, and 1985; the WAEMU VAR includes a single lag on each variable (*LREER, LTTT, LNCGR, LNIR, LPROD, LOPEN*), a constant, and three dummy variables for 1994, 1974–1979, and 2003). **and *** denote rejection of the null hypothesis at the 5 percent and 1 percent significance level.

Figure A6.2.1. Exchange Rates and Relative Prices
(Index 1990 = 100)



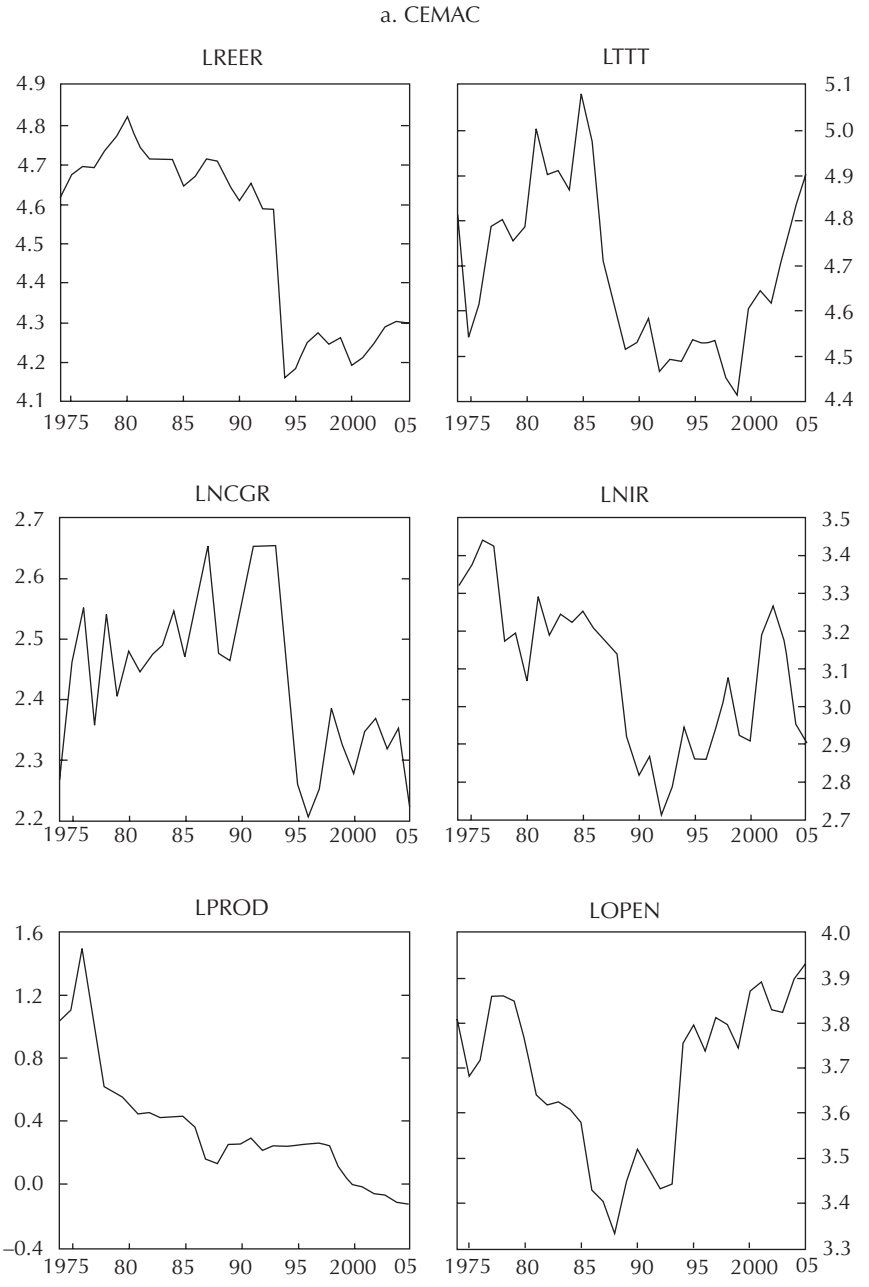
Sources: IMF, World Economic Outlook database; and authors' calculations.

Figure A6.2.2. Real Effective Exchange Rates of Member Countries
(Index 1990=100)



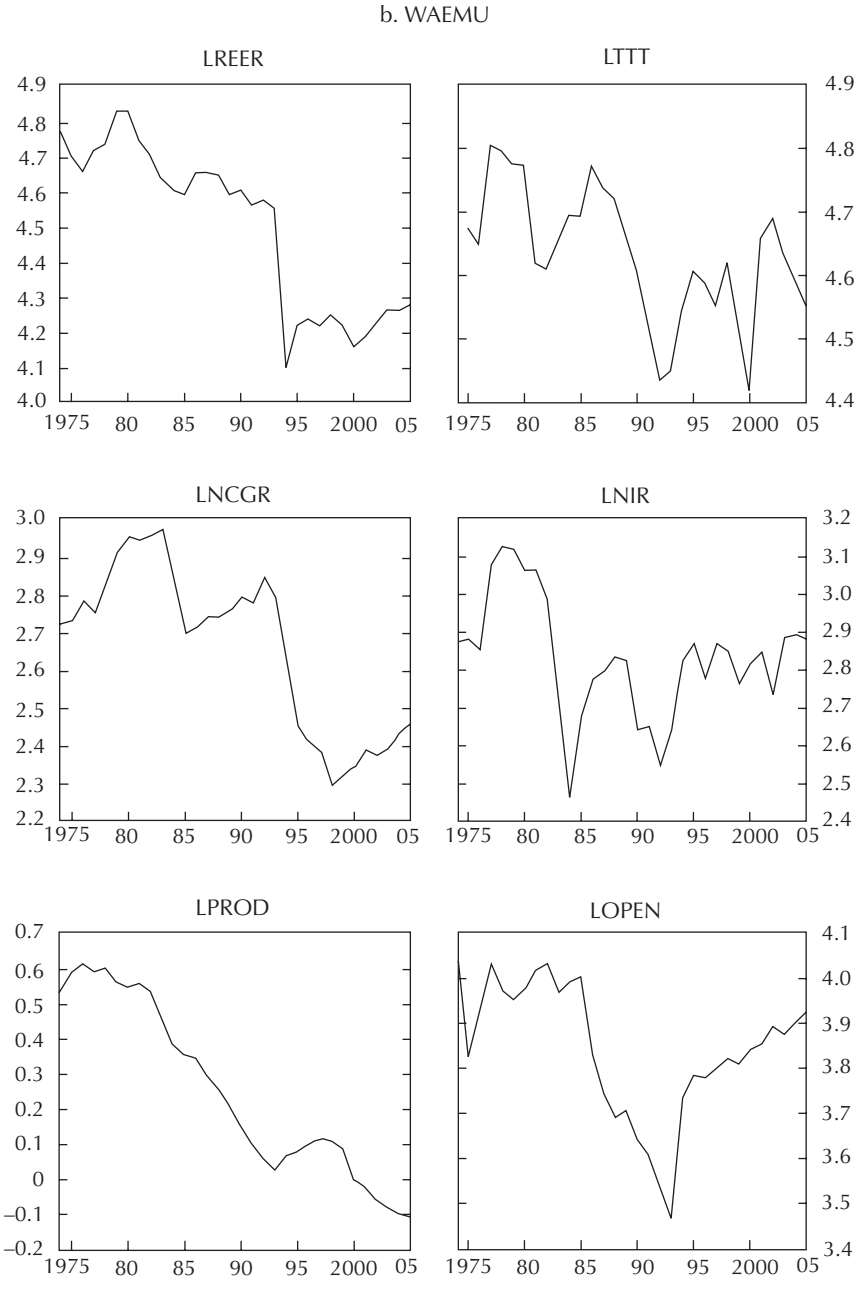
Sources: IMF, World Economic Outlook database; and authors' calculations.

Figure A6.2.3. Cointegration Variables



Source: Authors' calculations.

Figure A6.2.3 ***(concluded)***



Source: Authors' calculations.

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7

Competitiveness in the CFA Franc Zone

GUSTAVO RAMIREZ AND CHARALAMBOS TSANGARIDES

The 1994 devaluation of the CFA franc was a result of a prolonged deterioration of the terms of trade of the countries of the CFA franc zone, a steep rise in the labor costs of those countries, and a nominal appreciation of the French franc against the U.S. dollar, all of which resulted in an overvalued exchange rate.[1] The devaluation was instrumental in making CEMAC and WAEMU countries more competitive, and, reinforced by prudent macroeconomic policies and structural reforms, helped GDP return to positive growth rates.[2] This experience has shown that maintaining the fixed exchange rate regime in the CFA franc region requires careful attention to competitiveness and suggests that an assessment of whether the competitiveness gains since the devaluation have been preserved or eroded is warranted.

Generally, competitiveness can be defined as the ability of a country to operate efficiently and productively in relation to other countries while keeping living standards for its citizens high. From a macroeconomic perspective, competitiveness can be viewed as the degree to which a nation can produce goods and services that meet the test of international markets

[1]As discussed in Chapter 1, a fixed exchange rate for the CFA franc was adopted by the CFA franc zone countries in 1948. The CFA franc zone countries include the eight members of WAEMU and the six members of CEMAC.

[2]The 50 percent devaluation in January 1994 was the only change in the exchange rate peg. Since the introduction of the euro in 1999, the CFA franc has been pegged to the euro at CFAF 655.957 per 1.

while simultaneously expanding the real incomes of its people over the long term under free trade and fair market conditions (OECD, 1992). At the microeconomic level, competitiveness is the capacity to sell products profitably. To be competitive, a firm—and by extension, a country—must be able to charge lower prices or offer products of better quality (or with better service) than its competitors (Cockburn and others, 1998).

Using a comprehensive competitiveness framework, we review the evolution of competitiveness in the CEMAC and WAEMU regions and benchmark their performance against other countries and comparator groups. Our main findings are as follows. First, the evidence of the evolution of competitiveness in the two regions suggests that there are some areas where competitiveness has improved (particularly export profitability and market share in CEMAC, driven by oil market developments) but others where competitiveness has worsened (including, for both regions, real effective exchange rate appreciation and poor scores on cost of doing business and governance). Second, there are serious competitiveness gaps when CEMAC and WAEMU are compared with their peer groups of countries, particularly in the areas of business environment, governance, and human capital. Finally, in order to overcome competitiveness challenges there is a need for structural reform policies in both regions to boost productivity, reduce excessive factor costs, diversify the base of production, and create the conditions to attract higher domestic and foreign private investment in all sectors of economic activity.

The rest of the chapter is organized as follows. First, the chapter presents the thinking about competitiveness and proposes our competitiveness framework. Next, it reviews progress in achieving sustainable growth and improvements in the quality of life in CEMAC and WAEMU, and presents the environment and conditions affecting competitiveness, and policy inputs affecting competitiveness. The chapter concludes with policy implications.

The Competitiveness Framework

Countries are increasingly evaluating their competitiveness in global markets, and international competitiveness comparisons are conducted yearly.[3] National competitiveness is particularly important for small open

[3]Some countries, among them Croatia, Greece, Ireland, the Philippines, Tunisia, and the United States, maintain advisory bodies or special government agencies that handle competitiveness issues. Yearly competitiveness surveys are conducted by the World Economic Forum (*Global Competitiveness Report*), the International Management Development Institute (*World Competitiveness Yearbook*), and the World Bank (*Doing Business*).

economies aiming to give people the opportunity to improve their living standards and quality of life, by providing employment and raising incomes through productivity gains. Although productivity gains are necessary, the process of raising productivity may differ across countries.

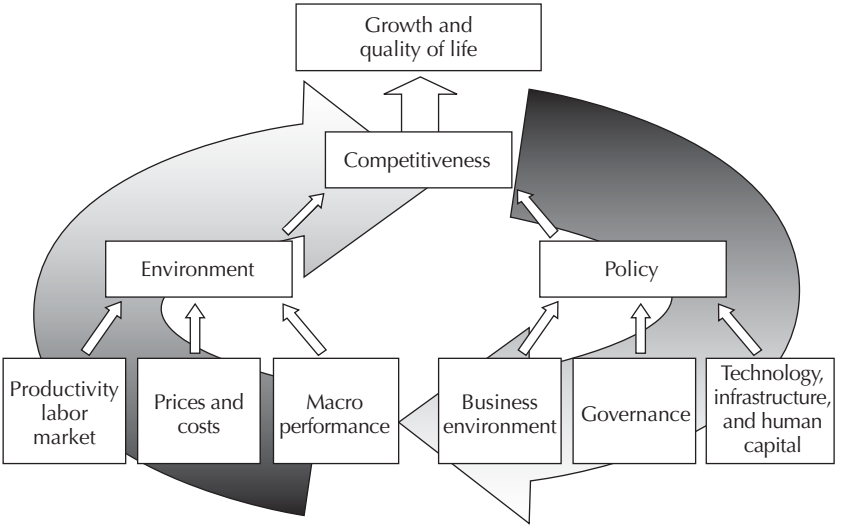
Competitiveness can be analyzed across many dimensions. The World Economic Forum's annual *Global Competitiveness Report* (*GCR*) separates countries by stage: factor-driven, efficiency-driven, or innovation-driven. Countries in the factor-driven stage of development have four main concerns: well-functioning public and private institutions, appropriate infrastructure, a stable macroeconomic framework, and good health care and primary education. On the other hand, the four main factors the *World Competitiveness Yearbook* (*WCY*) uses in analyzing countries are economic performance, government efficiency, business efficiency, and infrastructure. Finally, the competitiveness pyramid of the Irish National Competitiveness Council (NCC) distinguishes between the "inputs" to national competitiveness—over which policymakers can have greater control—and the "essential conditions."

The common theme among all these analyses is that competitiveness is about identifying the elements necessary to ensure sustainable growth and improve living standards. Therefore, building on the Ireland NCC approach, we view competitiveness as consisting of two interlinked components or conditions, "environment" and "policy."[4] The environment component includes measures of costs, prices, exchange rates, and wages and their impact on the ability of the country to export enough goods and services to pay for its import requirements and maintain full employment. The policy component includes factors that contribute to better business performance through innovation and productivity, such as the business environment, governance, and physical and human capital. There are also useful and important links between the two components. For example, the determinants of the environment—namely, prices and costs, macroeconomic performance, and productivity and labor markets—are the conditions of competitiveness that good policies create. Similarly, policies are both responses to and results of the current environment. Diagram 7.1 below summarizes the factors that affect national competitiveness and presents growth and quality of life as the ultimate goals of competitiveness.

Our analysis traces sequentially environmental and policy factors and their determinants to provide a comprehensive story of competitiveness

[4]Models used in the *GCR* and *WCY* can, in a sense, be "embedded" in the Ireland model, which we consider more comprehensive for our analysis.

Diagram 7.1. Elements of Competitiveness



in the CFA franc zone. Our work is complementary to other competitiveness reports on Africa—notably the 2007 World Economic Forum's *Africa Competitiveness Report*—but at the same time, more comprehensive in its coverage of all 14 countries of the CFA franc zone and more focused on the characteristics of the WAEMU and CEMAC regions.[5] We avoid generalizing competitiveness indicators in some form of a metric to assess competitiveness. Rather, to avoid synthesizing results from a variety of indicators, we try to capture a more "global" view of the two regions' competitiveness by comparing how each region fares vis-à-vis the other and the comparator groups.

Before proceeding, it is useful to recognize the data limitations associated with our analysis, as is the case in many developing country competitiveness analyses.[6] Although these limitations do exist, we believe

[5]The 2007 *Africa Competitiveness Report* covers only 5 of the 16 countries of the WAEMU and CEMAC regions.

[6]In fact, many competitiveness analyses exclude developing countries because of data availability and reliability issues. In other cases, as for example in the 2007 *Global Competitiveness Report* (page xxv), the reader is cautioned that for some countries survey data "have high within-country variance; until the reliability of survey responses improves with future educational efforts and improved sampling in these countries, their rankings should be interpreted with caution."

that they do not reduce the usefulness of our analysis. The multiplicity of competitiveness indicators examined allows the flexibility to look at a more comprehensive picture of competitiveness and reduces the errors that may result from any data limitations.

Competitiveness Overview: Sustainable Growth and Quality of Life

GDP Performance

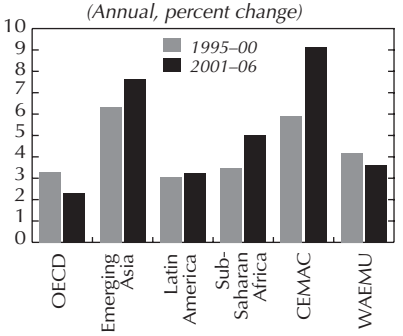
Growth since the 1994 devaluation has varied within the CFA franc zone and has been uneven between WAEMU and CEMAC. It has been linked to external price exchange rate developments, as well as the structural characteristics of economies in the regions. Oil market developments—including variations in world oil prices and country-specific positions in the life cycle of oil production—have dominated the CEMAC economies.[7] Since 1994, real GDP growth in CEMAC averaged about 5 percent (with a pronounced drop in 1999 as oil prices plunged); in WAEMU, growth has been lower and more volatile, averaging about 4 percent. Relative to the averages for sub-Saharan Africa, real per capita growth has been strong. Real growth in both regions has exceeded growth in Latin America and member countries of the Organization for Economic Cooperation and Development (OECD), and in CEMAC growth has exceeded that of emerging Asia: for 2001–06 it was almost double the sub-Saharan Africa average (Figures 7.1a and 7.1b). However, real growth in per capita terms was not as favorable for either region, with WAEMU growing at lower than the sub-Saharan Africa rates and CEMAC just about at the sub-Saharan Africa rates (Figure 7.1c). Disparities between WAEMU and CEMAC result from higher population growth rates in WAEMU and higher growth in CEMAC because of oil market developments.

In nominal terms, WAEMU and CEMAC output per capita does not compare favorably with that of peer groups. WAEMU and CEMAC rates are below those of other developing country groups, including Latin America and emerging Asia, both in U.S. dollar and purchasing power parity (PPP) adjusted terms (Figures 7.1d and 7.1e). Despite the recent growth developments in CEMAC, its per capita GDP is barely above the average

[7]Of the six CEMAC members, only the Central African Republic does not produce oil. Petroleum constitutes the bulk of the region's export receipts and more than half its budgetary revenue.

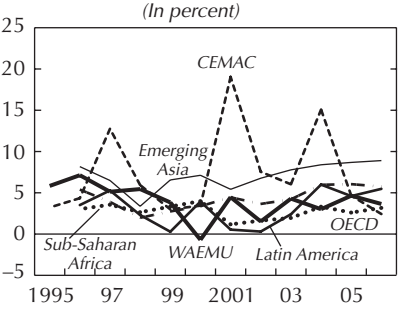
Figure 7.1. Real GDP Growth

a. Real GDP Performance
(Annual, percent change)



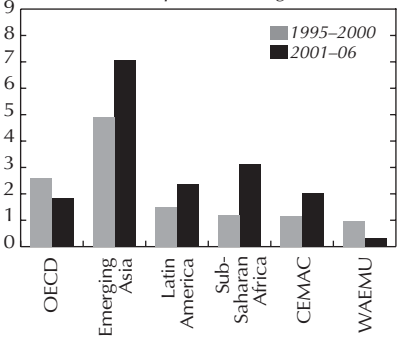
Sources: IMF, *World Economic Outlook* and staff estimates.

b. Real GDP Growth
(In percent)



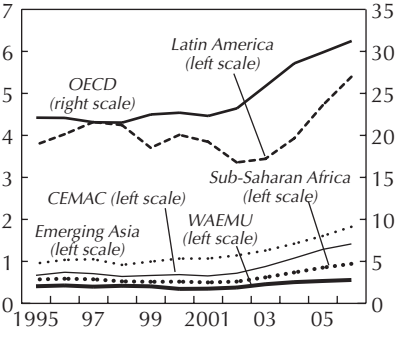
Source: IMF, *World Economic Outlook.*

c. Real Per Capita GDP Growth
(Annual, percent change)



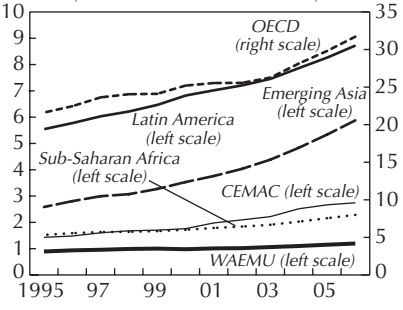
Sources: IMF, *World Economic Outlook* and staff estimates.

d. Per Capita GDP
(In thousands of U.S. dollars)



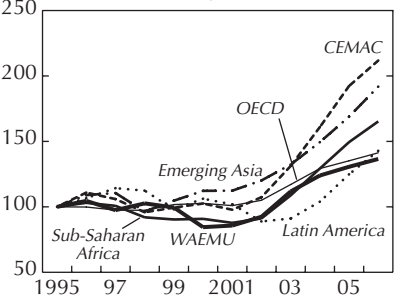
Source: IMF, *World Economic Outlook.*

e. Per Capita PPP GDP
(In thousands of U.S. dollars)



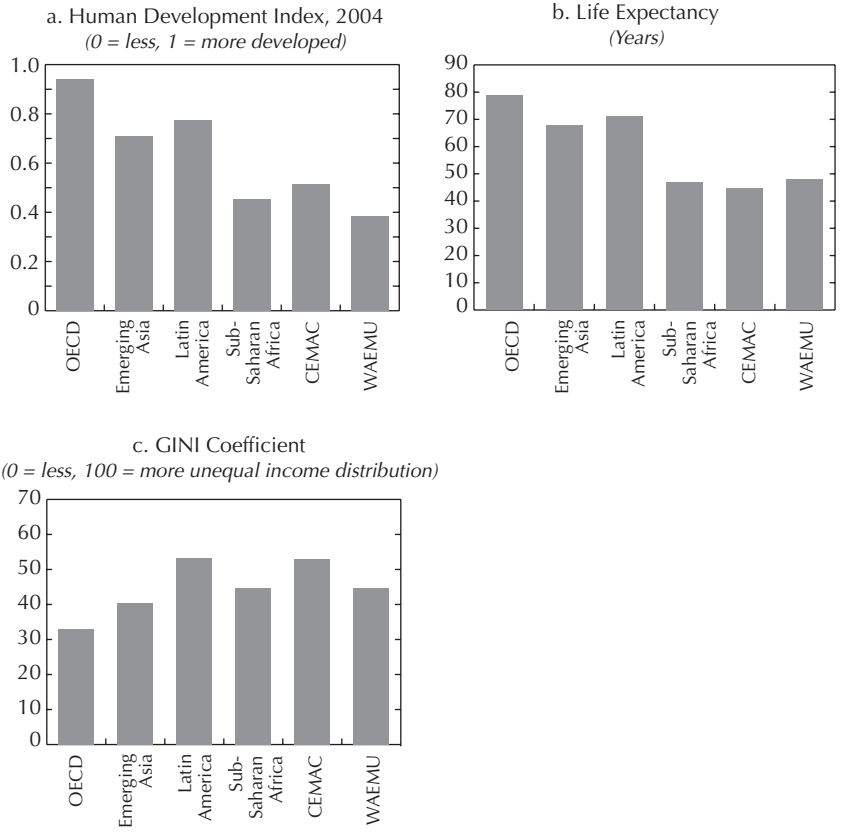
Source: IMF, *World Economic Outlook.*

f. Per Capita GDP
(Index 1995 = 100, U.S. dollars)



Source: IMF, *World Economic Outlook.*

Figure 7.2. Human Development Index, Life Expectancy, and Income Inequality



Source: United Nations, *Human Development Report, 2006*.

for sub-Saharan Africa and is below comparator groups both in dollar and PPP terms (Figure 7.1f).

Quality of Life

A key objective of competitiveness is to ensure that the quality of life improves, a concept that goes beyond growth rates and material living standards. We measure quality of life using the United Nations Human Development Index (HDI), which combines measures of

life expectancy, literacy, and income, and a measure of inequality, the Gini coefficient.

In terms of HDI, CEMAC and WAEMU rank below the OECD countries and other comparator groups such as emerging Asia and Latin America, and the CEMAC region performs only marginally above the sub-Saharan Africa average (Figure 7.2a). All WAEMU countries rank in the "low human development" part of the HDI, and four WAEMU countries (Guinea-Bissau, Burkina Faso, Mali, and Niger) rank among the five lowest in the index, with virtually no improvement since 2000. CEMAC countries perform only marginally better, with Chad and the Central African Republic in the bottom seven of the index and the rest rated in "middle human development." At about 50 years, life expectancy in both WAEMU and CEMAC ranks much below the averages for emerging Asia and Latin America, both of which are catching up fast with the OECD (Figure 7.2b). Finally, income inequality as measured by the Gini coefficient is higher in CEMAC than in WAEMU, which is about at the sub-Saharan Africa average and higher than emerging Asia and the OECD countries (Figure 7.2c).

In summary, recent increases in GDP growth rates in both regions have for the most part failed to translate into improvements in quality of life indicators and sustainable improvements in living standards.

Environment and Conditions

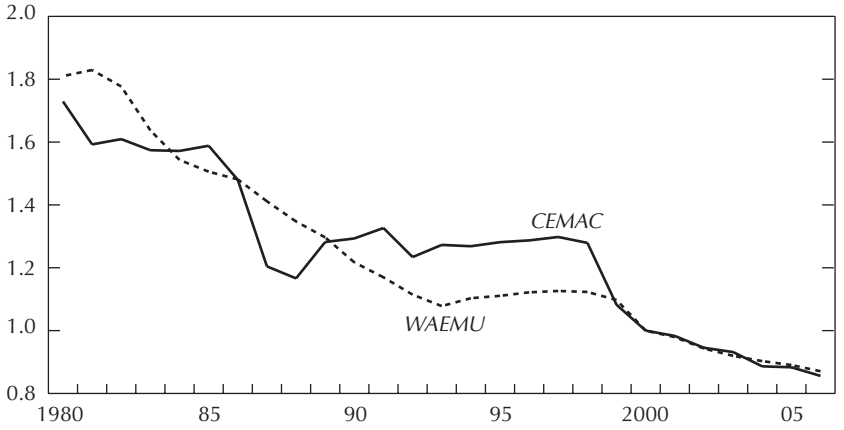
Productivity and Labor Markets

Productivity is a driver of economic growth and important as both a determinant and indicator of competitiveness. In general, productivity is a measure relating a quantity or quality of output to the inputs required to produce it; it often refers to labor productivity, which can be measured by quantity of output per time spent or number of workers employed.[8]

First, we examine the overall productivity of WAEMU and CEMAC using real per capita GDP as a proxy for output per worker. The real per capita GDP growth estimates in Figure 7.3 suggest that WAEMU productivity is the lowest among all developing country comparator groups including sub-Saharan Africa, with the trends indicating a decline since

[8]Human and physical capital and resources, technology and innovation, and the macroeconomic and institutional environment determine productivity. We discuss the environment here. Because they are influenced by policy, we discuss human and physical capital, resources, technology, and innovation in the section "Policy."

Figure 7.3. CEMAC and WAEMU: Productivity Index
(Real GDP per capita, vis-à-vis main trading partners)



Source: United Nations, *Human Development Report, 2006*.

1995–2000. CEMAC productivity is at about the sub-Saharan Africa level and has been improving since 2000.

Next, we construct a productivity index of each region's real per capita GDP against its partner countries, which can give another dimension of productivity.[9] Looking at this measure, for both WAEMU and CEMAC there is a persistent decline in productivity since the late 1990s, with both productivity indices at about the same levels in 2006 (Figure 7.3).

The cost of inputs in the production process is another determinant of competitiveness. A measure of these costs that also measures international competitiveness is the unit labor cost (ULC), which essentially combines labor cost and productivity. The International Labor Organization's Key Indicators of the Labor Market (KILM) gives ULC comparisons mainly for developed economies, because (1) for developing countries information on labor compensation is inadequate, particularly on employers' costs (such as social security contributions), and (2) in developing countries there is a relatively large share of self-employed persons operating in the informal

[9]The productivity index is constructed as the ratio of real per capita GDP relative to each region's main trade partners (in logarithmic terms), normalized for each region to 1 in 2000. See Abdih and Tsangarides (2006) for more details.

sector, which complicates the analysis of ULCs.[10] We therefore focus on measures of labor market conditions, particularly supply.

With no data available on unemployment rates, we examine other demographic and labor market characteristics in WAEMU and CEMAC (Figure 7.4). For 1990–2004, the average population growth rate in WAEMU was about 2.7 percent, higher than in both CEMAC and sub-Saharan Africa, almost twice as high as in lower- and middle-income (LMI) countries and Latin America, and more than twice as high as in the East Asian countries. In a Malthusian view, these rates do not translate into a larger labor force but into higher resource constraints. At about 79 percent in 2004, total labor force participation rates in WAEMU compare favorably with those of sub-Saharan Africa (76 percent), LMI countries (71 percent), and Latin American countries (70 percent). Although marginally below the sub-Saharan Africa rates in 2004, female labor force participation in both WAEMU and CEMAC compares favorably with that of other groups, including LMI countries (57 percent) and Latin American countries (55 percent).

In summary, measured productivity compared with that of trading partners for both WAEMU and CEMAC has been declining. Although high population growth rates exert a resource constraint, some labor market conditions, such as labor force participation, appear promising when contrasted with comparator groups.

Costs and Prices

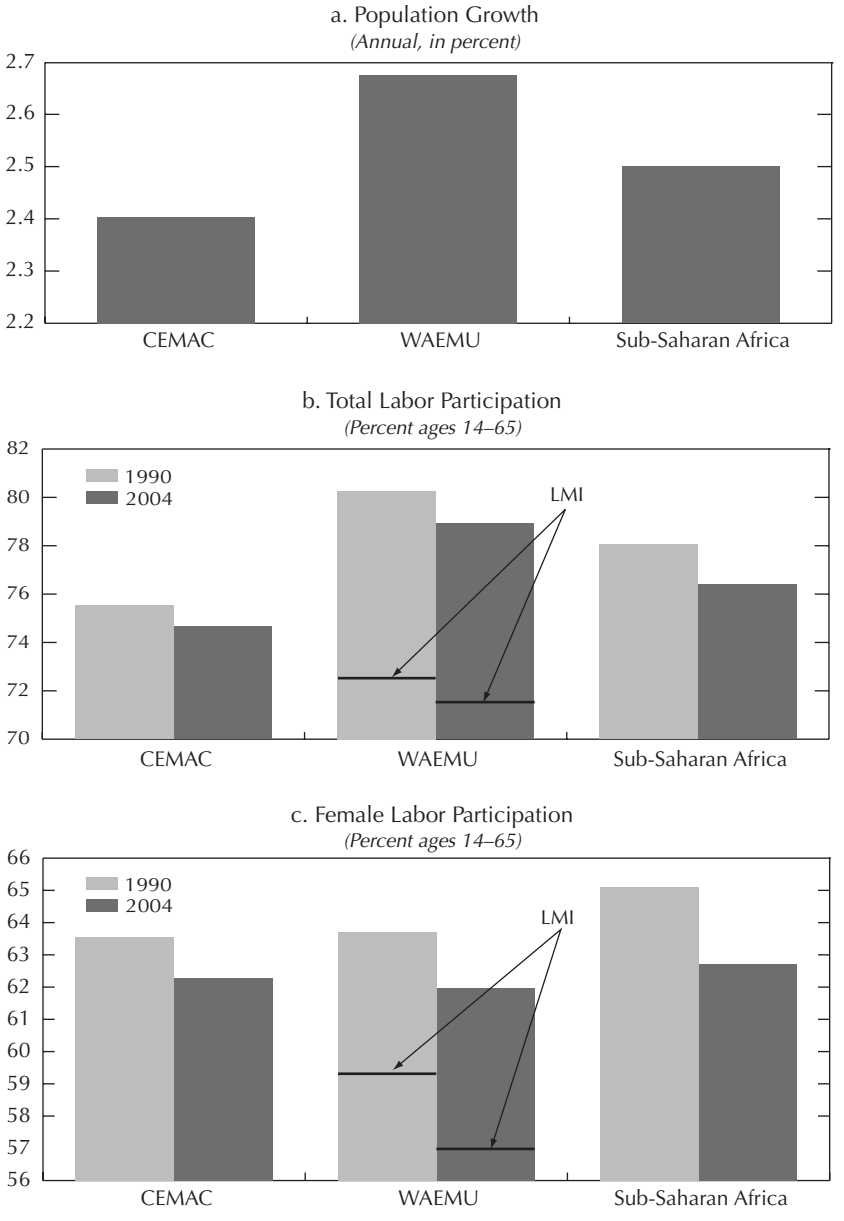
Because they have an immediate incidence on the prices and profitability of exports and import-competing goods relative to other products, exchange rates are widely used measures of competitiveness. Cost and price indicators measure either the extent to which traded goods and services can compete with those of other countries, or the extent to which production of traded goods and services is attractive relative to the production of nontraded goods and services. To measure these costs we use a variety of exchange rate indicators, including real effective exchange rates (REERs) based on consumer price indices and labor costs, internal exchange rates, and unified exchange rates compared with those of their trading partners.

Real Effective Exchange Rates

The 1994 devaluation helped make the CEMAC and WAEMU countries more competitive. It was followed by a steady appreciation

[10]See KILM's "Unit labor costs, productivity and international competitiveness," available via the Internet at www.ilo.org/public/english/employment/strat/kilm.

Figure 7.4. Demographics and Labor Market



Source: World Bank, *World Development Indicators, 2006.*
Note: LMI = Lower- and middle-income countries.

Table 7.1. WAEMU and CEMAC: Real Effective Exchange Rate and Components
(In percent)

	Jan. 1994–Dec. 1998	Jan. 1999–Dec. 2000	Jan. 2001–Dec. 2006
WAEMU			
Real effective exchange rate	29.6	–9.1	10.8
Nominal effective exchange rate	12.2	–7.5	13.0
Relative price index	13.7	–1.7	–1.9
CEMAC			
Real effective exchange rate	43.0	–10.6	20.9
Nominal effective exchange rate	12.4	–8.5	11.8
Relative price index	27.0	–2.4	7.8

Sources: IMF, Information Notice System; and authors' calculations.

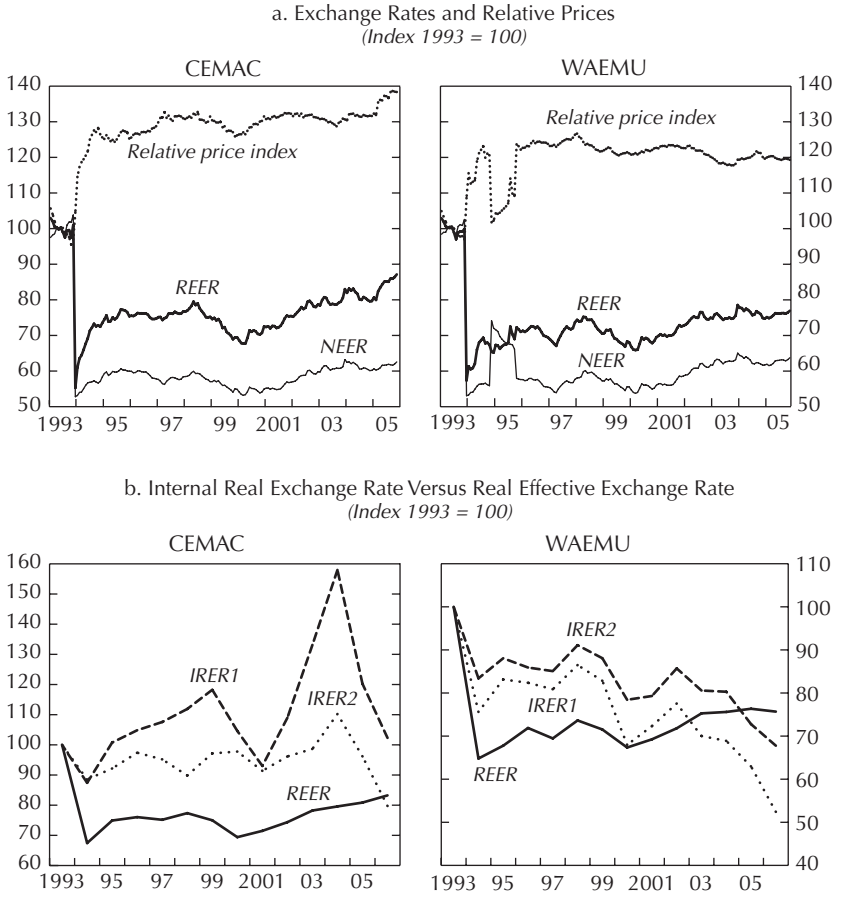
of the REER (Table 7.1 and Figure 7.5a).[11] Since then, the CEMAC REER appreciated cumulatively by about 32 percent through December 2000 and by another 21 percent from January 2001 to December 2006; by December 2006 the CEMAC REER was at 86 percent of its pre-devaluation level. The WAEMU REER appreciated by about 21 percent through December 2000 and by another 11 percent from January 2001 to December 2006; by December 2006 the WAEMU REER was at 77 percent of its pre-devaluation level. For both WAEMU and CEMAC the most recent appreciation was essentially a result of the strengthening of the euro, to which the CFA franc is pegged.[12]

There are significant variations around the regional averages among member countries of each region (Figures 7.5c). Within WAEMU, Benin has experienced the highest appreciation since the 1994 devaluation and Mali the lowest. By December 2006 Mali's REER stood at 66 percent and Benin's at 89 percent of the pre-devaluation levels. In the CEMAC, there was a much wider variance of REERs, partly because of the new oil producers. At end-2006, Equatorial Guinea had the highest appreciation (116 percent of the pre-devaluation level) and Gabon the lowest (70 percent).

[11]The regional aggregate REER for CEMAC and WAEMU were constructed using weighted averages of the individual countries' REERs. The weights are based on nominal GDP.

[12]For CEMAC, the three main trading partner countries and their weights were France (0.29), the United States (0.11), and Germany (0.09). For WAEMU, they were France (0.27), Germany (0.10), and the United States (0.09).

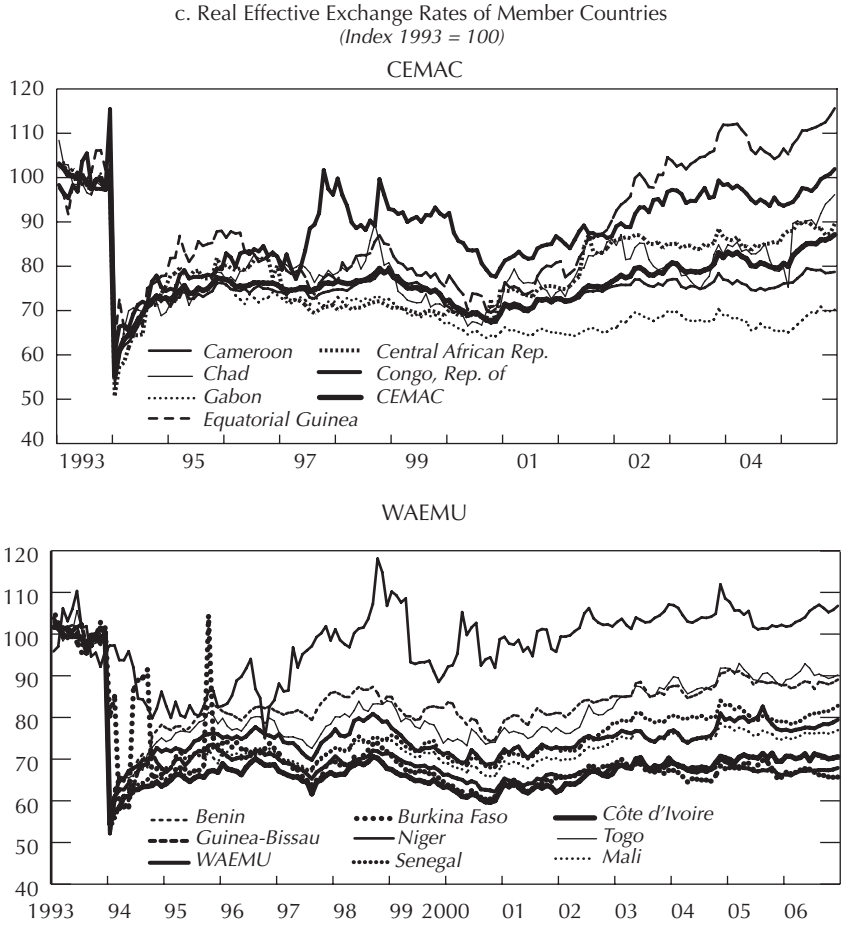
Figure 7.5. Exchange Rate Measures



Internal Real Exchange Rate

The internal real exchange rate (IRER) can be an appropriate measure of competitiveness for small economies where the cost of production is reflected in the price of nontradable goods and the price of imports is determined in the world market. It is measured as the ratio of the prices of nontraded goods (P_{NT}) to those of tradable goods (P_T). This in itself presents a difficulty because there is no straightforward definition of what are tradable and what are nontradable goods. For a robustness check of our

Figure 7.5 ***(concluded)***



Sources: IMF, Information Notice System and staff estimates and projections.

results, we apply two different approaches used in the literature (denoted as $IRER_1$ and $IRER_2$).[13]

In CEMAC, fluctuations in the IRER followed those of the consumer price index (CPI)-based REER but with wider amplitude; for WAEMU, the IRER was in line with the CPI-based REER (Figure 7.5b). In the case

[13]Details on the calculation of the IRER using two alternative methodologies are presented in Appendix 7.1. The same methodology was applied in IMF (2005).

of CEMAC, the IRER suggests slightly more erosion of competitiveness than is suggested by the CPI-based REER. Specifically, by end-2006 the total cumulative yearly appreciation of the IRER since 1994 was about 11 percent, bringing it to 91 percent of its pre-devaluation value; the CPI-based REER was 86 percent above its pre-devaluation value.[14] For WAEMU, the IRER measures track the CPI-based REER very closely until about 2003, suggesting that the CPI-based REER captures the costs of production adequately. After 2003 the CPI-based REER seems in a sense to overestimate the erosion of competitiveness, because both the IRER measures are below the REER.

Labor Costs and Other Real Exchange Rate Measures

Given the lack of reliable data on total production costs in the two regions, the analysis focuses on labor costs. Because there are no firsthand data on the wage rate of the countries as a whole (including the private sector), we use an index of wage rates of civil servants as its proxy.[15] We then construct a nominal wage index for each country in the zone using data on total wage and salary expenditures of the government, together with the number of civil servants (for WAEMU) or the population (for CEMAC, where data on the number of civil servants are not available). We proxy real wages by the ratio of the nominal wage index to the CPI.

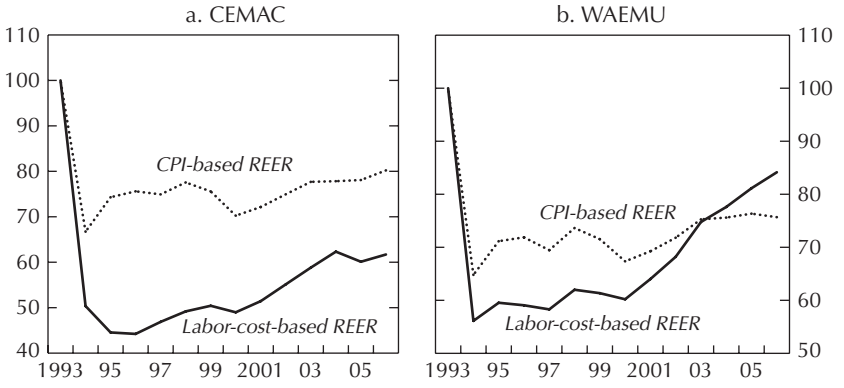
Nominal wages tend to have grown more slowly than other domestic prices in most countries in both zones. By the end of 2006, CEMAC countries showed a similar decline in the real wage index, except Equatorial Guinea (where government expenditures increased sharply with oil revenues) and Gabon (Figure 7.6a). In WAEMU, real wages in 2006 were lower than in 1993 in Burkina Faso, Côte d'Ivoire, Niger, and Togo but through 2003 had risen in Benin, Mali, and Senegal (Figure 7.6b). The decline in real wages was most noticeable at the time of the devaluation, because exchange rate pass-through to wages is weaker than pass-through to other prices.[16]

[14]For both WAEMU and CEMAC, total cumulative appreciation of the IRER is calculated as a simple average of the two measures of IRER.

[15]The analysis focuses on the wage index (and consequently the rate of change in wages), not the wage level. This allows us to explore the evolution of wage rates over time without needing information on the wage level in the private sector (or the ratio of public sector to private sector wages). An index based on civil servant wages should capture well the movement of wage rates of the economy as a whole as long as public and private sector wages tend to move together (which is likely at least over the long term).

[16]Unit labor costs (that is, labor costs adjusted for labor productivity) would have been computed if reliable data had been available. Because it was not, we resorted to per capita GDP as a proxy for labor productivity.

Figure 7.6. CPI-Based Versus Labor-Cost-Based REER
(Index 1993 = 100)



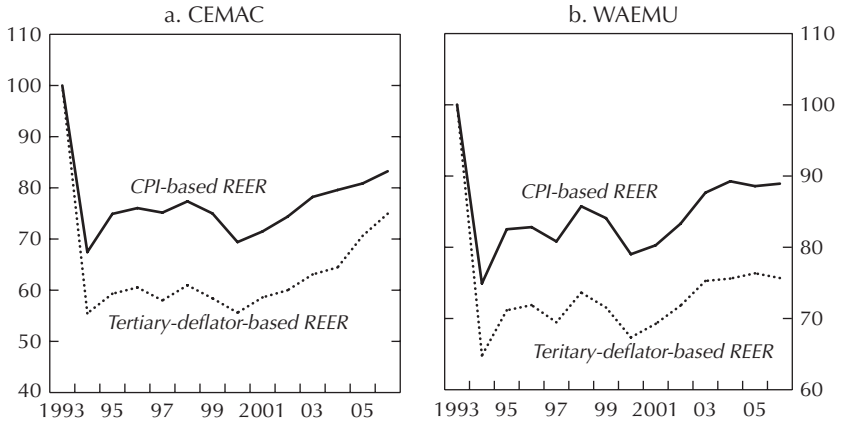
Sources: IMF, World Economic Outlook database and staff estimates and projections.

Labor-cost-based REERs have remained below CPI-based REERs in both CEMAC and WAEMU (Figures 7.7a and 7.7b).[17] CEMAC's labor-cost-based REER depreciated much more than the CPI-based REER after the devaluation and has remained lower at about 62 percent of its pre-devaluation level. The WAEMU labor-cost-based REER followed a similar pattern up to 2003 but since then has been appreciating faster than the CPI-based REER, suggesting that recently labor costs in WAEMU have been rising faster than prices. Overall, with the exception of WAEMU after 2003, labor-cost-based measures suggest that for both regions competitiveness in international markets appears to be more favorable when cost-based rather than CPI-based REERs are used. Particularly for the case of CEMAC, the finding that CPI-based REER appreciated more than the labor-cost-based REER could be an indication of Dutch disease. In addition, for both regions, the stronger depreciation of the labor-cost-based REER compared with the CPI-based REER suggests there was a downward adjustment of nominal wages.

The service-sector-deflator-based REER gives a somewhat different picture. It has been lower than the CPI-based REER in CEMAC (Figure 7.8a) but above it in the WAEMU region (Figure 7.8b).

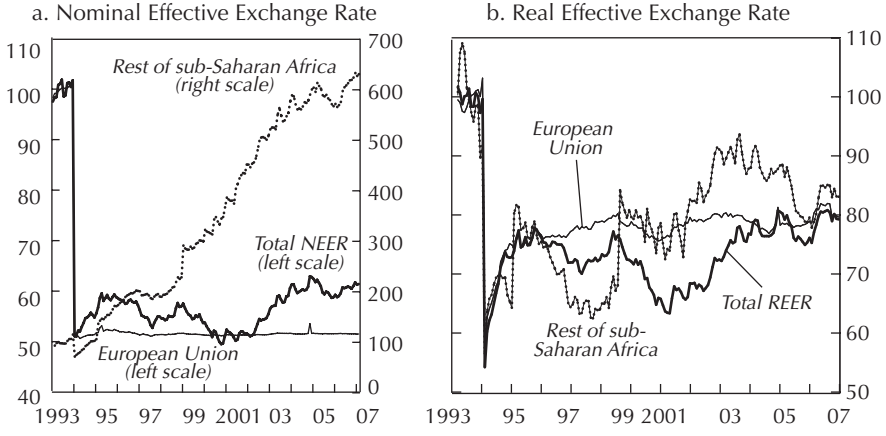
[17]Because of data limitations, labor-cost-based REER is proxied by the CPI-based REER multiplied by the real wage index (= nominal wage index/CPI). This proxy is our best approximation because of a lack of reliable data on labor costs for many trading partners.

Figure 7.7. CPI-Based Versus Tertiary-Deflator-Based REER
(Index 1993 = 100)



Sources: IMF, World Economic Outlook database and staff estimates and projections.

Figure 7.8. CEMAC: Nominal and Real Effective Exchange Rates
(Index 1993 = 100, 2000–04 weights)

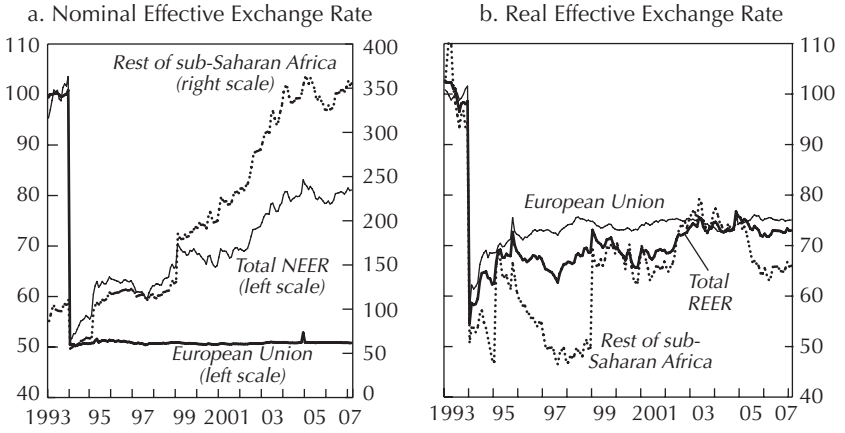


Sources: IMF, Information Notice System; and authors' calculations.

Unified Regional Exchange Rates

As a robustness measure of the (CPI-based) REER, we treat each region as an economic unity and measure the international price com-

Figure 7.9. WAEMU: Nominal and Real Effective Exchange Rates
(Index 1993 = 100, 2000–04 weights)



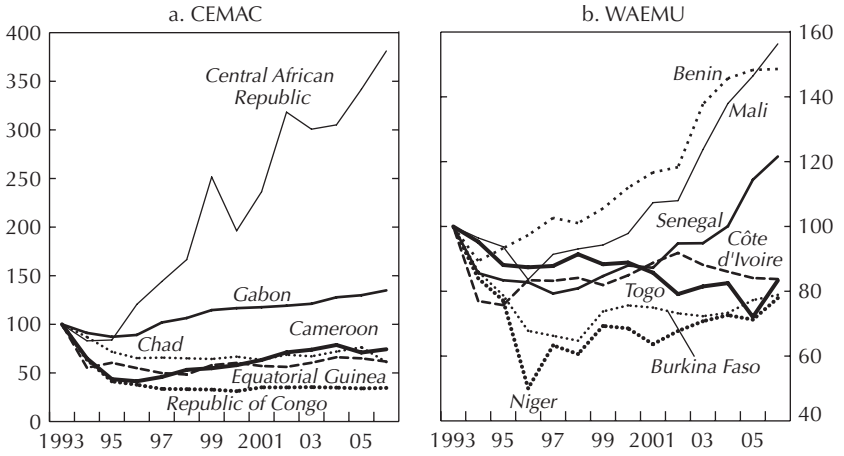
Sources: IMF, Information Notice System; and authors' calculations.

petitiveness of the common currency union. As for the euro area, we construct a measure of the unified regional exchange rate (URER) in both nominal and real terms (URNEER and URREER). These aggregated indicators are constructed so that individual-country domestic prices are weighted by the trade between the monetary union as a whole and the rest of the world, thus excluding (by construction) intra-union trade, which in some cases might bias the regional competitiveness indicator.[18] We also decompose URERs between partners to observe any specific patterns.

Average URNEER for CEMAC now stands at about 60 percent of its pre-devaluation level at end-2006 (Figure 7.9a). It reached its minimum in 2000, when the URNEER was at about 50 percent of its 1993 level. Including the effect of relative prices, the CEMAC URREER appreciated about 28 percent from 1994 to 2006 and is now at about 83 percent of its pre-devaluation level (Figure 7.9b). Immediately after the 1994 devaluation, the CEMAC URREER appreciated to about where it was at the end of 2006, but it depreciated from December 1995 to October 2000 before turning around for four years of significant appreciation

[18]Details on the calculation of the URREER are presented in Appendix 7.2. For more details see Ramirez and Tsangarides (2007).

Figure 7.10. Real Wage Index
(Index 1993 = 100)



Sources: IMF, World Economic Outlook database and staff estimates and projections.

(21 percent from its low in 2000 to December 2004); there has since been no clear trend. Because of the peg to the euro, the URREER relative to the European Union is less volatile than total URREER. The end-2006 levels of the CEMAC URNEER and URREER are both consistent with the NEER and REER. The WAEMU URNEER has appreciated by about 30 percent since 1994 and is currently at 80 percent of its pre-devaluation level (Figure 7.10a). By 2007, its URREER was at about 72 percent of the pre-devaluation level (Figure 7.10b). There was significant appreciation in the two years after devaluation, but the index has since been fluctuating around a relatively stable mean. Unlike the URREER compared with the EU, the WAEMU URREER compared with trade partners in sub-Saharan Africa is more volatile, and there were episodes of extreme depreciation in February 1995 and in January 1999. When compared with the conclusions based on the WAEMU NEER and REER, at the end of 2006, the URNEER was about 20 percent higher than the NEER, and the URREER was about 5 percent lower than the REER.

Equilibrium Real Exchange Rates

Assessing competitiveness and necessary exchange rate or other appropriate policy action also requires a quantitative analysis of the actual and

equilibrium exchange rate (EREER). Chapter 6 analyzes the movements of the REERs of the two monetary unions of the CFA franc zone vis-à-vis their long-run equilibrium values. Using the fundamental equilibrium exchange rate (FEER) approach based on the Edwards (1989) model and the Johansen (1995) cointegration methodology, the authors identify certain fundamentals that account for most of the fluctuation of the real effective exchange rates: increases in the terms of trade, government consumption, and productivity improvements tend to cause the exchange rate to appreciate, whereas increases in investment and openness lead to a depreciation. Based on these fundamentals, Abdih and Tsangarides (2006) estimate that although both the WAEMU and CEMAC real exchange rates were slightly more appreciated than their estimated long-run equilibrium levels at end-2005, the estimated misalignments were not statistically significant. This suggests that at end-2005 both the CEMAC and WAEMU real effective exchange rates were broadly in line with their long-run equilibrium values.[19]

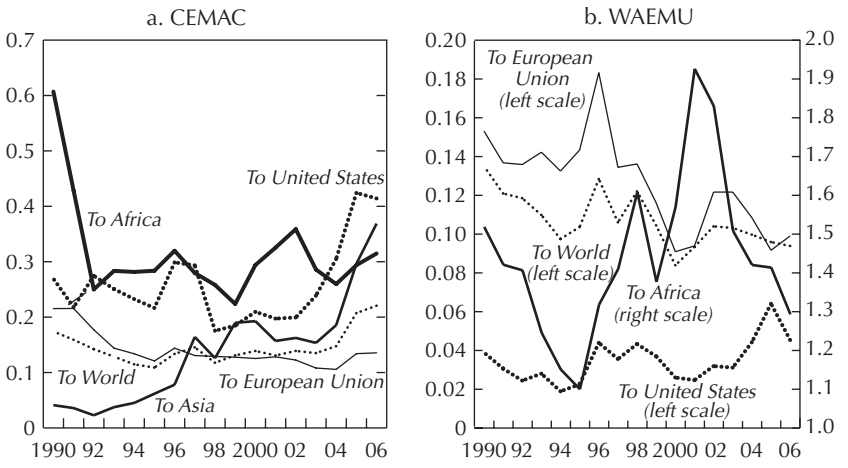
In summary, the various real exchange rate measures point to an appreciation of the CFA franc in both WAEMU and CEMAC, suggesting a loss of competitiveness. However, the constructed nominal wage indices show that nominal wages have grown more slowly than other domestic prices in the majority of the countries in both regions.

Macroeconomic Performance

Macroeconomic performance indicators measure the evolution of export flows and market share, as well as foreign direct investment (FDI) flows. Strong export growth (if not associated with equally strong import growth), expansion in export market share, and increasing export diversification suggest improved competitiveness. Such trends are also associated with increasing profitability of exports, measured as falling unit costs or increasing value added. FDI flows also reflect the attractiveness of a country's investment climate and tend to be correlated with increases in exports.

[19]Further, in the context of the IMF's 2007 Article IV discussions, the analysis of Abdih and Tsangarides (2006) was extended for both the WAEMU and CEMAC EREERs up to 2006. That work concludes that in 2006 *also* the levels of the real effective exchange rates were in line with the estimated equilibrium real effective exchange rate paths, without any statistically significant misalignments.

Figure 7.11. Ratio of Exports to Selected Groups' Total Imports
(In percent)



Sources: IMF, *Direction of Trade Statistics;* and authors' calculations.

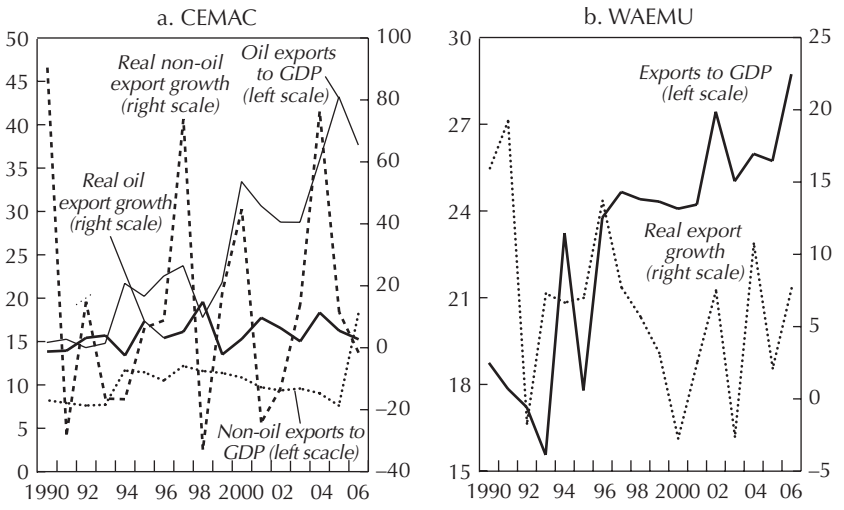
Export Patterns and Market Share

Since 2001, the CEMAC share of the export market to the world has been increasing, declining to Africa, and has remained roughly constant to the European Union (EU) (Figure 7.11a).[20] Intra-CEMAC trade has been virtually flat at about 1 percent since 2000. Over the same period, the WAEMU market share to the world appears to be increasing, and for Africa and the EU decreasing (Figure 7.11b), but intra-WAEMU exports have been expanding and are much higher than intra-CEMAC exports.

The evolution of the exports-to-GDP ratio and the volume growth rates for CEMAC are shown in Figure 7.12a and for WAEMU in Figure 7.12b. For WAEMU, the ratio of exports to GDP has been increasing, and, since 2000, the volume (although volatile) has been growing by an average of 2 percent. For the CEMAC region, export performance has been dominated by the oil sector, as is evident by the increase of both the share and volume of oil exports. Since 1997 there has been a decline in the ratio of non-oil exports to GDP, though they began to pick up in 2005. In comparison with export shares of other groups, CEMAC average exports to GDP

[20]Share is defined as the ratio of a region's total exports to the total imports of selected groups.

Figure 7.12. Export Patterns
(In percent)



Sources: IMF, *Direction of Trade Statistics;* and authors' calculations.

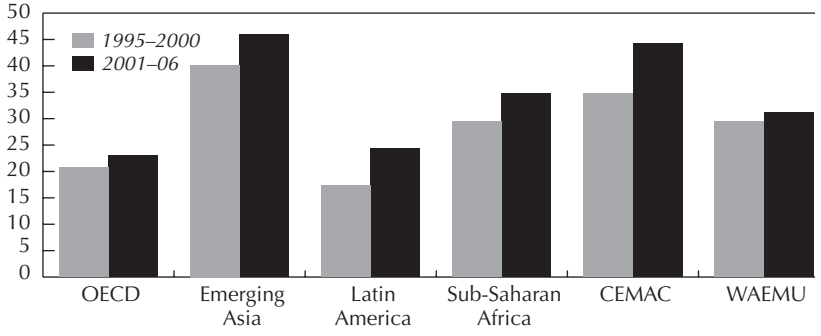
in 2001–06 are higher than in Latin America, sub-Saharan Africa, and OECD member countries, and almost at the level of emerging Asia. At about 31 percent, WAEMU's average export shares are below sub-Saharan Africa generally but compare favorably to the other comparator groups (Figure 7.13a).

FDI and Diversification

FDI flows to developing countries are good sources of non-debt-creating capital, offering access to advanced technology and global marketing networks. FDI flows (and stocks) to developing countries vary because countries differ in their ability to attract FDI, depending on their market size, labor costs, and human capital and technology. Figure 7.13b shows that emerging Asia has attracted the majority of FDI—US$1.4 billion in 2005—almost twice as much as the next developing country group, Latin America. Although FDI in both WAEMU and CEMAC is low in dollar terms, it has been significant as a share of GDP (Figure 7.13c). FDI in CEMAC has been steadily increasing, surpassing other sub-Saharan Africa countries since 2001, primarily because of oil-related investments; it amounted to about 40 percent of the region's GDP in 2005. In WAEMU, FDI has been flat at about

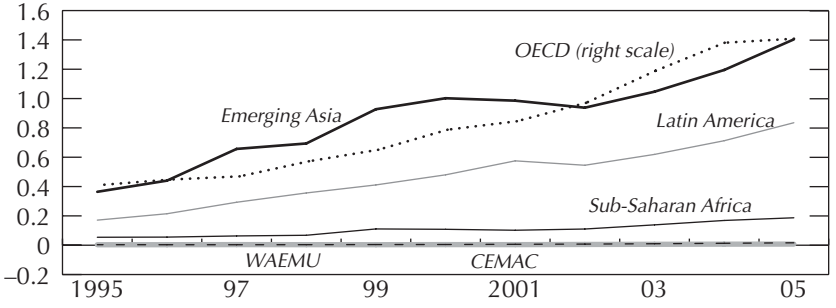
Figure 7.13. Exports and Foreign Direct Investment

a.Exports of Goods and Services
(In percent of GDP)



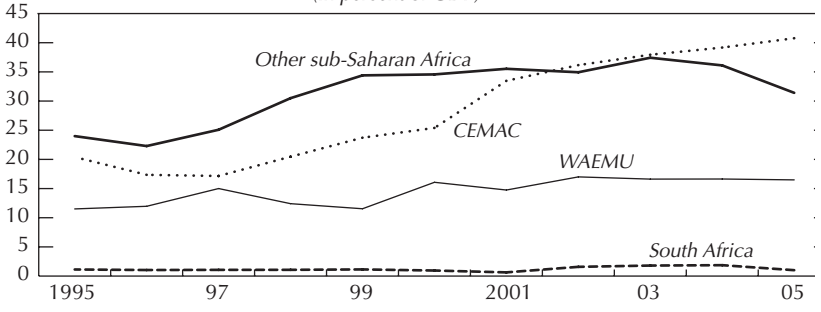
Sources: IMF, *World Economic Outlook* and staff estimates.

b. Foreign Direct Investment
(In billions of U.S. dollars)



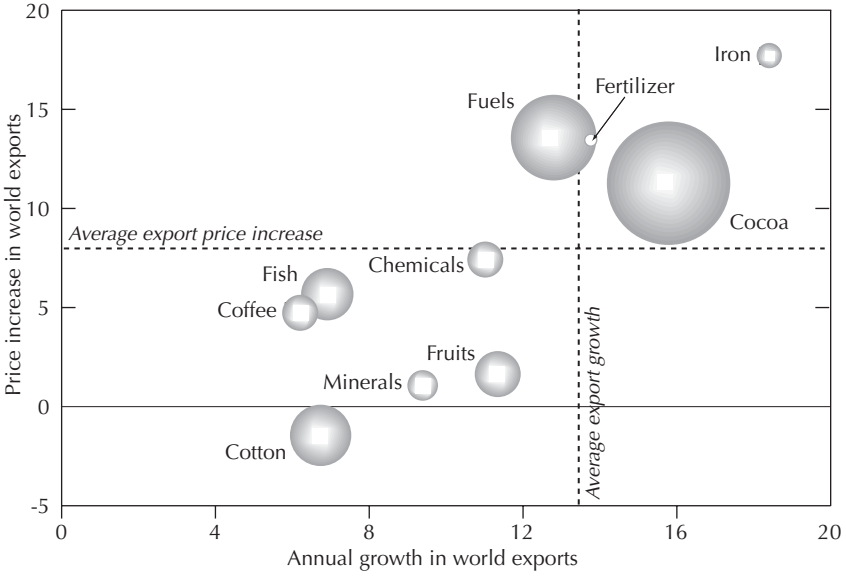
Sources: UN UNCTAD; and IMF, *World Economic Outlook*.

c. Foreign Direct Investment
(In percent of GDP)



Sources: UN UNCTAD; and IMF, *World Economic Outlook*.

Figure 7.14. WAEMU: Export Performance by Product, 2000–05
(Percent, bubbles reflect relative size of exports)



Sources: UN COMTRADE and authors' calculations.

15 percent of regional GDP since about 2000. In sub-Saharan Africa as a whole FDI has been declining since 2003; in 2005 it was 30 percent of GDP. As a comparison, FDI flows represent about 2.5 percent of GDP in lower-middle-income countries, 3.0 percent in Latin America, and 2.4 percent in East Asia and the Pacific; 3.2 percent in sub-Saharan Africa as a whole; 7.1 percent in CEMAC; and just 0.9 percent in the WAEMU.

Loss of competitiveness may be a result of patterns of specialization. We examine this possibility by comparing the evolution of the growth of market share of WAEMU exports in 2000–05 with the evolution of world export prices. We perform the analysis only for WAEMU because in CEMAC all export developments are dominated by oil. The bottom two quadrants of Figure 7.14 identify commodities whose prices increased less than average export prices. The two right quadrants identify areas where WAEMU export growth was higher than the world average. The size of the bubble reflects the importance of the commodity in WAEMU trade. The figure makes it clear that, excluding fuels, cocoa, and iron, for

2000–05 the average growth in exports in U.S. dollars of the products that WAEMU countries export was below the overall average for total world exports. In addition, for all these products, average price increases were lower than the world export average. In contrast, in the markets for cocoa and iron, export price increases have been higher than average, and higher than average export growth. Cocoa's weight in WAEMU trade is what drives WAEMU export performance; the other sectors have not been doing so well.

In summary, export volumes show improvement in both regions, dominated in CEMAC by the oil sector. Export growth for WAEMU was much slower than for CEMAC but showed some diversification. Export market share has been increasing in some markets and worsening in others. FDI has been increasing in CEMAC and compares favorably with the rest of sub-Saharan Africa, but has stagnated for WAEMU.

Policy

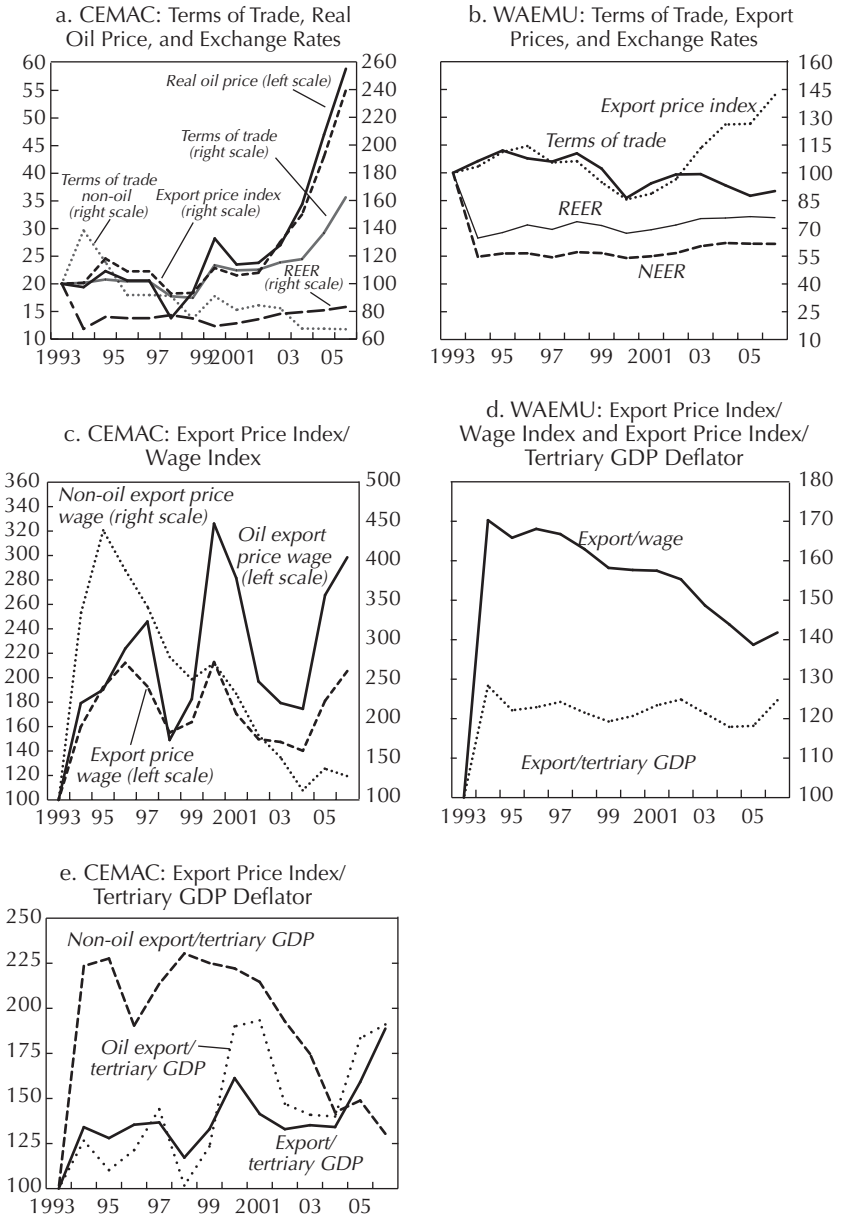
Business Environment

Profitability

The oil sector has been driving profitability of exports in CEMAC fueled by rising oil prices in recent years. Figure 7.15a shows that the impact of the appreciating REER was somewhat contained over the past two years, as CEMAC exports increased, terms of trade improved because of oil price increases, and export profitability generally improved. Figure 7.15b shows an overall deterioration of the terms of trade for WAEMU since about 1995, coupled with an appreciation of the REER, which suggests challenges to export competitiveness and profitability, even though, at the same time, there was an overall improvement of the export index.

Although overall export and oil export profitability have been improving, there is evidence of an erosion of the profitability of non-oil exports in CEMAC. We therefore construct two direct measures of profitability, the export price index to tertiary GDP deflator and the export price index to wages deflator. For CEMAC, we also construct oil and non-oil indices to investigate the profitability of each sector separately. Both indices (Figures 7.15c and 7.15e) show clearly that even though the profitability of exports generally has been increasing in the past two years, this is driven by the oil sector; non-oil-sector profitability has been steadily declining since 2000. For WAEMU (Figure 7.15d), the indices show (on average) a net decline in profitability since 2002.

Figure 7.15. Prices and Exchange Rates
(Index 1993 = 100)



Sources: IMF, World Economic Outlook database and staff estimates and projections.

Survey-Based Indicators of the Business Environment

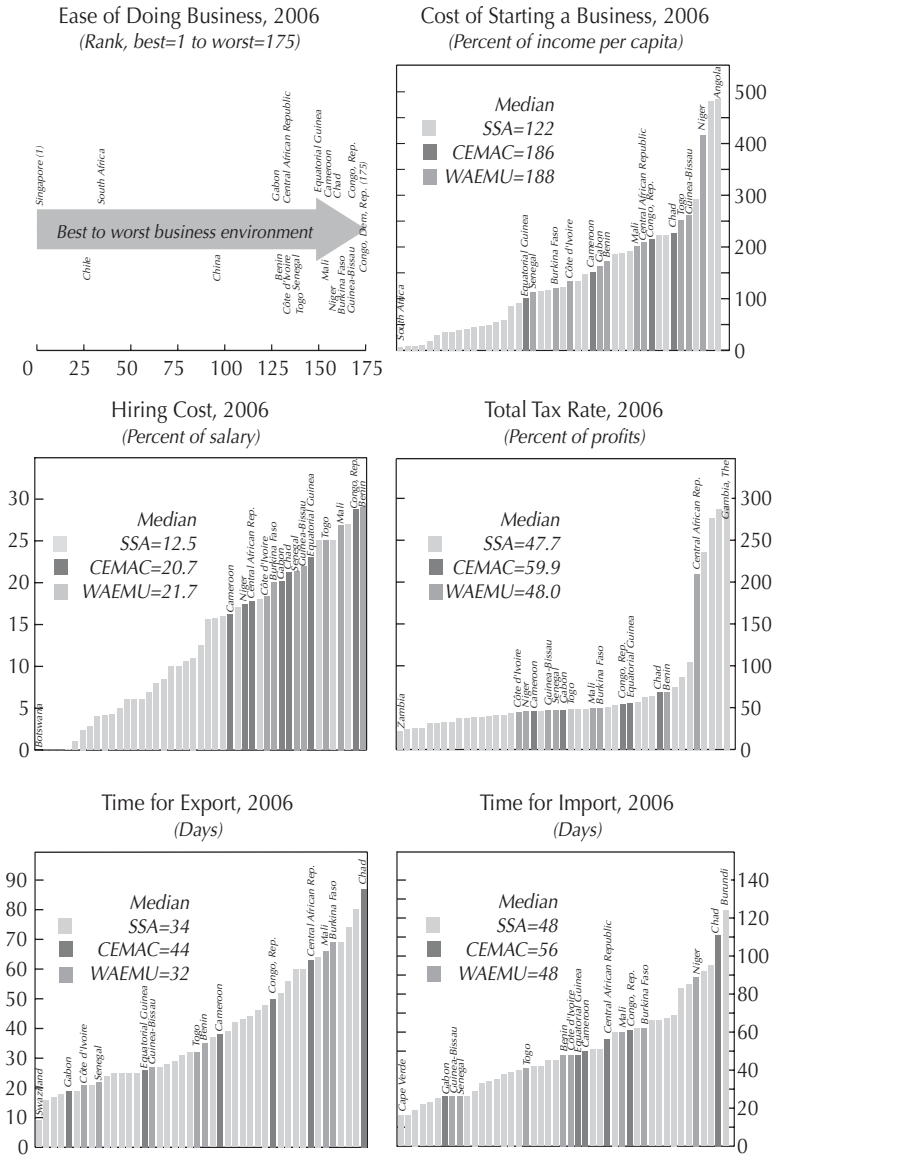
Survey-based indicators of the business climate and governance are useful measures of the indirect costs of production, such as inefficient or unpredictable regulation and institutions (for example, corruption, red tape, and the inability to enforce contracts). Among the sources with the most relevant information is the World Bank's Doing Business Database, which covers 186 countries, including all WAEMU and CEMAC countries. These indicators are a useful source of micro information to compare different measures of structural advantage or disadvantage for a specific country with those for the whole group.

CEMAC and WAEMU countries rank among the lowest in aggregated ease of doing business (Figure 7.16). Results of the Doing Business surveys for all these countries show severe structural impediments to developing a competitive private sector (Tables 7.2a and 7.2b).

In both WAEMU and CEMAC, the costs of starting a business are higher than in sub-Saharan Africa generally or any other comparator group. The minimum capital required to start a business in a WAEMU country is 2.5 times higher (in income per capita terms) on average than in sub-Saharan Africa, and registering property is about 30 percent costlier in both WAEMU and CEMAC. Moreover, labor regulations in WAEMU and CEMAC are 20–30 percent more rigid than in sub-Saharan Africa; firing costs are almost twice as high in both WAEMU and CEMAC than in sub-Saharan Africa as a whole. For investors, disclosure of ownership and financial information is not as satisfactory in CEMAC as in sub-Saharan Africa, though about the same as for WAEMU, and it is more difficult and costly to enforce contracts. Finally, closing a business in CEMAC is about twice as costly and time-consuming than in sub-Saharan Africa, and the recovery rate is extremely low (10 cents on the dollar compared to 18 for sub-Saharan Africa). In WAEMU, time to close a business is longer but the cost is lower than the sub-Saharan Africa average, and the recovery rate is about 23 cents, above both the CEMAC and sub-Saharan Africa averages.

Starting a business in sub-Saharan Africa generally is four to five times more onerous than in a median developing country, and the costs in CEMAC or WAEMU are six to ten times higher. The median cost of hiring relative to salary is about 70 percent above sub-Saharan Africa, and most countries in the regions top the highest recruiting costs for sub-Saharan Africa. Benin and the Republic of Congo are the most costly places to hire of all sub-Saharan Africa countries. Although CEMAC and WAEMU countries face high hiring costs, they are only 50 percent above the median developing country. The tax burden relative to profits puts CEMAC above WAEMU,

Figure 7.16. CEMAC and WAEMU: Doing Business Indicators, 2006



Source: World Bank, *Doing Business,* 2006.

Table 7.2a. CEMAC: Doing Business Indicators, 2006

	CEMAC							Sub-Saharan Africa
	Cameroon	Central African Republic	Chad	Congo, Rep. of	Equatorial Guinea	Gabon	Average[1]	Average[1]
Starting a business								
Procedures (number)	12	10	19	8	20	10	13	11
Time (days)	37	14	75	71	136	60	66	62
Cost (percent of income per capita)	152.2	209.3	226.1	214.8	100.7	162.8	177.7	162.9
Minimum capital (percent of income per capita)	187.3	554.6	414.1	192.4	13.1	36.1	232.9	209.9
Dealing with licenses								
Procedures (number)	15	21	16	15	19	13	17	18
Time (days)	444	245	199	175	156	268	248	236
Cost (percent of income per capita)	1,165.6	301.0	1,139.1	1,243.0	364.9	45.3	709.8	1,047.8
Employing workers								
Difficulty of hiring index	28	89	39	78	67	17	53	44
Rigidity of hours index	60	80	60	60	60	80	67	52
Difficulty of firing index	80	50	80	70	70	80	72	45
Rigidity of employment index	56	73	60	69	66	59	64	47
Nonwage labor cost (percent of salary)	16.2	17.8	21.2	28.8	23.0	20.1	21.2	12.7
Firing costs (weeks of wages)	32.5	21.7	35.8	41.2	132.9	43.3	51.2	71.2
Registering property								
Procedures (number)	5	3	6	7	6	8	6	7
Time (days)	93	69	44	137	23	60	71	110
Cost (percent of property value)	18.7	11.7	21.2	27.2	6.2	10.5	15.9	11.6
Getting credit								
Legal rights index	3	3	4	3	2	4	3	4
Credit information index	2	2	1	2	2	2	2	1
Public registry coverage (percent adults)	3.4	1.1	0.2	1.4	2.4	2.6	1.9	1.5

Protecting investors								
Disclosure index	8	4	3	4	6	5	5	4
Director liability index	2	6	4	5	4	4	4	4
Shareholder suits index	6	7	7	6	5	5	6	5
Investor protection index	5.3	5.7	4.7	5.0	5.0	4.7	5.1	4.7
Paying taxes								
Payments (number)	39	54	65	94	48	27	55	41
Time (hours)	1,300	504	122	576	212	272	498	336
Profit tax (percent)	22.1	181.7	32.2	22.8	17.5	25.0	50.2	24.2
Labor tax and contributions (percent)	18.8	8.3	24.6	34.1	26.1	23.3	22.5	14.0
Other taxes (percent)	5.3	19.4	11.5	0.5	18.8	0.0	9.3	33.0
Total tax rate (percent profit)	46.2	209.5	68.2	57.3	62.4	48.3	82.0	71.2
Trading across borders								
Documents for export (number)	10	9	7	12	6	4	8	8
Time for export (days)	38	63	87	50	26	19	47	40
Cost to export (US$ per container)	524	1,502	1,860	1,732	1,203	4,000	1,804	1,561
Documents for import (number)	14	19	14	15	6	10	13	12
Time for import (days)	51	60	111	62	50	26	60	52
Cost to import (US$ per container)	1,360	1,572	2,400	2,201	1,203	4,031	2,128	1,947
Enforcing contracts								
Procedures (number)	58	45	52	47	38	32	45	38
Time (days)	800	660	743	560	553	880	699	581
Cost (percent of debt)	36.4	43.7	54.9	45.6	14.5	9.8	34.2	42.2
Closing a business								
Time (years)	3.2	4.8	10.0	3.0	No practice	5.0	5.2	3.5
Cost (percent of estate)	14.5	76.0	63.0	24.0	No practice	14.5	38.4	20.2
Recovery rate (cents on the dollar)	24.1	0.0	0.0	19.4	0.0	13.9	9.6	17.7

Source: World Bank, Doing Business, 2006.
[1]Simple average.

Table 7.2b. WAEMU: Doing Business Indicators, 2006

	WAEMU									Sub-Saharan Africa
	Benin	Burkina Faso	Côte d'Ivoire	Guinea-Bissau	Mali	Niger	Senegal	Togo	Average[1]	Average[1]
Starting a business										
Procedures (number)	7	8	11	17	13	11	10	13	11	11
Time (days)	31	34	45	233	42	24	58	53	65	62
Cost (percent of income per capita)	173.3	120.8	134.1	261.2	201.9	416.8	112.6	252.7	209.2	162.9
Minimum capital (percent of income per capita)	379.1	481.4	226.7	1028.9	519.8	778.1	269.6	539.7	527.9	209.9
Dealing with licenses										
Procedures (number)	16	32	22	11	15	19	15	14	18	18
Time (days)	333	226	569	161	209	148	185	273	263	236
Cost (percent of income per capita)	338.9	1,247.5	196.3	2,664.9	1,813.2	2,986.7	151.6	1,435.6	1,354.3	1,047.8
Employing workers										
Difficulty of hiring index	39	83	44	100	44	100	72	44	66	44
Rigidity of hours index	60	60	80	60	60	80	60	60	65	52
Difficulty of firing index	40	50	10	70	50	50	50	70	49	45
Rigidity of employment index	46	64	45	77	51	77	61	58	60	47
Nonwage labor cost (percent of salary)	29.0	20.0	18.4	22.0	26.9	17.4	21.4	25.0	22.5	12.7
Firing costs (weeks of wages)	35.8	33.6	48.8	86.7	31.4	31.4	37.9	35.8	42.7	71.2
Registering property										
Procedures (number)	3	8	6	9	5	5	6	7	6	7
Time (days)	50	107	32	211	33	49	114	242	105	110
Cost (percent of property value)	15.1	16.2	14.3	13.2	20.7	14.0	18.1	7.7	14.9	11.6
Getting credit										
Legal rights index	4	4	3	3	3	3	3	3	3	4
Credit information index	1	1	1	1	1	1	1	1	1	1
Public registry coverage (percent adults)	10.3	2.4	3.1	1.0	2.9	1.2	4.7	3.6	3.7	1.5

Protecting investors										
Disclosure index	5	6	6	0	6	4	4	4	4	4
Director liability index	8	5	5	5	5	5	4	3	5	4
Shareholder suits index	4	3	3	6	3	5	4	5	4	5
Investor protection index	5.7	4.7	4.7	3.7	4.7	4.7	4.0	4.0	4.5	4.7
Paying taxes										
Payments (number)	72	45	71	47	60	44	59	51	56	41
Time (hours)	270	270	270	208	270	270	696	270	316	336
Profit tax (percent)	19.7	19.8	13.6	15.5	12.0	14.5	14.9	12.7	15.3	24.2
Labor tax and contributions (percent)	33.6	23.2	20.6	25.5	31.2	20.1	24.8	29.1	26.0	14.0
Other taxes (percent)	15.3	8.2	11.4	6.5	6.9	11.4	8.1	6.5	9.3	33.0
Total tax rate (percent profit)	68.5	51.1	45.7	47.5	50.0	46.0	47.7	48.3	50.6	71.2
Trading across borders										
Documents for export (number)	8	9	9	8	10	. . .	6	7	8	8
Time for export (days)	35	69	21	27	66	. . .	22	32	39	40
Cost to export (US$ per container)	980	1215	781	1656	1752	. . .	978	463	1118	1561
Documents for import (number)	11	13	19	9	16	19	10	9	13	12
Time for import (days)	48	66	48	26	61	89	26	41	51	52
Cost to import (US$ per container)	1,452	1,700	1,395	1,749	2,680	3,266	1,674	695	1,826	1,947
Enforcing contracts										
Procedures (number)	49	41	25	40	28	33	33	37	36	38
Time (days)	720	446	525	1140	860	360	780	535	671	581
Cost (percent of debt)	29.7	95.4	29.5	27.0	45.0	42.0	23.8	24.3	39.6	42.2
Closing a business										
Time (years)	4.0	4.0	2.2	No practice	3.6	5.0	3.0	3.0	3.5	3.5
Cost (percent of estate)	14.5	9.0	18.0	No practice	18.0	18.0	7.0	14.5	14.1	20.2
Recovery rate (cents on the dollar)	23.7	26.4	33.8	0.0	23.7	14.2	31.6	27.2	22.6	17.7

Source: World Bank, Doing Business, 2006.
[1]Simple average.

which is close to the sub-Saharan Africa average. Almost 60 percent of the profits are taken in taxes in CEMAC, and about 48 percent in WAEMU, which is at the sub-Saharan Africa median and not far from the developing country median (46 percent). As for the external sector, in 2006 the WAEMU region is again very close to the sub-Saharan Africa average, but in CEMAC the total number of days needed to export and import was about 10 more for the median country compared to WAEMU and sub-Saharan Africa. The median developing country can place its merchandise in just 26 days, in WAEMU a country needs 32 days, and in CEMAC 44 days. Imports reach their destination in the median developing country in 34 days, but the process takes 48 days in WAEMU and 56 days in CEMAC.

In summary, the profitability of exports improved in CEMAC as a result of rising oil prices but has lately declined somewhat in WAEMU. Survey-based indicators of the business environment reveal structural impediments to developing a competitive private sector in both regions.

Governance

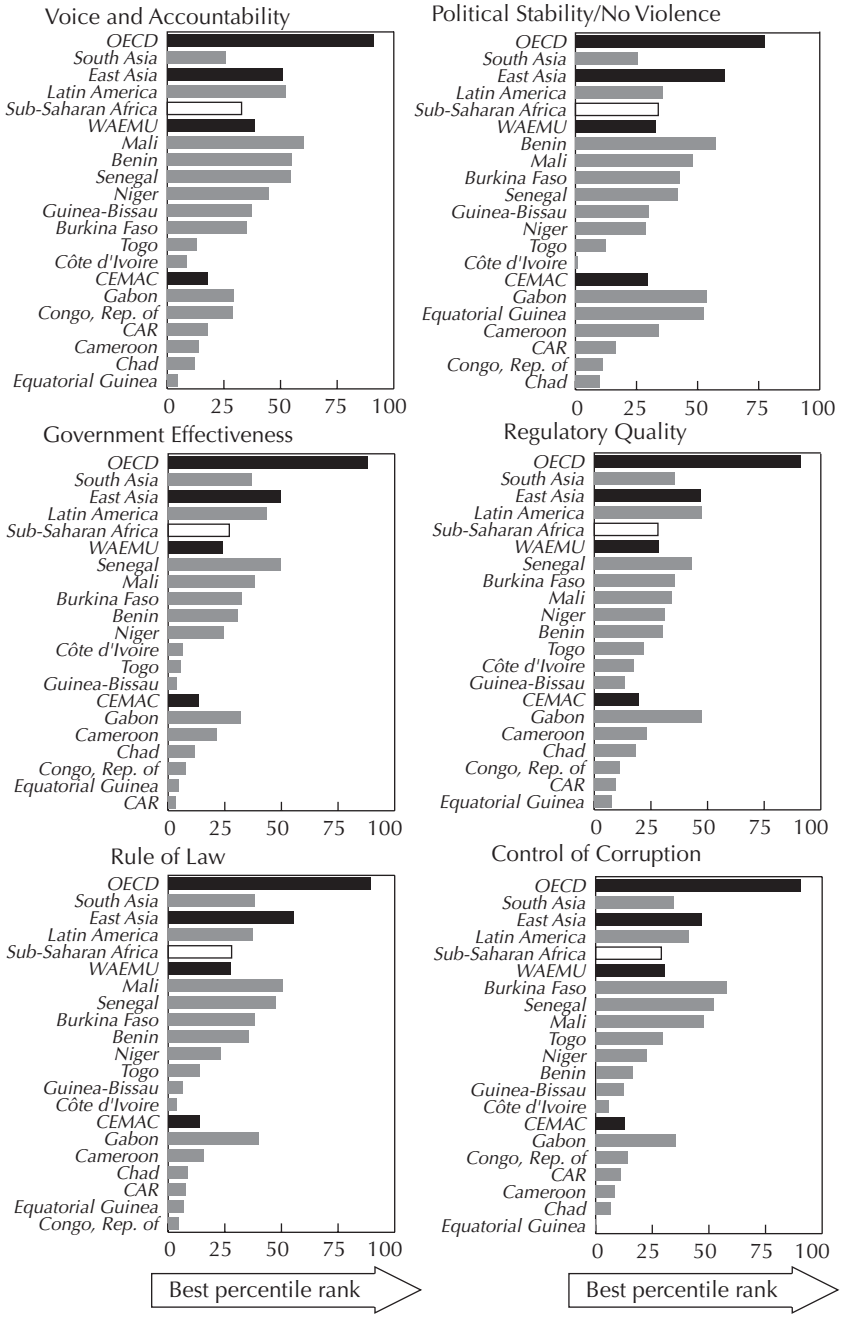
Poor governance and weak institutions can undermine competitiveness by imposing significant direct and indirect costs on the business environment and on the cost of doing business. The World Bank's Worldwide Governance Indicators (WGI) database covers six dimensions of governance in 213 countries for 1996–2006. The indicators are constructed by aggregating surveys and indicators, and the dimensions covered are voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption.[21]

Both WAEMU and CEMAC countries tend to rank below average on important dimensions of governance compared with other countries at a similar level of development (Figure 7.17). However, there has been progress in recent years, and in some cases averages may mask country improvements. For example, Senegal is cited in the 2006 WGI report as one of six African countries that have made progress in improving governance and curbing corruption.[22]

[21]The data and methodology used to construct the indicators are described in Kaufmann, Kraay, and Mastruzzi (2006). Compared with the Transparency International (TI) Corruption Perceptions index, the WGI indicators rely on a broader set of sources and cover about twice as many countries. WGI data have smaller margins of error than the TI index.

[22]The other five are Botswana, Ghana, Sierra Leone, Mozambique, and Liberia.

Figure 7.17. Governance Indicators, 2005



Source: World Bank, *Governance Indicators, 2006*.

Less than 18 percent of the countries in the WGI sample had lower scores on the governance indicators generally than the CEMAC average in 2006. CEMAC countries perform worst on the government effectiveness and control of corruption components, with on average less than 13 percent of all countries ranking below them. In terms of the other components, CEMAC countries rank between the 14th and 30th percentiles, with relatively higher rankings on political stability. There is considerable variation between countries: aside from Gabon, which typically ranks highest in the area in all components (for example, in the 54th percentile for political stability), the other countries rank very low on at least one component (for example, the Central African Republic is in the 3rd percentile in government effectiveness, Equatorial Guinea in the 5th in voice and accountability, Chad in the 10th in political stability, and the Republic of Congo in the 5th on the rule of law).

WAEMU countries on average rank better than the CEMAC countries, and about 30 percent of the countries surveyed ranked worse than the WAEMU average. On average WAEMU countries are at about the 40th percentile in voice and accountability, but only in the 24th in government effectiveness. Excluding Côte d'Ivoire and Guinea-Bissau from the averages improves the rankings by as much as 10 percentage points. There are again substantial variations. Benin, Senegal, Mali, and Burkina Faso are performing relatively better, and Côte d'Ivoire and Guinea-Bissau relatively worse. Mali, for instance, ranks at the 60th percentile in voice and accountability and 51st in the rule of law. Senegal ranks at the 50th percentile on government effectiveness and 43rd on regulatory quality. Benin is in the 58th percentile in political stability, and Burkina Faso in the 58th percentile in the control of corruption. As expected, Côte d'Ivoire and Guinea-Bissau are doing badly particularly in political stability (Côte d'Ivoire at the 1st percentile); rule of law (Côte d'Ivoire at the 4th percentile); control of corruption (Côte d'Ivoire at the 6th percentile); and government effectiveness (Guinea-Bissau at the 4th percentile).

In summary, countries in the two regions tend to rank below average on important dimensions of governance, such as government effectiveness, regulatory quality, the rule of law, and control of corruption, compared with other countries at a similar level of development.

Technology and Physical and Human Capital

Technology and capital, both physical and human, are policy inputs that can raise productivity and competitiveness. Perhaps the most widely

used determinant of productivity is technology and innovation. This category includes anything new about the means of producing goods and services, including ideas, techniques, products, machines, and forms of organization; in a sense, changes in technology are the only source of permanent increases in productivity. In addition, the capital infrastructure in a country affects competitiveness and performance in a number of ways: it can increase productivity, reduce costs, and facilitate trade and other economic transactions. Finally, human capital, especially education and health, is important for economic performance and can be considered part of the country's infrastructure in competitiveness terms.

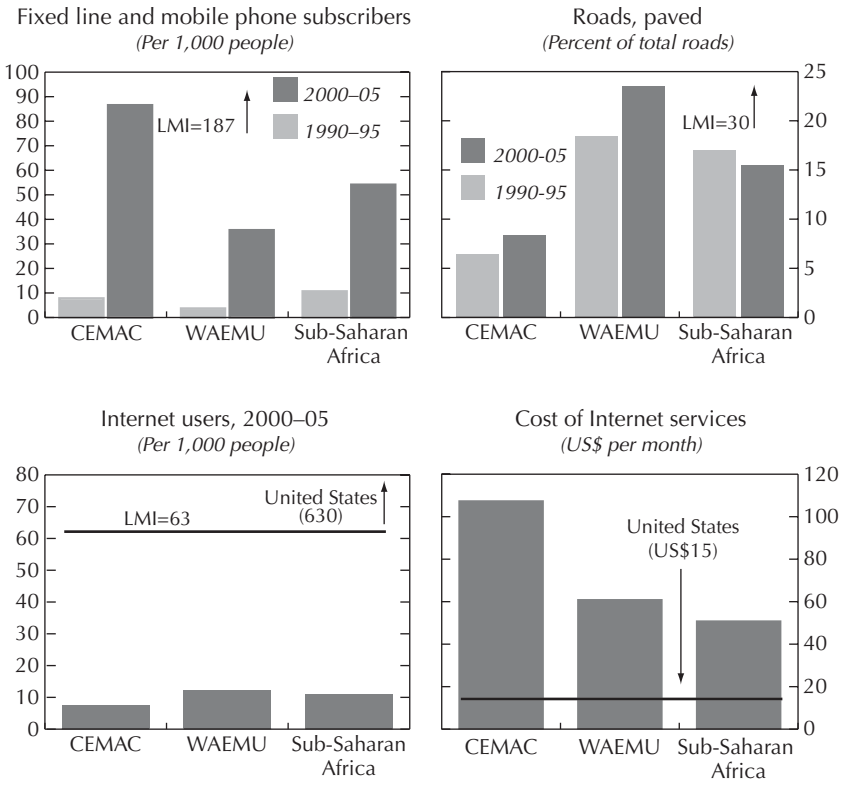
Infrastructure and technology indicators show some improvements over sub-Saharan Africa averages (Figure 7.18). For both WAEMU and CEMAC, physical infrastructure as measured by the percentage of paved roads improved in 2000–05 compared with 1990–95. However, infrastructure in CEMAC is particularly poor, at about half the sub-Saharan Africa average, though in WAEMU it is about 50 percent higher than the sub-Saharan Africa average and compares favorably with Latin America (27 percent) and the general LMI country average (30 percent). Improvements in the WAEMU are likely to continue in light of the recent Regional Economic Plan (REP), an ambitious program designed at accelerating regional growth; 80 percent of REP resources are allocated to road projects.[23]

Using mobile phone subscriptions and Internet usage as a proxy for technology suggests that CEMAC performs above both the WAEMU and sub-Saharan Africa averages. Yet, average CEMAC mobile phone subscriptions for 2000–05 are below the average for LMI countries (187) and Latin America (318). Internet usage in CEMAC is above the average for lower- and middle-income countries (63) but below the Latin America average (115), and it is very expensive: monthly service costs are almost two-and-a-half times higher than the sub-Saharan Africa average and about four times higher than the lower-middle-income country average.

Selected human capital indicators for WAEMU and CEMAC point to deficiencies that in some cases are staggering (Figure 7.19). At about 50 years, life expectancy in WAEMU is higher than in CEMAC, which is marginally better than in sub-Saharan Africa; but more worryingly, in both CEMAC and sub-Saharan Africa life expectancies declined in 2000–05 compared to 1990–95. The 2000–05 WAEMU and CEMAC rates are strikingly lower than for other developing country groups, such

[23]The REP calls for regional priority spending to be scaled up by about CFAF 2,900 billion, about 11 percent of the region's 2006 GDP.

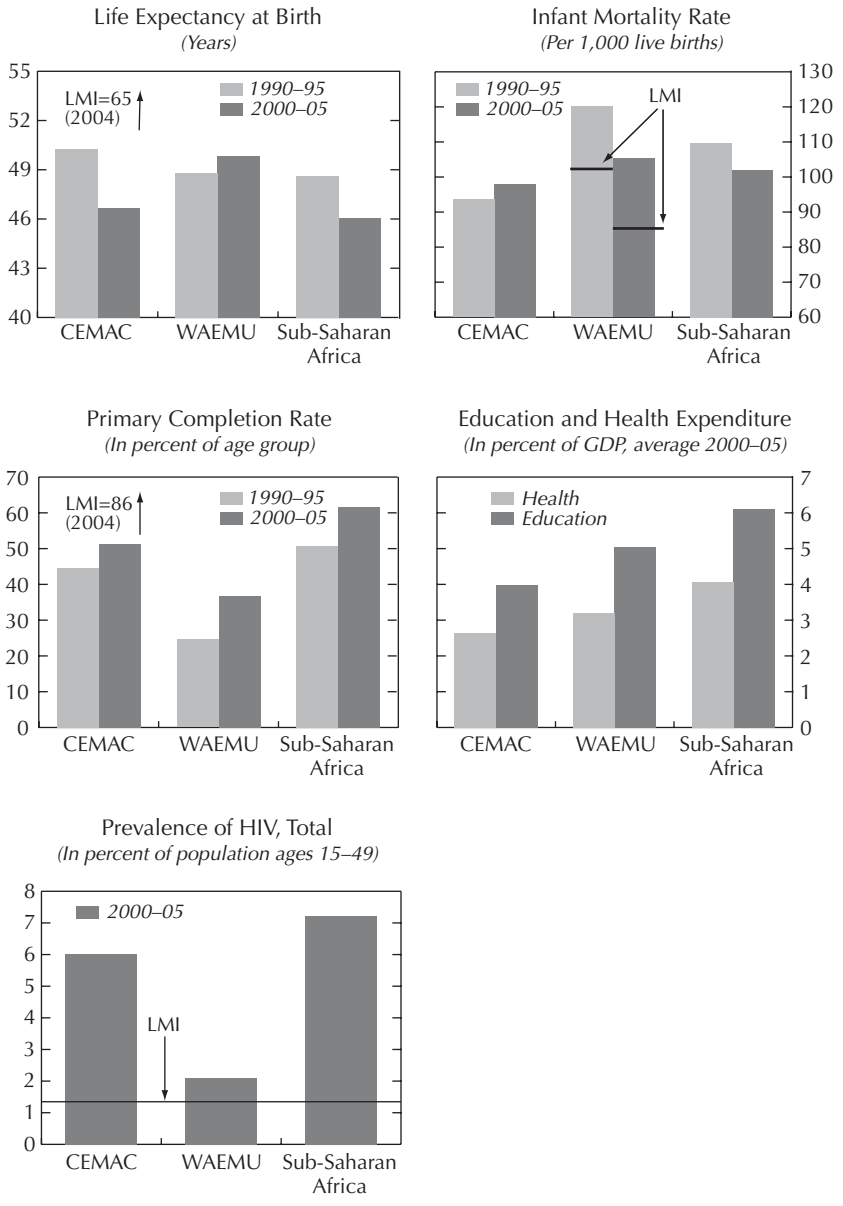
Figure 7.18. Infrastructure and Technology Indicators



Source: World Bank, *World Development Indicators,* 2006.
Note: LMI = Lower- and middle-income countries.

as Latin America (72 years), East Asia and Pacific (70), and South Asia (63). Infant mortality rates have improved in WAEMU to about the sub-Saharan Africa rates (102 per 1,000) but marginally worsened in CEMAC in 2000–05. The rates are much higher than for Latin America (27), East Asia and Pacific (29), and South Asia (66). The education and health expenditures-to-GDP ratio is below sub-Saharan Africa levels for both WAEMU and CEMAC. At about 4 to 5 percent of GDP for health and 2.5 to 3 percent for education in 2000–05, these rates will not be sufficient for these countries to attain the Millennium Development Goals; though primary education completion rates have improved for both WAEMU (35 percent) and CEMAC (52 percent), they are below the sub-Saharan Africa level, which, in turn, is lower than the LMI group (86 percent) Latin

Figure 7.19. Human Capital Indicators



Source: World Bank, *World Development Indicators,* 2006.
Note: LMI = Lower- and middle-income countries.

America (97 percent), and South Asia (82 percent). Finally, HIV prevalence in 2000–05 was below sub-Saharan Africa levels in both WAEMU (2 percent of the population) and CEMAC (6 percent). Nevertheless, these rates are much higher than any other developing country group considered; the lower- and middle-income country average was 1.2 percent and the East Asia and Pacific average was 0.2 percent.

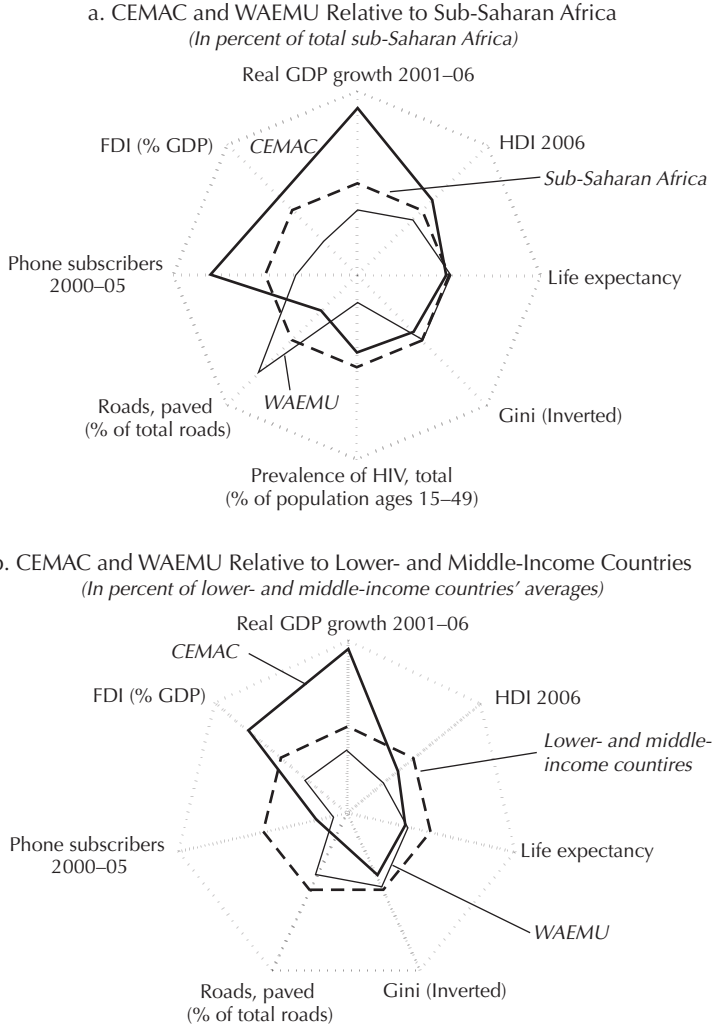
In summary, although selected physical capital indicators point to improvement, particularly in CEMAC, the two regions are seriously deficient according to human capital indicators.

Conclusion

The multifaceted approach to competitiveness proposed in the introduction was applied to examine recent developments in competitiveness in the WAEMU and CEMAC regions. The approach views competitiveness in the context of a framework and goes beyond simply presenting conventional indicators of competitiveness. It also views competitiveness as a strategy where the ultimate goals are sustainable growth and improvements in the quality of life. Key elements of this strategy are the two linked components environment and policy, which are each analyzed in terms of quantifiable determinants.

The results of our analysis of the WAEMU and CEMAC regions can be summarized as follows. First, improvements in GDP growth rates have for the most part failed to translate into improvements in quality of life indicators. Second, the environment indicators of competitiveness show a mixed picture. On the one hand, REER measures indicate clear appreciation following the 1994 devaluation; however, the extent of the appreciation depends on which indicator is used. The appreciation is less pronounced for the labor-cost REER compared to the CPI, and most pronounced using internal real exchange rate measures. On the other hand, export patterns and market shares show some improvements in competitiveness. In spite of the real appreciation, the terms of trade and export profitability in CEMAC have recently improved—although the improvements have failed to translate into increased export market shares. This is partly because the recent real appreciation was driven mostly by nominal exchange rate changes and has so far failed to translate into price and wage increases. In addition, the overall terms of trade and profitability improvements have been driven by oil price and volume increases; for non-oil exports, terms of trade and profitability have been declining since the late 1990s. Export profitability in the WAEMU region has remained roughly constant since

Figure 7.20. Competitiveness Challenges



Source: Authors' calculations.

1994. Third, the policy indicators of competitiveness suggest structural rigidities in business climate and governance indicators, as well as significant challenges in improving human and physical capital in comparison to other peer groups WAEMU and CEMAC face significant challenges.

We summarize the competitiveness challenges that CEMAC and WAEMU face in Figures 7.20a and 7.20b above. Using representative indicators already discussed, we plot WAEMU and CEMAC indicators against those for sub-Saharan Africa and for LMI countries: the further the distance away from the group toward the center, the worse the competitiveness problems. Clearly, both WAEMU and CEMAC fare significantly worse on the majority of the measures, lagging behind both the sub-Saharan Africa average and the LMI country average.

Building competitiveness in order to raise growth and improve the quality of life needs to be a major objective of WAEMU and CEMAC and each of their member countries. Priorities should include structural reforms to boost labor productivity, reduce excessive factor costs, and diversify the base of production and exports of the economies; reduction of factor costs by improved access to new technologies; regional integration programs, notably in road infrastructure, telecommunications and energy, and other areas facilitating interregional trade; and creating the right conditions for an increase in domestic and foreign private investment in all sectors of the economy (especially in the non-oil sector for CEMAC), beginning with reforming the legal and regulatory system, governance, and the business environment.

Appendix 7.1. Calculation of the Internal Real Exchange Rate

The internal real exchange rate (*IRER*) is calculated as the ratio of the domestic prices of nontradable goods to those of tradable goods. To categorize the consumption bundle into tradable and nontradable goods, we use two proxies described in the literature.

First Proxy: $IRER_1$

Using the definition of IRER,[24]

$$IRER = P_{NT}/P_T \,. \tag{7.1}$$

[24]The same methodology was used in IMF Occasional Paper No. 170 by Hernández-Catá and François (1998) and is also discussed in detail in Hinkle and Nsengiyumva (1997).

Also, the consumer price index (CPI) can be defined as a weighted average of the prices of tradable and nontradable goods. Let z be the share of tradable goods in the CPI basket. Then,

$$CPI = (P_T)^z (P_{NT})^{1-z}. \tag{7.2}$$

Reorganizing equation (7.2) and substituting equation (7.1), the *IRER* can be expressed as

$$IRER_1 = (CPI/P_T)^{1/(1-z)}. \tag{7.3}$$

Import prices (from the import price index) were used as a proxy for prices of tradable goods, and the share of imported consumption goods in total private consumption was used as a proxy for z.

Second proxy: $IRER_2$

The second proxy was based on the three-good model of Devarajan, Lewis, and Robinson (1993).[25] The model categorizes the economy as producing a domestic good and an exported good. Aggregate income is given by:

$$p_y Y = p_d D + p_x X, \tag{7.4}$$

where p_y, is the GDP deflator, p_d is the price of the domestically produced good, p_x is the price of the export good, Y is total output, D is output of the domestically produced good, and X is the output of the exported good (all in real terms).

Dividing equation (7.4) by Y and denoting the share of exports X/Y as S_x yields

$$p_y - p_x S_x = p_d D/Y. \tag{7.5}$$

Rearranging equation (7.5) and letting $(1 - S_x)=D/Y$ yields

$$p_d = (p_y - S_x p_x)/(1 - S_x). \tag{7.6}$$

$IRER_2$ can then be calculated using the standard definition (P_{NT}/P_T) and using import prices as a proxy for the price of tradable goods:

$$IRER_2 = [(p_y - S_x p_x)/(1 - S_x)]/P_T. \tag{7.7}$$

[25]The three goods are the domestically produced good, the imported consumption good, and the export good.

Appendix 7.2. Calculation of the Unified Regional Effective Exchange Rates (UREERs)

The calculation of the UREERs for CEMAC and WAEMU follows the standard method used by the IMF to compute monthly indices at the country level and the approach applied by the European Central Bank to obtain the effective exchange rate of the euro (see Buldorini, Makrydakis, and Thimann, 2002). The key feature of the UREER construction is the correct calculation of trade weights for each of the two regions compared with their partners, so intraregional trade is taken out to avoid biasing the results. Information on exchange rates and prices are from IMF, *International Financial Statistics*, and on international trade from IMF, *Direction of Trade Statistics*. The calculation of the UREERs proceeds as follows:

(1) Total merchandise exports and imports are obtained for each of the CEMAC and WAEMU countries to calculate flows net of intraregional trade for 2000–04.

(2) Weights are calculated based on total merchandise exports and imports, for 2000–04 (see Table A7.2.1). For CEMAC the main partners are the United States (28 percent), France (20 percent), other euro area countries (24 percent), China (9 percent), and others (19 percent). WAEMU trades mainly with France (26 percent), other euro area countries (26 percent), Nigeria (10 percent), the United States (6 percent), and others (32 percent). CEMAC trade is more concentrated in a few countries; WAEMU has a longer list of partners and trades more with other African countries.[26]

(3) A common deflator for each region is constructed based on national consumer prices weighted by the gross domestic product at purchasing power parity (GDP_{PPP}). The average GDP_{PPP} for 2000–04 produces the country's relative weight in the aggregated CPI inflation of the monetary union. The domestic CPI inflation for the individual partner countries is weighted by the same trade weights used in the UREER calculation.

(4) To calculate the URNEERs, geometric weighted averages of the third-country exchange rates relative to the monthly average of the CFA franc exchange rate are obtained. The URREERs are based on

[26]For CEMAC, 52 countries accounted for more than 82 percent of total trade. For WAEMU, 32 countries accounted for more than 75 percent of the region's exports and imports.

Table A7.2.1. CEMAC and WAEMU Trade Weights, 2000–04

CEMAC		WAEMU	
United States	28.4	France	26.2
France	19.7	Nigeria	9.8
China	9.3	Netherlands	7.9
Spain	9.2	United States	5.8
Italy	6.0	Italy	4.9
Netherlands	3.5	Spain	4.2
United Kingdom	2.6	India	4.1
Korea	2.5	Germany	3.7
Germany	2.2	China	3.6
Nigeria	2.1	Belgium	3.5
Belgium	1.9	United Kingdom	3.0
Japan	1.9	Thailand	2.7
Canada	1.7	Ghana	2.1
Portugal	1.4	Japan	2.0
Côte d'Ivoire	1.1	Gabon	1.7
Other	6.6	Other	14.7

Source: IMF, *Direction of Trade Statistics*.

the URNEERs and the national consumer prices. The regional CPI is the weighted average of the CPIs of the countries in the region, with the weights based on the GDP_PPP for 2000–04.

Specifically, the following formula was applied for the URNEER:

$$URNEER_j = \frac{e_j}{Exp(\sum_{i=1}^{n} w_{ji} \ln(e_i))},$$

where j is CEMAC or WAEMU, i is the partner country, e is the exchange rate in local currency for U.S. dollars, and w_{ji} is the weight of country i in total trade of the region j (sum of the weights is 1).

The URREERs is obtained from

$$URREER_j = \frac{CPI_j e_j}{Exp(\sum_{i=1}^{n} w_{ji} \ln(CPI_i e_i))},$$

where *CPI* refers to the consumer price index of either the region j or the country i. To compare indices, it is also possible to obtain measures of international price competitiveness for subgroups of trade partners. Specifically, URREERs were calculated in terms of the European Union and the rest of sub-Saharan Africa. In those cases, relevant countries were listed and the weights renormalized to add up to 1 (100 percent).

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8

What Is Fuzzy About Clustering in West Africa?

MAHVASH SAEED QURESHI AND CHARALAMBOS TSANGARIDES

Following the successful launch of the euro as the single currency of the European Economic and Monetary Union (EMU), there has been a renewed interest internationally in the economics of monetary integration. Other regions are seeking to emulate the success of the EMU, usually by setting up similar institutional frameworks and establishing processes of convergence as prerequisites for wider monetary integration.

The objective of wider regional integration based on a reinforcement of regional surveillance and peer pressure for sound macroeconomic policy management is a welcome effort. In some cases, however, the drive for regional cooperation and integration has overshadowed concerns about the dissimilarities of the shocks accruing to the economies and of the economies' adjustment after they respond to the shocks—the key criteria of the optimum currency area (OCA) theory as pioneered by Robert Mundell (1961). In this spirit, this paper tries to assess the comparative relevance of the proposed "monetary area boundaries" in West Africa and seeks to determine if the candidate countries are ready to form an OCA.

We use cluster analysis to provide an assessment of the readiness and sustainability of monetary unions by classifying West African countries into groups according to their performance toward achieving the OCA and convergence criteria for common currency adoption. Considering the noisy nature of the data, we employ the more realistic and powerful technique of fuzzy clustering along with the traditional hard clustering method. Fuzzy clustering techniques uncover useful relationships between countries

in a group and the homogeneities among group members, by taking into account the possibility that a country may be similar to one country (or group of countries) in some respects and at the same time share certain other characteristics with another country (or group of countries). In the end, a country is assigned the largest membership coefficient for the cluster with which it shares the greatest similarities.

The findings of our analysis reveal considerable dissimilarities in the economic characteristics of the countries in West Africa. In particular, the West African Monetary Zone (WAMZ) countries do not form a cluster with the WAEMU countries; and, within WAMZ, there is a significant lack of homogeneity, with Nigeria and Ghana appearing as independent singletons. These results cast doubt on the feasibility of a separate monetary union that comprises all WAMZ countries and, more important, on the prospects of the wider monetary integration in the Economic Community of West African States (ECOWAS). Furthermore, when west and central African countries are considered together, we find significant heterogeneities within the CFA franc zone, with the WAEMU and CEMAC countries not clustering together, and some interesting similarities between the CEMAC and WAMZ countries, which tend to group together.

Background

Optimum Currency Areas and West Africa

Several of the existing monetary arrangements in sub-Saharan Africa result from choices countries made during or after the colonial era: former British colonies moved from currency boards to flexible exchange rates after achieving independence, while after World War II, former French colonies and France set up a monetary arrangement in the form of the CFA franc zone. The CFA franc zone comprises 14 countries grouped into two monetary unions, WAEMU and CEMAC.[1] A special case is the monetary union project in ECOWAS. Founded in 1975, ECOWAS is an organization of 15 members (8 of which are the members of WAEMU), with the mandate to promote regional economic integration. Since April 2000, the five non-WAEMU members of ECOWAS (Nigeria, The Gambia, Ghana, Guinea, and Sierra Leone) have formed a second monetary area, the WAMZ, and established a convergence process toward launching a

[1]For more details see Chapter 1 of this volume, and Hadjimichael and Galy (1997) for an analysis of the CFA franc zone and its institutions.

common currency.[2] Wider monetary unification between member states of ECOWAS is envisaged, although no announcement has been made to date of the type of monetary arrangement that would be adopted following the unification.

The standard tool used in economic literature to evaluate the adequacy of a currency union is the OCA theory, pioneered by Mundell (1961) and McKinnon (1963), with important elaborations by, among others, Kenen (1969) and Krugman (1990). The OCA theory compares the benefits and costs to countries of participating in a currency union. On the one hand, benefits include lower transaction costs, price stabilization, improved efficiency of resource allocation, and increased access to product, factor, and financial markets (thereby facilitating investment and promoting economic growth). The main cost, on the other hand, is the country's loss of sovereignty to maintain national monetary and exchange rate policies.

Two criteria are identified in evaluating the feasibility of a monetary union—the nature of shocks affecting the potential monetary union member countries and the speed with which they adjust to such shocks. First, when a country joins a common currency area, it relinquishes its own currency and abandons monetary policy and exchange rate autonomy. If all countries in a currency area are hit with symmetric negative shocks, the adverse effects could be mitigated by depreciating the common currency or by adopting a common expansionary monetary policy. However, if countries are hit with asymmetric shocks, depreciation or monetary expansion are not feasible instruments because they might boost production in countries with negative shocks but run the risk of triggering overheating and inflation in countries with positive shocks. Thus, the costs of forming a common currency area are lower if the shocks are symmetric and higher if they are asymmetric.

Second, the speed with which economies adjust after shocks also has important implications for the formation of a currency union. If, after the shocks, market mechanisms are quick to restore equilibrium, then asymmetric shocks need not imply significant costs even if they are large. Two such mechanisms that ensure rapid adjustment are labor mobility and fiscal transfers. For example, if labor can move freely throughout the currency area, unemployed workers in a country hit by an adverse shock could move to and find jobs in other parts of the currency area that experienced positive shocks. The movement of labor would help mitigate the

[2]The launch date of the common currency, initially set for July 2005, has been postponed to December 2009 because the WAMZ member states failed to achieve the convergence criteria.

impact of a recession. Similarly, if the region has a good system of fiscal transfers, resources could be transferred from the country with positive shocks to countries affected by negative shocks. Adjustments in relative wages, changes in labor force participation induced by wage changes, and capital mobility are various other mechanisms for responding to shocks as discussed in Blanchard and Katz (1992).

The OCA criteria are a useful benchmark for evaluating the feasibility of monetary arrangements and may be used to analyze the establishment of ECOWAS. First, the West African states are small, open economies that export primary commodities; they are not well diversified, and are highly susceptible to asymmetric shocks. Although some primary commodities, such as coffee, cocoa, cotton, fish, timber, and groundnuts are common to a number of countries, others are found in only one or two countries. Several countries depend on a single commodity for 50 percent or more of their earnings.[3] In addition, terms of trade movements tend to be very large for most of these countries, with uncorrelated shocks to terms of trade mainly because of differences in commodity exports whose prices in world markets do not necessarily move together. For example, Nigeria, a large oil exporter, has terms of trade shocks that are very different from other WAMZ countries, which are all oil importers. Not only are the correlations with other members low (or negative), the variability in Nigeria's terms of trade changes is also large and higher than that of any other country in the region.[4] In general, correlations of terms of trade shocks are higher among the WAEMU member countries than between WAEMU and WAMZ countries, or among the WAMZ countries themselves.[5]

The asymmetry of shocks may be less of a problem if countries are sufficiently flexible, or if they have sufficient shock absorbers, in particular, factor mobility or a system of fiscal transfers. Although reliable migration data are hard to find, migration between the WAEMU region and traditional migratory trade routes within West Africa seem high, albeit less high in recent years because of conflict.[6] In contrast, fiscal transfers are inhibited by a lack of financial resources and the poor systems of transfers and taxes. In addition, trade within the ECOWAS region is relatively low. WAEMU countries trade considerably more among themselves than with

[3]See Cashin and Pattillo (2000) and Masson and Pattillo (2005).

[4]See Masson and Pattillo (2001). Ogunkola (2002) studies bilateral real exchange rate volatility in the sub-Saharan African countries and finds the conditional volatility for Nigeria to be the highest in the region.

[5]See Table A8.2.3 in Appendix 8.2.

[6]See Masson and Pattillo (2001) and van den Boogaerde and Tsangarides (2005).

non-WAEMU countries, whereas trade within non-WAEMU countries is limited, which raises doubts about the magnitude of potential savings from a reduction in transactions costs.[7]

In principle, however, the West African countries stand to reap significant gains by giving up the pursuit of an independent monetary policy. Fixed exchange rates provide a way for countries to make a credible commitment to lower inflation and can help bring about price stability.[8] In fact, in the absence of central bank independence and debt markets in which governments can finance themselves, monetary policy is generally dictated by the need to finance fiscal policy and persistent deficits lead to excessive money creation as governments resort to seigniorage. In this context, a monetary union could encourage fiscal discipline, and the common independent central bank could act as an "agent of restraint" for fiscal policies.[9]

Recent Literature

Much of the earlier research on monetary arrangements in Africa was carried out in the context of the CFA franc zone and examines whether economies in the CFA franc zone have fared better or worse than their neighbors that are not part of the zone.[10] The asymmetry of shocks accruing to the sub-Saharan African economies has been studied by Bayoumi and Ostry (1997); Hoffmaister, Roldos, and Wickham (1998); and Fielding and Shields (2001) using the vector autoregressive (VAR) approach. They find little correlation of the disturbances to real output per capita among the sub-Saharan African countries. Also, Hoffmaister, Roldos, and Wickham show that external shocks are an important source of macroeconomic fluctuations in sub-Saharan Africa and are more detrimental to CFA franc

[7]This situation should be viewed in conjunction with the fact that the scope for intraregional trade is limited by low market potential, weak transportation infrastructure, and similarities in factor endowments. Further, benefits from reduced transaction costs do not seem to have translated into increased intraregional trade even in the CFA franc zone despite years of monetary unification. Trade within the CFA zone remains modest, especially within CEMAC, and practically nonexistent between WAEMU and CEMAC.

[8]However, Masson and Pattillo (2001) note that, so far, African countries with a common currency have not been successful in achieving price stability and have not made optimal monetary policy changes in response to various asymmetric shocks.

[9]In examining the CFA monetary union, Masson and Pattillo (2001) conclude, "a monetary union in West Africa can be an effective agency of restraint on fiscal policies if the hands of the fiscal authorities are also tied by a strong set of fiscal restraint criteria."

[10]See, for example, Devarajan and Rodrik (1991), Elbadawi and Majd (1996), and Ghura and Hadjimichael (1996).

countries than to the non-CFA franc countries, probably because of the fixed exchange rate regime in the former.

Recently, however, focus has shifted to analyzing the feasibility of forming a monetary union in the ECOWAS region perhaps because of the enthusiastic drive of the West African countries toward establishing a monetary union. Bénassy-Quéré and Coupet (2005) use cluster analysis to examine the monetary arrangements in the entire sub-Saharan Africa region using the crisp clustering methodology only. Celasun and Justiniano (2007) use a dynamic factor analysis to study the synchronization of output fluctuations among the member countries. Their results indicate that small groups of countries within ECOWAS experience relatively more synchronized output fluctuations. They therefore suggest that monetary unification among subsets of countries is preferable to wider monetary integration in West Africa. Debrun, Masson, and Pattillo (2005) develop a model of monetary and fiscal policy interactions and use it to assess the potential for monetary integration in ECOWAS. Their findings show that the proposed monetary union is desirable for most non-WAEMU countries but not for most of the existing WAEMU member states unless Nigeria implements institutional changes that lower its financing needs.

In general, it is difficult to assess the overall costs and benefits associated with a potential monetary union because of concerns about political commitment, credibility, and endogeneity. The endogeneity concern of the OCA criteria, flagged by Frankel and Rose (1998), implies that countries become similar when they share a common currency. This concern is a particularly important issue, but it is not addressed in most cost-benefit analyses. Furthermore, despite a consensus about the dissimilarities in economic structures and asymmetries of shocks, the ECOWAS countries stand by their commitment to monetary integration for different socioeconomic reasons. Against this background, in this paper we adopt a different approach and assess how well-prepared and suitable West African states are to form a monetary union in light of their increased efforts toward macroeconomic convergence since 2000. In doing so, we investigate the homogeneity of the candidate countries in terms of a number of economic characteristics that are inspired from the OCA criteria as well as the convergence criteria set by these countries.

Our study differs from previous work in its approach as well as in its methodology. We use clustering analysis to assess the similarity between countries within a region and across the regions. Cluster analysis offers a number of advantages. First, by allowing us to account for a number of variables simultaneously, it enables us to investigate synchronization in terms of the symmetry of business cycles as well as the symmetry of vari-

ous other relevant variables. Second, cluster analysis has less stringent data requirements in terms of the time dimension of the data series than other methodologies and works well for countries for which consistent time series data are limited, such as the African economies. Third, by exploring the group pattern in the data, this methodology identifies the areas in which each country needs to improve if it is to achieve macroeconomic convergence (which is necessary for forming the union), and provides useful information for making informed policy choices.

Methodology

Cluster analysis refers to methods used to organize multivariate data into groups (clusters) according to homogeneities among the objects such that items in the same group are as similar as possible and items in different groups are as dissimilar as possible.[11] The resulting data partition improves our understanding of the data by revealing its internal structure. Clustering is a useful exploratory tool that has been applied to a wide variety of research problems aiming to examine the underlying relationships in the data for classification, pattern recognition, model reduction, and optimization purposes. Broadly, clustering methodologies may be classified into two groups according to the types of clusters obtained: crisp (or hard) clustering approaches and soft (or fuzzy) clustering techniques.

Crisp Clustering

Crisp clustering algorithms divide the data into mutually exclusive clusters such that each object belongs to only one cluster. Mathematically, crisp partitioning of a data set X, with N objects and p variables, into c clusters is defined as a family of subsets $\{A_i \mid 1 \leq i \leq c \subset X\}$ having the following properties:

$$\cup_{i=1}^{c} A_i = X, \tag{8.1}$$

$$A_i \cap A_j,\ 1 \leq i \neq j \leq c, \text{ and} \tag{8.2}$$

$$\Phi \subset A_i \subset X,\ 1 \leq i \leq c, \tag{8.3}$$

[11]The term "similarity," however, should be understood as mathematical similarity measured in a well-defined sense. In metric spaces, for example, similarity is defined by means of a distance function.

where condition (8.1) states that the subsets A_i contain all data in X; condition (8.2) states that the subsets must be disjoint so that each object belongs to one cluster only; and condition (8.3) states that none of the subsets is an empty set (Φ) or contains all the data in X.

In terms of membership coefficients, (μ_{ik}, which indicate the degree of belongingness of an object i to a cluster k, the above conditions may be expressed as

$$\mu_{ik} \in 0,1 \text{ and } 1 \leq i \leq N; 1 \leq k \leq c, \tag{8.4}$$

$$\sum_{k=1}^{c} \mu_{ik} = 1,\ 1 \leq i \leq N, \text{ and} \tag{8.5}$$

$$0 < \sum_{i=1}^{N} \mu_{ik} < N,\ 1 \leq k \leq c, \tag{8.6}$$

where equations (8.4), (8.5) and (8.6) imply that a membership coefficient is either zero or one, the sum of the membership coefficients of an object across clusters is equal to one, and the sum of membership coefficients in a cluster lies between zero and the total number of objects in the data set, respectively.

Different methods have been developed to partition data according to the above properties. These include hierarchical classification of data into groups and the classification of data based on the optimization of a numerical criterion. In this paper, we perform hard partitioning using the *hierarchical clustering analysis*—a procedure consisting of a series of partitions, which may run from a single cluster containing all individuals to N clusters each containing a single individual. Hierarchical clustering can be performed using either the agglomerative methods, whereby successive fusions of individuals are made to a set containing all observations, or the divisive methods, whereby a set consisting of all individuals is divided successively into smaller groupings.

In this paper, we use the *agglomerative* method of hierarchical clustering and proceed by a series of successive fusions of the N objects into groups until the last group consisting of all objects is reached. We begin by estimating the dissimilarities between every pair of objects using the Euclidean distance measure.[12] Once the proximity between objects in the data set has been computed, the next step is to determine which objects should be grouped together into clusters. This is done by considering the

[12]The Euclidean distance between the row vectors x_1 and x_2 for an $n \times m$ matrix where n is the number of objects and m is the number of variables, is given by $d_{12}^2 = (x_1 - x_2)(x_1 - x_2)'$. For n objects, this results in $n(n-1)/2$ distance values.

distance information and linking pairs of objects that are close together into binary clusters (clusters made up of two objects). The newly formed clusters are then linked to other objects or clusters to create bigger clusters until all the objects in the original data set are linked together.

The linking of objects/clusters can be performed in various ways depending on how proximity between two groups of objects is measured. The commonly used methods of measurement or linkage functions include the Group Average, Ward, and Single linkage methods. The Group Average linkage method uses the average distance between all pairs of individuals in each group to calculate the distance between clusters. Thus, for two clusters (1 and 2) with n_1 and n_2 observations, respectively, this method measures proximity, *dist*, as

$$dist_{12} = \frac{1}{n_1 n_2} \sum_{i=1}^{n} \sum_{j=1}^{n} d(x_{1i}, x_{2j}). \tag{8.7}$$

The Single linkage method, however, uses the nearest-neighbor distance or the smallest distance between objects in the two groups. In other words, it looks for an object in a cluster that is most closely placed to another object in a different cluster and uses the distance between the two objects as a measure of the closeness of clusters. That distance is expressed as

$$dist_{12} = \min\{d(x_{1i}, x_{2j})\};\ i \in (1,2,\ldots, n_1),\ j \in (1,2,\ldots, n_2). \tag{8.8}$$

Finally, the Ward linkage uses the increase in the total within-cluster error sum of squares when two clusters are joined to determine the grouping of objects. It is defined as

$$dist_{12} = \frac{n_1 n_2 d^2(\bar{x}_1, \bar{x}_2)}{(n_1 + n_2)}, \tag{8.9}$$

where $\bar{x}_c = \frac{1}{n_1} \sum_{i=1}^{n_1} x_{ci}$ is the center of each cluster and $d^2(\bar{x}_1, \bar{x}_2)$ is the distance between the centers of the two clusters.

The linking of objects in hierarchical clustering is presented in the form of a cluster tree known as a *dendrogram*. The tree is not a single set of clusters, but rather a multilevel hierarchy with clusters at one level being joined at the next higher level to form a bigger cluster, and so on. The heights of the "links" of the dendrogram represent the distance at which each fusion is made such that the greater the dissimilarity between the objects or group of objects, the greater the distance between them and the taller the link.

We perform clustering using all the above-mentioned linking approaches to investigate if the grouping of countries is affected by the

choice of the proximity measure and to opt for the method that best represents our data. The results are then compared using the *cophenetic correlation coefficient*, which is a validity measure of the cluster information generated by the linkage functions. A cophenetic correlation coefficient measures the linear correlation between distances obtained from a cluster tree and the original distances (or dissimilarities) in the distance vector, which were used to construct the cluster tree. Therefore, it is a measure of how well the cluster tree represents dissimilarities among observations and reveals patterns present in the data set. Values of the cophenetic correlation coefficient close to one represent better clustering and indicate that the dendrogram does not greatly distort the original structure of the data input.

Determining the optimal number of clusters is a tricky task in hierarchical cluster analysis. In general, the appearance of the dendrogram itself is a natural guide to cluster divisions, where large changes in fusion levels are taken to indicate the best cut for forming clusters as suggested by Everitt, Landau, and Leese (2001).[13] A number of formal rules have also been proposed to determine the best number of clusters. However, earlier research indicates that because of deficiencies in each methodology, no single technique prevails for determining the appropriate number of clusters. Milligan and Cooper (1985) evaluate the performance of 30 cluster-stopping rules on four hierarchical methods and find that the *pseudo-F index* developed by Calinski and Harabasz (1974) is the best performer. This index, commonly known as the Calinski-Harabasz Index (CHI), is a measure of the quality of the separation between clusters and is defined as

$$CHI = \frac{S_b/(k-1)}{S_w(n-k)}, \tag{8.10}$$

where S_b is the between-clusters sum of squares, S_w is the within-clusters sum of squares, k is the number of clusters, and n is the number of observations. Higher values of the index indicate a distinct partitioning and better clustering. Here, we use the *CHI* to determine the best number of clusters as identified by the hierarchical analysis.

[13]When the height of a link is consistent with the heights of its neighboring links, it is an indication of similarities between objects, whereas if the height of a link differs from its neighboring links, the link is said to be inconsistent and the object is considered different from the remaining elements.

Fuzzy Clustering

The fuzzy cluster analysis draws on the fuzzy set theory attributed to Zadeh (1965). In conventional set theory, each element is attributed to one particular set such that if it is a member of one set, then it cannot be a member of any other set. In fuzzy set theory, however, an element may be associated with more than one set, for each of which the degree of membership takes a value between zero and one. Similarly, in fuzzy clustering, objects are not forced to belong to one cluster or another; rather, each object belongs to each cluster to some degree or the other. Objects in the data set are assigned membership coefficients between zero and one, which indicate their partial memberships or degree of belongingness to each cluster.[14]

Fuzzy clustering methodology is, therefore, different from crisp clustering primarily because it takes into account the realistic possibility that an object may share similarities with objects in other clusters and permits overlapping clusters. It conveys more information about the data than crisp partitioning and is preferable to crisp partitioning. A number of algorithms have been proposed for fuzzy clustering: the fuzzy c-means algorithm (FCM), the Gustafson-Kessel algorithm (GK), the Gath-Geva algorithm (GG), and the fuzzy c-varieties algorithm (FCV). The FCM approach, however, remains the most prominent algorithm and is used in this paper for grouping purposes. The FCM, developed by Dunn (1974) and further developed by Bezdek (1981), is based on the minimization of an objective function called the c-means functional, which has been defined by Dunn (1974) as follows:

$$J(\mu, \nu) = \sum_{i=1}^{N}\sum_{k=1}^{c}(\mu_{ik})^2 d^2(x_i, \nu_k) = \sum_{i=1}^{N}\sum_{k=1}^{c}\mu_{ik}^2\sum_{j=1}^{m}(x_{ij} - \nu_{kj})^2, \tag{8.11}$$

where d is the Euclidean distance between an object x_i and the center of the cluster k, μ_{ik} is the degree of membership that x_i belongs to the center of each cluster ν_k, and ν_k is calculated for each variable j as follows:[15]

$$\nu_{kj} = \sum_{i=1}^{N} u_{ik}^2 x_{ij} / \sum_{i=1}^{N} u_{ik}^2. \tag{8.12}$$

The minimization of equation (8.11) is subject to the following constraints:

[14]A membership coefficient close to or equal to zero suggests that the object is dissimilar to other objects in that cluster whereas a membership coefficient closer to or equal to one indicates that the object is highly similar to other objects in that cluster.

[15]Euclidean distance d is defined as $d(x_i, \nu_k) = \left[\sum_{j=1}^{m}(x_{kj} - \nu_{ij})^2\right]^{1/2}$.

$$0 \leq \mu_{ik} \leq 1, \tag{8.13}$$

$$\sum_{k=1}^{c} \mu_{ik} = 1,\ 1 \leq i \leq N, \text{ and} \tag{8.14}$$

$$0 < \sum_{i=1}^{N} \mu_{ik} < N,\ 1 \leq k \leq c, \tag{8.15}$$

where the first constraint implies that the membership coefficients may take any value in the closed interval zero and one, subject to constraints that are similar to the constraints in equations (8.5) and (8.6), respectively. This is in contrast to the hard partitioning conditions, which force the membership coefficients to take values of zero or one only.

Like other optimization clustering methods, the fuzzy clustering methodology finds the best fit for a *fixed* number of clusters but does not ensure that it is the best possible fit for the data overall. To ensure that the chosen number of clusters gives an optimal representation of data, the clustering results needs to be validated. In particular, cluster validation is the task of determining the quality of cluster structures and assessing whether they reflect the data accurately (Zimmerman, 1991). A number of validation measures have been proposed in the literature to assess the goodness of the obtained partitions. They include the indices by Dunn (1974), Roubens (1982), Rousseeuw (1987), and Xie and Beni (1991). Because none of the indices is reliable by itself, Balasko, Abonyi, and Feil (2004) suggest that the optimal number of clusters should be chosen after comparing results from several indices. In this paper, we use three frequently applied measures—Dunn's Partition Coefficient (DPC), Xie and Beni's Index (XBI), and the silhouette plot—to determine the number of optimal clusters and to assess the effectiveness of our analysis. These three validity measures are discussed in Appendix 8.1.

Data and Variables

Choice of Variables

The choice of variables in clustering depends on the purpose of partitioning and the availability of data. In this paper, we explore the feasibility of the proposed currency union in West Africa by examining whether the economic structures of the candidates are similar enough to support a fixed exchange rate arrangement between their currencies. Therefore, our choice of variables is based on the OCA literature as well as on the convergence

criteria set for establishing a monetary zone in the region.[16] In particular, we use variables that measure the synchronization of output and terms of trade shocks, exchange rate variability, inflation, regional trade intensity of individual countries, and government balance. We also include the debt-servicing requirement as a variable because the West African states spend a large part of their foreign exchange earnings to service their debts.[17] Finally, to attach equal weights to all variables, we perform clustering on normalized variables, where we achieve normalization by taking the deviation of each variable from its mean and dividing by its respective standard deviation. The construction of each variable is described in detail below.

Output Volatility

Measuring the synchronization of business cycles between countries requires the choice of an anchor country (or a group of countries) for computing correlations. For example, before EMU, Germany was considered as the internal anchor country, and the European Central Bank was modeled after the Bundesbank. Therefore, research on the European Union has focused on Germany as the central country and assessed the performance of individual countries with respect to Germany (Artis and Zhang, 2001 and 2002; Boreiko, 2003; and Kozluk, 2004). However, for Africa, the choice of an anchor country for assessing the feasibility of monetary arrangements is unclear. Nigeria, one candidate for West Africa, lacks the financial development and disciplined fiscal policies of Germany and has an export structure that differs greatly from its neighbors. Hence, it has the potential to influence monetary policies in ways that partners in a monetary union would find undesirable and is therefore not suitable as an anchor country. An alternative strategy therefore is to use an area outside of West Africa as a benchmark. Therefore, following Bénassy-Quéré and Coupet (2005), we calculate the correlation of business cycles of the West African countries with respect to the euro area.[18]

[16]Clustering was performed considering the OCA and convergence criteria separately as well as taking all the variables together. However, since this did not have any significant effect on the groupings, we report the results for the latter only for brevity reasons. All results are available from the authors upon request.

[17]In general, countries with higher debt-service ratios are expected to be more willing to peg and less inclined to devalue, as debt servicing is denominated in hard currencies (Bénassy-Quéré and Coupet, 2005).

[18]Bénassy-Quéré and Coupet (2005) point out that the euro area is preferable to any other country or region as an anchor because of the current CFA arrangement, as well as because of the large trade flows between the two regions.

In the first step of estimating the synchronization of output shocks between ECOWAS countries, the Hodrick-Prescott filter is used to detrend the annual real GDP series of all ECOWAS countries as well as the aggregate real GDP series of the euro area. Next, cross-correlations of the cyclical components of the individual GDP series are estimated vis-à-vis the euro area.[19] West African countries with similar correlation values, whether positive or negative, are considered to have relatively parallel business cycles. However, when the correlation coefficients are different in magnitude or in sign, they indicate no correlation of output shocks and higher costs of joining the monetary union. During 1995–2004, the average correlation of output fluctuations was higher for the WAEMU region as compared to the average correlation for the WAMZ region as well as for the entire ECOWAS region.[20]

Terms of Trade Synchronization

Large swings in terms of trade are an important source of shocks, especially for countries that rely heavily on the exports of primary commodities for their foreign exchange earnings. The costs of monetary unification are higher if terms of trade shocks are not well correlated across countries, because the exchange rate is no longer available as an instrument to cushion against these shocks. To measure the cross-correlation of terms of trade movements, we again assign the anchor role to the euro area. To compute changes in the terms of trade for every country, we take the first difference of the annual terms of trade index and measure correlation with the annual change in the aggregate terms of trade index series for the euro area. As before, countries with similar values of the correlation coefficient, positive or negative, are considered to have relatively parallel terms of trade shocks, whereas dissimilar coefficients represent asymmetric shocks. Overall, WAEMU countries appear to have more synchronized terms of trade changes than the WAMZ countries.[21]

Real Exchange Rate Variability

The OCA theory emphasizes that the primary costs to countries of monetary unification stem from the loss of maintaining a flexible exchange rate, which, under monetary independence, they can use as a policy tool to absorb

[19]Correlations are also estimated using annual GDP growth rates. This did not alter the results in any way.

[20]See Appendix Table A8.2.2 for cross-correlation in output fluctuations of the ECOWAS countries.

[21]See Appendix Table A8.2.3 for cross-correlation in terms of trade changes of the ECOWAS countries.

any supply and demand shocks hitting the economy. Hence, for countries with a small variation in exchange rates, abandoning monetary policy independence might cause little concern, and vice versa. We measure the variability in exchange rates as the standard deviation of the log difference of annual real exchange rates of individual countries. However, we include this variable while examining the grouping of the WAMZ countries only. The ECOWAS arrangement includes both non-CFA (WAMZ) countries and CFA (WAEMU) countries; the latter already have a pegged exchange rate system in place. Thus, using the volatility of the exchange rate as a criterion for examining similarities is not appropriate for all ECOWAS member countries.

Regional Trade Intensity

Regional trade intensity is measured as a ratio of the sum of exports and imports between a country and the rest of the region to the sum of that country's total exports and imports. Thus, for any country *i* in the sample, trade intensity with the WAMZ and ECOWAS groups is given by $(x_{i,WAMZ}+M_{i,WAMZ})/(X_i+M_i)$ and $(X_{i,ECOWAS}+M_{i,ECOWAS})/(X_i+M_i)$, respectively, where X represents exports and M denotes imports. We compute the annual regional trade intensity for each country and average it over the sample period. A higher value of trade intensity indicates greater intraregional trade and larger gains from joining the currency union. Statistics reveal that the average regional trade intensity among the WAMZ countries and between the WAMZ and WAEMU countries remains low; however, it is considerably higher among the WAMEU countries.

Inflation

The primary criteria set by WAMZ for achieving macroeconomic convergence to establish the desired monetary union includes maintaining the inflation rate at a single-digit level.[22] We construct the inflation rate variable for each country by taking the log difference of the annual consumer price index and averaging across the years. Overall, the average annual percentage change in prices was higher for WAMZ countries than for the WAEMU countries during 1995–2004.[23]

[22]The WAEMU primary convergence criterion limits inflation to below 3 percent.

[23]Among the WAMZ countries, for which the inflation target is single-digit annual rates, the average rate for The Gambia and Guinea remained in single digits; however, Ghana, Nigeria, and Sierra Leone recorded double-digit average inflation rates. In the WAEMU group, with the notable exception of Guinea-Bissau (14.5 percent), the average inflation rate for member countries remained between 2 and 4 percent.

Government Balance

Another primary convergence criterion for establishing WAMZ is a budget deficit to GDP ratio (excluding grants) of less than 4 percent. This ratio is calculated by taking the annual central government balance (excluding grants) as a percentage of annual GDP and then averaging observations for every country. The WAMZ countries have generally been running fiscal deficits and have found it difficult to meet the benchmark as prescribed in the convergence criteria.

Debt-Servicing Requirement

Debt servicing is a major problem for the West African states, which allocate a significant proportion of the export revenue to meet their debt-servicing obligations. The convergence criteria require member countries to build up surpluses to attain sustainable debt levels so as to ensure that they service their debt stock without inflating their economy by increasing the money supply or borrowing further to repay existing debt. We represent debt servicing for every country as the average of the ratio of its debt-servicing requirements to its total exports of goods and services. Although for the WAMZ countries the ratio has been steadily declining over the years, the average ratio in recent years still exceeds the threshold of debt sustainability of 10 percent.

Data Sources

Data for the above variables have been compiled on an annual basis from various sources. The real and nominal GDP series, terms of trade index, consumer price index, and government balance statistics are obtained from the IMF's *World Economic Outlook, April 2005*. The regional trade intensity variable has been computed using bilateral data from the IMF's *Direction of Trade Statistics*. The debt-servicing ratio has been compiled from the World Bank's *World Development Indicators 2004* and the African Development Indicators 2004 database. Information on the effective real exchange rate is taken from the Information Notice Systems (INS) database, which provides monthly exchange rate statistics. The monthly exchange rate values are averaged to estimate the average annual exchange rate for every country.

Clustering is applied to two different samples of countries. The first sample consists of the non-WAEMU countries except Liberia, for which complete data series are unavailable. Because five out of the six non-WAEMU countries belong to the WAMZ group, we refer to the non-

WAEMU countries as the WAMZ group henceforth.[24] Clustering of WAMZ countries allows us to examine the performance of countries in the WAMZ region in terms of the OCA and the established primary macroeconomic convergence criteria. The second sample—comprising ECOWAS member countries, that is, the WAMZ and WAEMU countries taken together—allows us to assess the similarities and dissimilarities among the economic characteristics of countries to be included in the proposed larger West African monetary union.

Empirical Results

Clustering of the West African states is performed for three overlapping periods (1990–2004, 1995–2004, and 2000–04), making it possible to analyze the extent to which the changing national and international policy environments have influenced homogeneity across countries over time.[25] The results for both hierarchical and fuzzy clustering reveal a high degree of similarity between groupings for the time periods 1990–2004 and 1995–2004. Therefore, we present and discuss our findings for 1995–2004 and 2000–04 only. For policy purposes, the results obtained for 2000–04 may be more relevant because they indicate the progress that countries made toward monetary unification after the inception of the WAMZ.

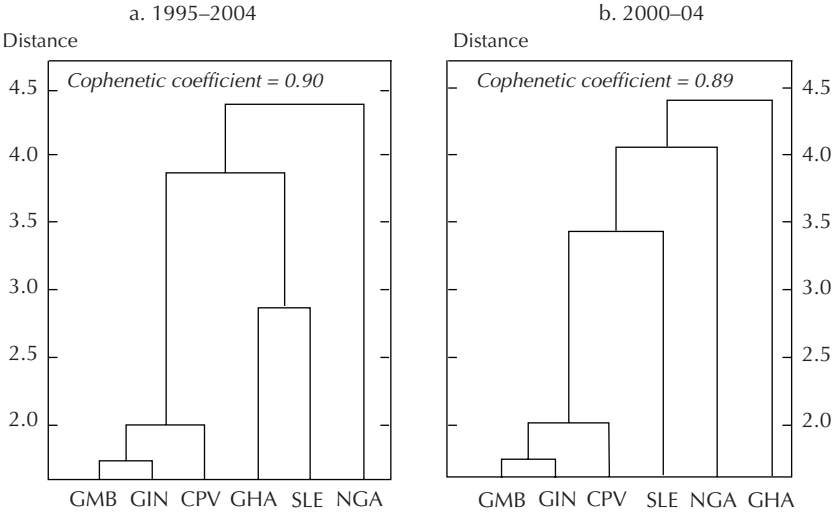
Hierarchical Analysis

Figures 8.1 and 8.2 present the hierarchical clustering of the WAMZ and ECOWAS countries, respectively. In each figure, the horizontal axis represents countries included in the sample, and the vertical axis indicates distances (or dissimilarities) between the countries. The cophenetic coefficient (reported with the dendrogram in each case) has a reasonably high value in all cases and indicates that the cluster information generated by the dendrogram is a good representation of dissimilarities in the original data. In addition, the results obtained from the hierarchical clustering of the WAMZ and ECOWAS countries show that the groupings do not depend on the type of agglomerative method used and remain similar across the Group Average, Ward, and Single linkage aggregation algorithms. Because the cophenetic

[24]Cape Verde has yet to formalize its membership in the WAMZ group. It was not a signatory of the Accra declaration on the creation of WAMZ.

[25]Grouping countries based on the latest data point only is not recommended because a country's performance in one year might not reflect its policy management.

Figure 8.1. Hierarchical Clustering Analysis: WAMZ countries



Note: For country abbreviations, see Table A8.2.1.

correlation coefficient corresponding to the Group Average linkage function is the highest for all samples, we discuss its results in this section.[26]

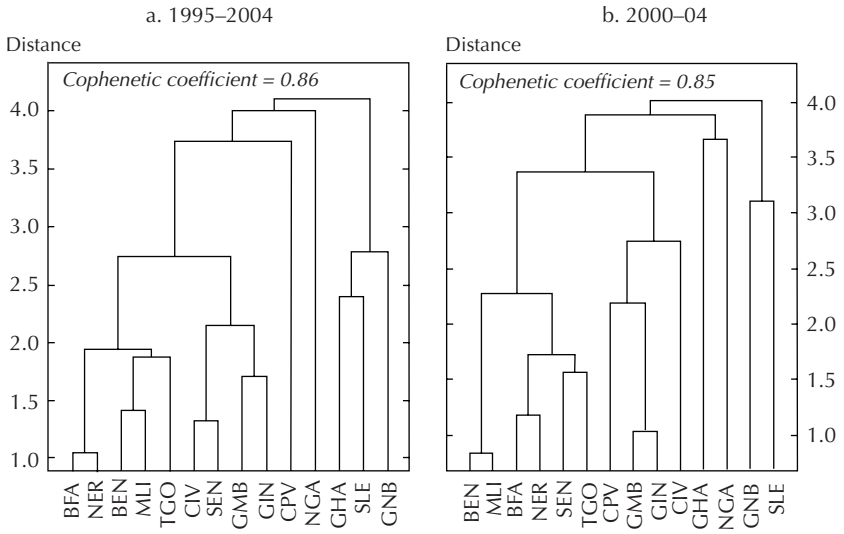
For the WAMZ countries, the Calinski-Harabasz Index (CHI) attains the highest value when the number of clusters is equal to four (see Appendix 8.3). Based on this, The Gambia, Guinea, and Cape Verde form one group, whereas Ghana, Nigeria, and Sierra Leone are singletons. This finding is supported by an inspection of the two panels of Figure 8.1, which illustrate that, among the WAMZ countries, The Gambia, Guinea, and Cape Verde are linked to each other at relatively smaller distances in both time periods and that the remaining three countries join the group at much higher distances (indicating larger dissimilarities).

In Figure 8.2, both the WAEMU and WAMZ countries are considered together. For the period 1995–2004, the CHI suggests that six is the optimal number of clusters.[27] The first group consists of five WAEMU

[26]Results for the Ward and Single linkage algorithms are presented in Appendix 8.2.

[27]In general, it has been suggested that an effective representation of data requires that the number of clusters be neither too small nor too large. Because our sample contains 14 elements, considering a solution with more than 7 groups does not seem feasible. We therefore examine the CHI for two to six cluster solutions only.

Figure 8.2. Hierarchical Clustering Analysis: ECOWAS countries



Note: For country abbreviations, see Table A8.2.1.

countries—Benin, Burkina Faso, Mali, Niger, and Togo. The second group comprises two WAEMU countries (Côte d'Ivoire and Senegal) and two WAMZ countries (The Gambia and Guinea). The third group consists of Ghana and Sierra Leone. The remaining three groups contain Cape Verde, Nigeria, and Guinea-Bissau as singletons. For 2000–04, the composition of clusters (as suggested by the CHI values) suggests grouping the data into five clusters that is not too different from the 1995–2004 grouping. The first group now includes Senegal in addition to Benin, Burkina Faso, Mali, Niger, and Togo. Cape Verde, Côte d'Ivoire, The Gambia, and Guinea form the second group. Guinea-Bissau and Sierra Leone make up the third group. Once again, Ghana and Nigeria do not seem to be part of any group.

In summary, based on hierarchical analysis, we notice that all the WAEMU countries except Guinea-Bissau group together and link with each other at relatively smaller distances. The WAMZ countries link with each other as well as with the WAEMU countries at higher link lengths. Overall, Ghana, Guinea-Bissau, Nigeria, and Sierra Leone appear to be the most different in terms of the macroeconomic attributes considered here.

Fuzzy Clustering

The results obtained from the fuzzy clustering of the WAMZ countries are reported in Table 8.1. The validity statistics—namely, the Dunn's Partition Coefficient (DPC), the silhouette width (SW), and the Xie and Beni's index (XBI)—indicate the presence of three clusters for 1995–2004 and of four clusters for 2000–04. Cape Verde, The Gambia, and Guinea have the highest membership coefficients for the same cluster during both time periods. Nigeria forms its own cluster, whereas Ghana and Sierra Leone have the highest membership coefficients for the same cluster if the longer data series is considered but not during the most recent time period.

We observe less fuzziness in the partitioning of clusters during 2000–04 than during 1995–2004. Countries that form a group in both years—that is, Cape Verde, The Gambia, and Guinea—experience positive but not very high correlation of business cycles and terms of trade changes with each other, relatively lower real exchange rate volatility, low trade intensity within the WAMZ region, low average inflation, and low debt service requirements. However, their statistics for average government balance-to-GDP ratio and real exchange rate volatility are less uniform (Figure 8.3).

Ghana and Sierra Leone have the highest membership coefficient for the same cluster in 1995–2004 and have positive and relatively high correlation coefficients for output variation and terms of trade changes. However, as is evident from the low average silhouette width of their cluster, they are not very similar in terms of other characteristics. The most outstanding charac-

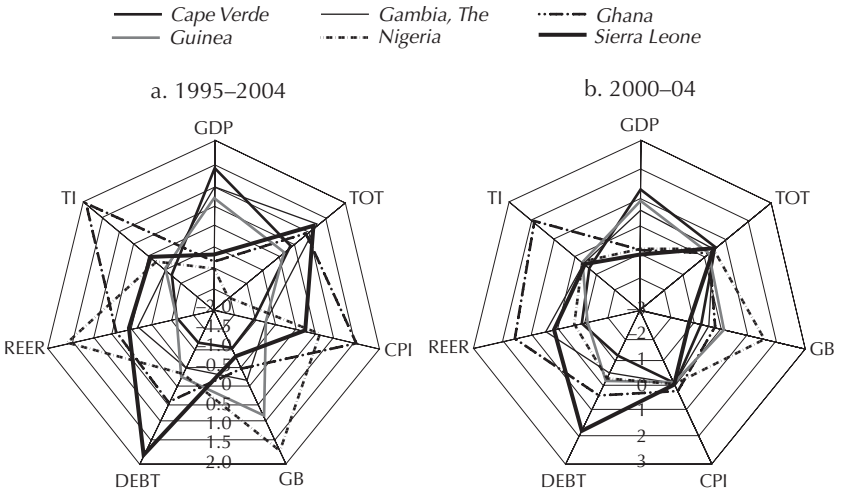
Table 8.1. Membership Coefficients for WAMZ Countries

	1995–2004				2000–04				
	I	II	III	SW	I	II	III	IV	SW
Cape Verde	**0.883**	0.068	0.049	0.805	**0.844**	0.069	0.037	0.050	0.750
Gambia, The	**0.909**	0.057	0.034	0.758	**0.719**	0.125	0.080	0.077	0.594
Ghana	0.064	**0.869**	0.067	0.524	0.000	0.000	**1.000**	0.000	1.000
Guinea	**0.824**	0.094	0.082	0.736	**0.827**	0.065	0.039	0.069	0.713
Nigeria	0.001	0.001	**0.999**	1.000	0.000	0.000	0.000	**1.000**	1.000
Sierra Leone	0.197	**0.691**	0.112	0.325	0.001	**0.999**	0.000	0.000	1.000
Average SW	0.766	0.425	1.000	0.691	0.686	1.000	1.000	1.000	0.843
DPC (normalized)	0.650				0.768				
DPC	0.767				0.826				
XBI	1.135				1.378				

Source: Authors' calculations.

Note: SW, DPC, and XBI denote the silhouette width, Dunn's Partition Coefficient, and Xie and Beni's Index, respectively. Average SW represents the average silhouette width of clusters if objects are forced to belong to each cluster according to their membership coefficients.

Figure 8.3. Characteristics of the WAMZ Countries



Sources: IMF, World Economic Outlook database; and authors' calculations.

Note: GDP is the correlation of business cycles with the euro area; TOT denotes the correlation of changes in terms of trade with the euro area; CPI is the average annual inflation rate; GB is the average government balance to GDP ratio; TI is the average trade intensity; DEBT is the average of dept servicing to exports ratio; and REER is real exchange rate variability.

teristic of Sierra Leone is its large debt-servicing requirements. Ghana has the highest within-region trade intensity. It experienced relatively moderate exchange rate volatility and high average inflation during 1995–2004 but greater real exchange rate fluctuations during 2000–04.

Nigeria has idiosyncratic characteristics and is therefore an outlier in both sets of results. It has weak correlation of business cycles and negative correlation of terms of trade changes with other countries, moderate average inflation, a low budget deficit-to-GDP ratio, and low regional trade intensity. However, a notable reduction is evident in its real exchange rate volatility during the recent period.

Broadly speaking, the results from fuzzy clustering appear to be consistent with the grouping suggested by crisp clustering in Figure 8.1. Based on these results, we may conclude that considerable dissimilarities remain in the economic characteristics of the WAMZ countries. Countries differ in not only the output and terms of trade shocks they experience, but also in terms of the progress they have made toward meeting the primary convergence criteria, which are a prerequisite for establishing a monetary union in the region.

Table 8.2 presents the membership coefficients and the validity statistics for the ECOWAS countries. In performing fuzzy clustering, we evaluate two to six clusters because of the small number of observations in our data set. The validity statistics of the estimations indicate the presence of five clusters in our data for both time periods. The DPC and silhouette width are very small (less than 0.500) in both cases and reveal a substantial lack of structure, that is, fuzziness in the data. However, the statistics for the most recent time period are slightly better and indicate improved within-cluster similarity and better cluster partitioning.

For 1995–2004, the best performing cluster comprises four WAEMU countries: Burkina Faso, Mali, Niger, and Togo. These four countries have a silhouette width greater than 0.500 and an average silhouette width of 0.614. They have well-correlated business cycle movements, relatively greater regional trade intensity, low inflation rates, and low budget deficits (see Figure 8.4). The other cluster with an average silhouette width of greater than 0.500 comprises Ghana, Guinea-Bissau, and Sierra Leone. These countries have higher government deficit-to-GDP ratios and relatively higher inflation rates and debt-servicing requirements. The output fluctuations of Ghana and Sierra Leone are relatively synchronized, but the same does not hold for Guinea-Bissau. The three countries, however, experience dissimilar terms of trade shocks.

Côte d'Ivoire, Guinea, and Senegal have the highest membership coefficients for the same cluster. The comparative statistics in Figure 8.5 show that the three countries had low average inflation, higher budget deficit ratios, and positive but low business cycle correlations although they differ in terms of other statistics. Guinea, however, has a lower membership coefficient (less than 0.500) than the other two countries and a negative silhouette width if forced to be included in this cluster. This is probably because of its high membership coefficient for the first cluster, which indicates that it also shared similarities with Cape Verde and The Gambia.

Cape Verde and The Gambia form another cluster based on the membership coefficients although as shown in Table 8.2, The Gambia does not have a very low membership coefficient for cluster IV, which indicates some similarity of characteristics with countries in that group. Surprisingly, Benin and Nigeria have the highest membership coefficients for the same group, although the silhouette width for Benin indicates that it does not belong to the same cluster as Nigeria. Nigeria experienced output and terms of trade shocks that are very different from those experienced by other countries in the region; it therefore seems best to identify Nigeria as a separate group.

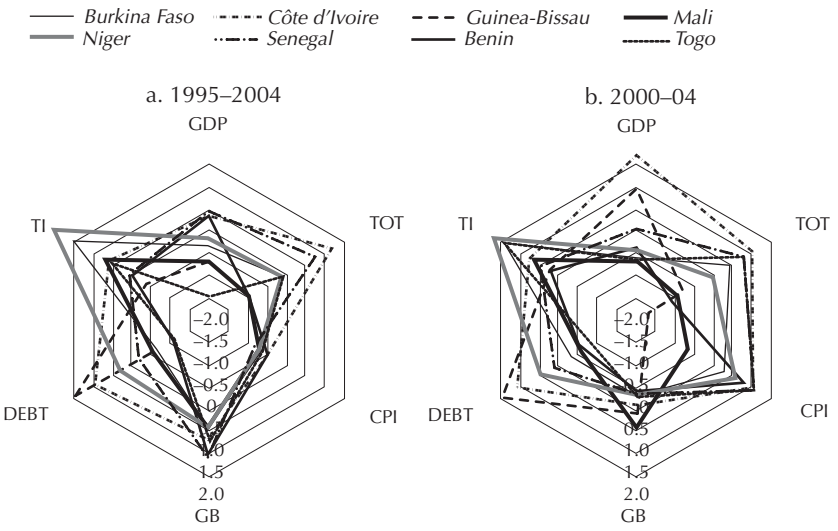
Table 8.2. Membership Coefficients for ECOWAS Countries

	1995–2004						2000–04					
	I	II	III	IV	V	SW	I	II	III	IV	V	SW
Benin	0.029	**0.813**	0.017	0.061	0.080	–0.468	0.030	0.050	**0.839**	0.065	0.016	0.880
Burkina Faso	0.008	0.031	0.008	0.030	**0.923**	0.731	0.036	0.021	0.101	**0.819**	0.023	0.512
Cape Verde	**0.942**	0.017	0.012	0.018	0.012	0.613	**0.502**	0.093	0.144	0.138	0.123	0.269
Côte d'Ivoire	0.039	0.068	0.055	**0.732**	0.107	0.436	**0.380**	0.100	0.148	0.234	0.139	–0.091
Gambia, The	**0.373**	0.118	0.098	0.298	0.113	–0.066	**0.878**	0.022	0.032	0.040	0.029	0.395
Ghana	0.070	0.090	**0.635**	0.111	0.095	0.498	**0.261**	0.204	0.145	0.172	0.219	–0.071
Guinea	0.256	0.233	0.087	**0.314**	0.109	–0.065	**0.882**	0.029	0.030	0.031	0.029	0.535
Guinea-Bissau	0.108	0.132	**0.520**	0.118	0.123	0.519	0.238	0.114	0.184	0.149	**0.316**	0.301
Mali	0.036	0.365	0.036	0.100	**0.464**	0.588	0.012	0.013	**0.936**	0.031	0.008	0.851
Niger	0.038	0.112	0.050	0.165	**0.635**	0.507	0.072	0.051	0.198	**0.623**	0.057	0.379
Nigeria	0.110	**0.395**	0.166	0.156	0.173	0.418	0.006	**0.977**	0.009	0.005	0.004	1.000
Senegal	0.032	0.082	0.023	**0.777**	0.087	0.494	0.147	0.058	0.155	**0.578**	0.062	0.480
Sierra Leone	0.059	0.058	**0.726**	0.096	0.061	0.488	0.018	0.010	0.011	0.013	**0.949**	0.328
Togo	0.051	0.228	0.060	0.150	**0.510**	0.630	0.073	0.051	0.144	**0.693**	0.040	0.587
Average SW	0.274	–0.025	0.502	0.288	0.614	0.380	0.207	1.000	0.866	0.490	0.315	0.454
DPC (normalized)	0.358						0.466					
DPC	0.486						0.573					
XBI	0.924						1.112					

Source: Authors' calculations.

Note: SW, DPC, and XBI denote the silhouette width, Dunn's Partition Coefficient, and Xie and Beni's Index, respectively. Average SW represents the average silhouette width of clusters if objects are forced to belong to each cluster according to their membership coefficients.

Figure 8.4. Characteristics of the WAEMU Countries



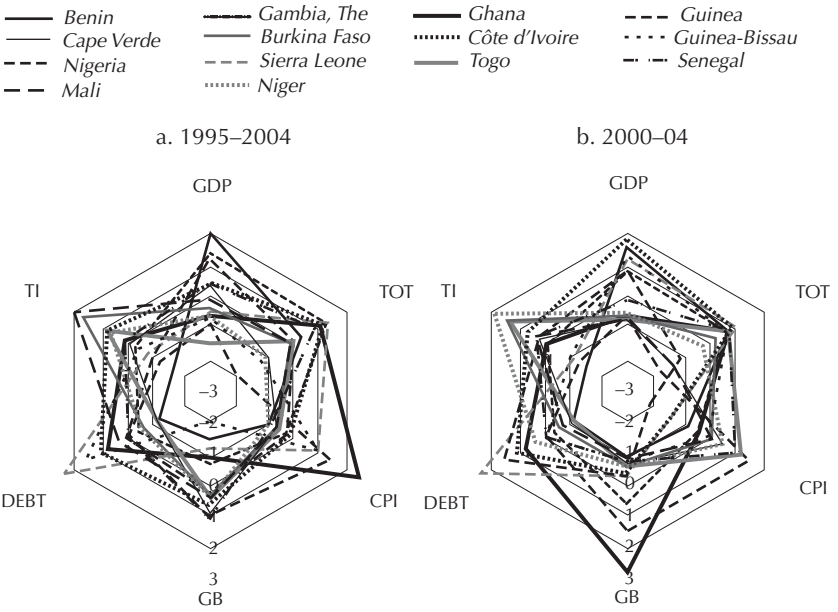
Sources: IMF, World Economic Outlook database; and authors' calculations.

Note: GDP is the correlation of business cycles with the euro area; TOT denotes the correlation of changes in terms of trade with the euro area; CPI is the average annual inflation rate; GB is the average government balance to GDP ratio; TI is the average trade intensity; DEBT is the average of dept servicing to exports ratio; and REER is real exchange rate variability.

Analysis of the period 2000–04 does not reveal much difference in countries' economic performance. The clustering algorithm identifies five groups of countries in the data where most of the WAEMU countries cluster together. Benin and Mali, which experience symmetrical terms of trade and output shocks form one group. Guinea-Bissau and Sierra Leone continue to be in the same group, and Nigeria is identified as a singleton. Cape Verde, Côte d'Ivoire, The Gambia, Ghana, and Guinea have the highest membership coefficients for the same cluster, but the silhouette widths and the magnitudes of their membership coefficients indicate that only Cape Verde, The Gambia, and Guinea are well specified in the cluster. Strict classification of Cote d'Ivoire and Ghana is not clear. Côte d'Ivoire differs from other countries mainly in terms of its output fluctuations, whereas Ghana has a high average inflation rate.

Figure 8.6 summarizes the findings of fuzzy clustering if groupings are forced on the basis of the highest membership coefficients across

Figure 8.5. Characteristics of the ECOWAS Countries



Sources: IMF, World Economic Outlook database; and authors' calculations.

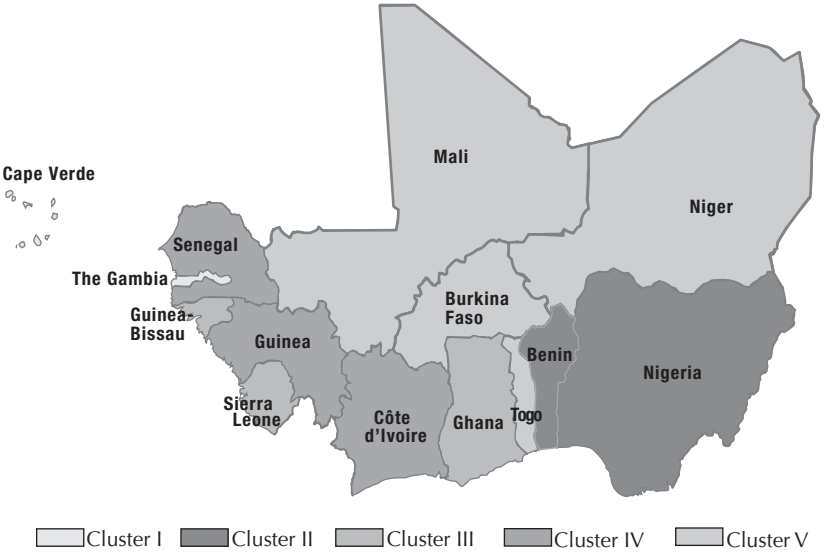
Note: GDP is the correlation of business cycles with the euro area; TOT denotes the correlation of changes in terms of trade with the euro area; CPI is the average annual inflation rate; GB is the average government balance to GDP ratio; TI is the average trade intensity; DEBT is the average of dept servicing to exports ratio; and REER is real exchange rate variability.

rows.[28] It is reassuring to see that, overall, results from fuzzy clustering are very similar to the groupings obtained from hierarchical clustering. With the notable exception of Guinea-Bissau, the remaining WAEMU countries are grouped together. Of the WAMZ countries, Cape Verde, The Gambia, and Guinea and are relatively similar to each other but different from the rest of the ECOWAS group. Ghana does not have much in common, and therefore cannot be identified, with one particular group or country. The same is true for Nigeria, whose behavior pertaining to terms of trade shocks, inflation, and exchange rate variability is highly idiosyncratic.

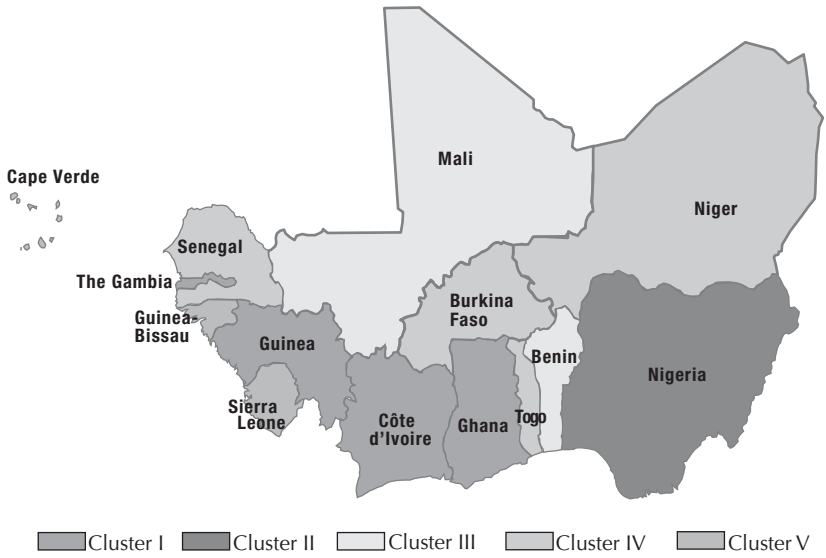
[28]Appendix Table A8.3.4 summarizes the forced classification of countries according to the highest membership coefficients and the closest neighbor cluster.

Figure 8.6. Clustering Based on Membership Coefficients

a. 1995–2004



b. 2004–04



Note: Shading of regions based on authors' calculations using fuzzy clustering, with groupings defined based on the highest membership coefficients across rows of Table 7.2. The maps are not for official purposes, nor do they show political boundaries.

Empirical Evaluation: Principal Component Analysis

A robustness check recommended for groupings generated from clustering analysis is the principal component analysis (PCA). PCA is a mathematical procedure for multivariate analysis that aims to reduce the number of possibly correlated variables into a smaller number of uncorrelated variables known as the "principal components." Each principal component, *PC*, is a linear combination of the original variables and may be expressed as

$$PC_i = \alpha_{i1}X_1 + \alpha_{i2}X_2 \ldots + \alpha_{ip}X_p; \qquad i = 1, 2, \ldots, p, \tag{8.16}$$

where *X* is a data matrix with *n* observations and *p* variables. The first principal component is supposed to account for much of the variability in data, whereas the following principal components explain the remaining percentage of variation. Often, the first few principal components explain most of the variation and the contribution of the remaining components is negligible. In a clustering context, PCA provides a way of projecting the data into a lower dimensional space, which makes visual inspection more effective as discussed in Everitt, Landau, and Leese (2001). To do so, we generate principal components and examine the clustering of ECOWAS countries based on the principal components, which satisfy the following properties:

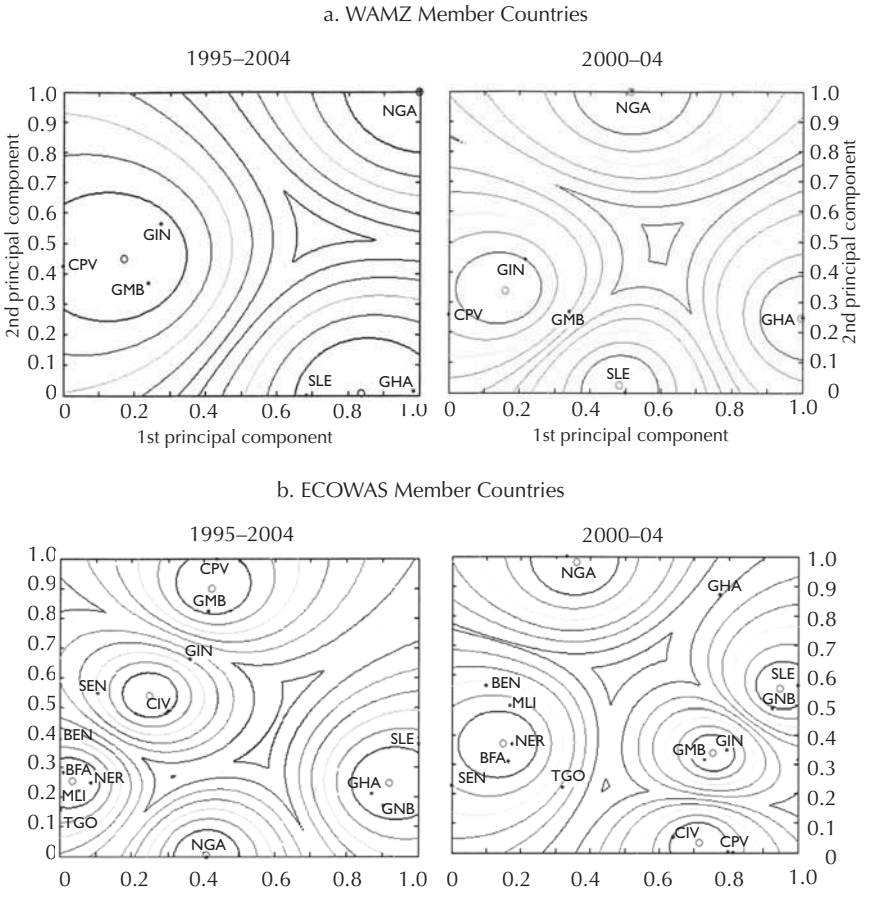
- They collectively explain at least 60 percent of the variation in data.
- Each of the components is associated with an eigenvalue of greater than 1.
- Each principal component individually explains at least 20 percent of the data variation.

The results show that the first two principal components satisfy the above properties for the sample of WAMZ and ECOWAS countries.[29] Hence, we generate two-dimensional scatter plots of countries, measuring the first principal component on the horizontal axis and the second principal component on the vertical axis (Figure 8.7). Further, we superimpose contour maps generated by fuzzy clustering on the scatter plots to visualize the results.[30] The plot

[29]Results for the PCA are presented in Appendix 8.3.

[30]Fuzzy clustering is performed using the first two principal components. Each big circle represents a cluster and the innermost circle within it represents the center of the cluster as obtained from the clustering results. The placement of the clusters gives an idea about the distances or similarities between them and the placement of the countries indicates the

Figure 8.7. Clustering Based on Principal Components Analysis



Note: For country abbreviations, see Table A8.2.1.

for the WAMZ countries supports the results obtained earlier. Similarly, for the ECOWAS countries, the composition of clusters is almost identical to that obtained earlier. Nigeria does not form part of any group in either case, whereas most WAEMU countries fall together. Côte d'Ivoire and Guinea-Bissau appear to be different from the rest of the WAEMU group and cluster with WAMZ countries in 2000–04.

similarities within a cluster. See Balasko, Abonyi, and Feil (2004) for a detailed explanation of the generation of contour maps.

Group Similarities: West Africa, Central Africa, and the Euro Area

We now extend our analysis to include the Central African countries and the euro area. We do this for two reasons. First, given the increased interest in emulating the European experience, we would like to quantify how the euro area clustering compares with the clustering of West Africa. Second, given the geographical proximity of the West and Central African regions, as well as the existing monetary arrangements in place in the CFA franc zone, we believe it is interesting to examine similarities among countries in a larger setting and explore the feasibility of alternative monetary groupings in sub-Saharan Africa using the clustering tools.

We begin by analyzing the dissimilarity matrices of the proposed currency unions in West Africa and calculate the average distance between a pair of objects in every group using the Euclidean distance as the dissimilarity measure.[31] The results are compared with the average dissimilarity between countries in the euro area and the Central African Economic and Monetary Community (CEMAC) region.[32] Table 8.3 shows that the WAMZ countries have the highest pairwise average distance among themselves whereas the WAEMU countries have the highest variation in distances. However, the euro area has the lowest average distance between countries, and the CEMAC region has the lowest dispersion around the mean.[33]

Figures 8.8, 8.9, and 8.10 present the box plots of the dissimilarity matrices for the WAMZ, WAEMU, and ECOWAS countries, respectively. The box plots summarize information on the pairwise distances between countries and facilitate comparison across countries. Each box has a line at the first quartile, the median, and the third quartile. Thus, the height of each box represents the inter-quartile range, and the lines extending from the boxes present the range of pairwise distances.[34] Figure 8.8 indicates that the median values differ considerably across the WAMZ countries. Ghana, Nigeria, and Sierra Leone have less dispersion in their distance

[31]A dissimilarity matrix presents the distance between every pair of objects in the data set. For a data set with n observations, the total number of pairs of distances would be $n\,(n–1)/2$.

[32]The euro area consists of Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain. The sample does not include Luxembourg because data on its terms of trade are unavailable. However, the euro area calculations do not include the debt-servicing variable.

[33]For comparison purposes, we use the same criteria for calculating distances within the euro area and CEMAC, as described earlier. The average distance within the euro area might decrease if the full Maastricht criteria are taken into account.

[34]Outliers in the data are indicated by a "+" sign.

Table 8.3. Dissimilarities Between Member Countries

	1990–2004		1995–2004		2000–04	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
WAMZ	3.57	1.15	3.59	1.21	3.59	1.09
WAEMU	3.14	1.50	3.23	1.09	3.28	1.14
ECOWAS	3.26	1.17	3.31	1.03	3.33	0.96
CEMAC	3.43	0.46	3.43	0.52	3.40	0.70
Euro area	2.54	1.24	2.58	1.09	2.63	1.03

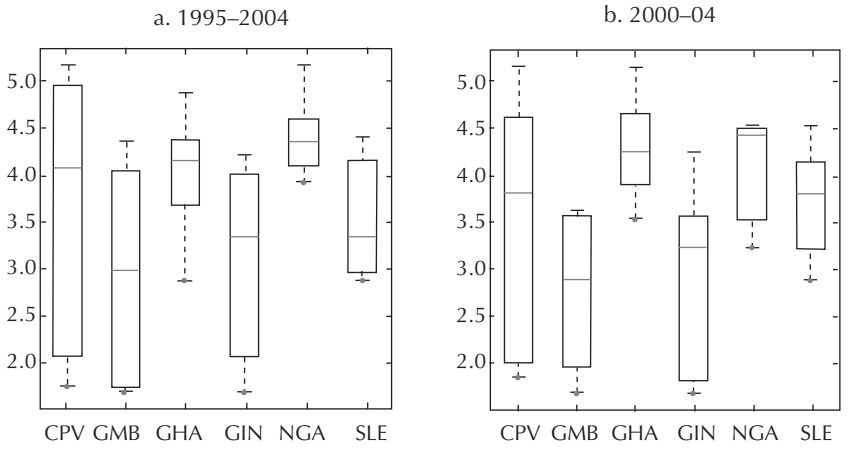
Source: Authors' calculations.

values but are farther away from other countries. Among WAEMU countries, Guinea-Bissau has the highest median distance as well as the highest minimum and maximum distance from other countries. The median distance is lower for Burkina Faso, Mali, Niger, Senegal and Togo. When WAEMU and WAMZ are included in the same sample, we notice that the distance range increases for almost all countries, although the WAEMU countries continue to have lower median values.

Next, we perform clustering for two different data sets. The first sample consists of all the countries in WAMZ, WAEMU, and CEMAC, and the second data set comprises the euro area. For both sets of countries, we consider the data for 1995–2004. Visual inspection of the dendrogram and the CHI obtained from the first sample suggest the presence of six clusters (Figure 8.11). Burkina Faso, Côte d'Ivoire, Niger, and Senegal form one group; Benin, Chad, Mali, and Togo form the second group; Cameroon and the Republic of Congo group together in one cluster; Cape Verde, the Central African Republic, The Gambia, and Guinea form the fourth group; Equatorial Guinea, Gabon, and Nigeria make up the fifth group; and Ghana, Guinea-Bissau, and Sierra Leone make up the final group. The fuzzy clustering analysis supports these findings, and the optimal number of clusters, as well as the composition of clusters according to the highest membership coefficients is identical to that obtained from hierarchical clustering (Table 8.4).

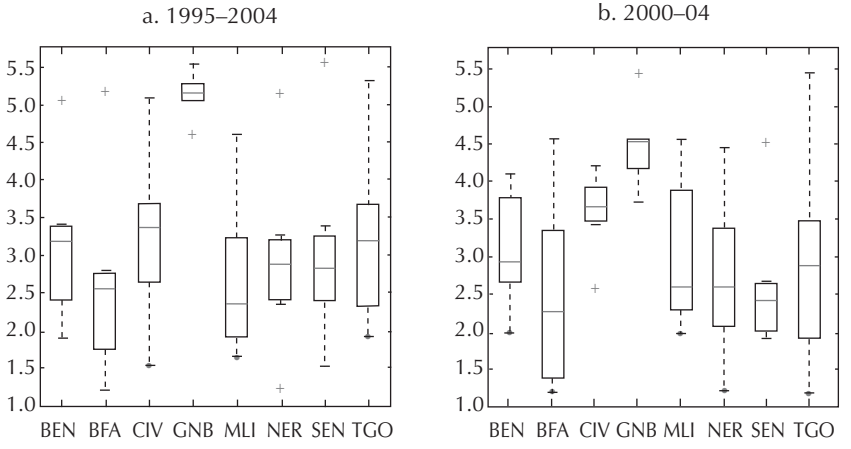
Two interesting observations emerge from this analysis. First, the CEMAC and WAEMU countries, despite being members of the CFA franc zone, do not group together. The WAEMU countries form their own clusters and seem to share greater similarities, as identified by the distances at which fusions are made. Second, a majority of the WAMZ countries group with the CEMAC countries. Nigeria has relatively higher membership coefficients for clusters consisting of the CEMAC countries, which indicates that greater similarities exist among them. This is not surprising

Figure 8.8. Box Plot of the Distances: WAMZ Countries



Note: For country abbreviations, see Table A8.2.1.

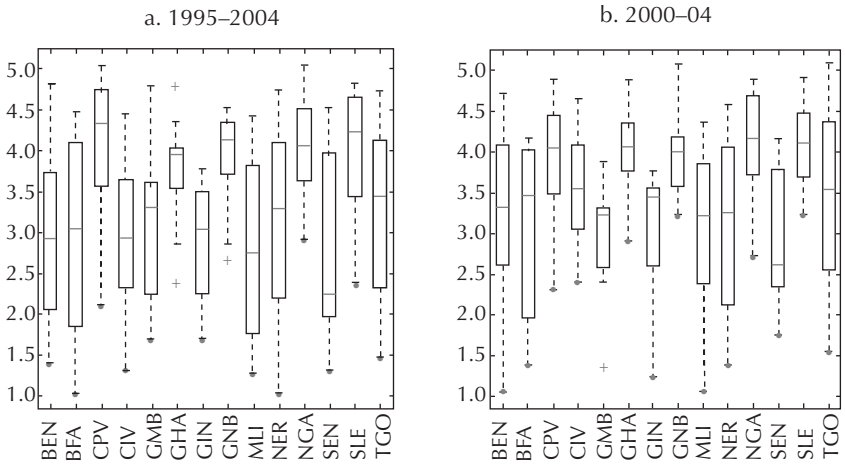
Figure 8.9. Box Plot of the Distances: WAEMU Countries



Note: For country abbreviations, see Table A8.2.1.

considering the heavy reliance of Nigeria and the CEMAC countries on oil for revenue. These findings are very similar to those of Bénassy-Quéré and Coupet (2005), despite differences in the time periods and criteria used for clustering.

Figure 8.10. Box Plot of the Distances: ECOWAS Countries



Note: For country abbreviations, see Table A8.2.1.

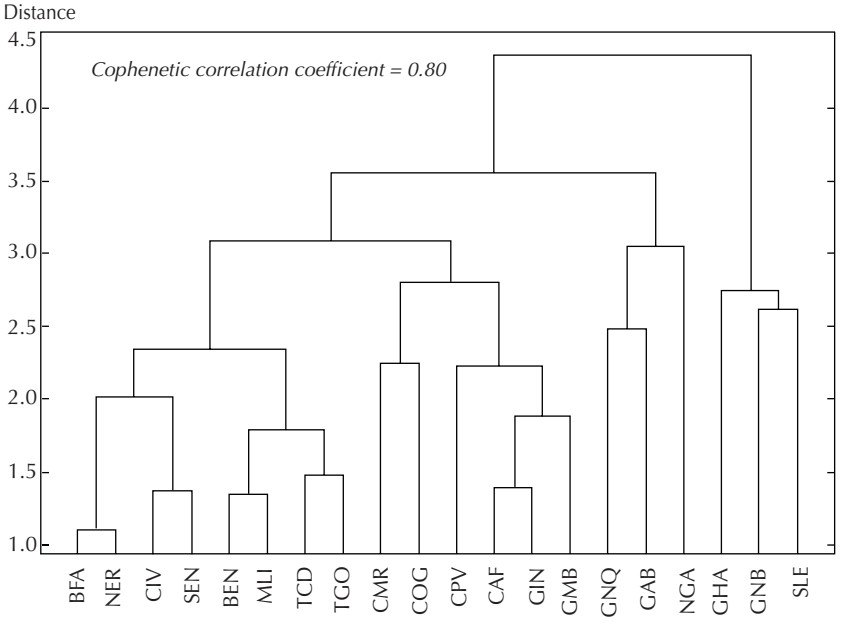
To examine how countries are grouped within the euro area, we use the same criteria as before but do not include the debt-servicing variable.[35] The cluster tree obtained from the hierarchical analysis clearly indicates the presence of two groups in the data (Figure 8.12). The first group consists of Austria, Belgium, France, Germany, Italy, Portugal, and Spain, and the second group contains of Finland, Greece, Ireland, and the Netherlands.[36] The validity statistics for fuzzy clustering also indicate the presence of two groups (Table 8.5).[37] Following earlier literature on the EMU, this result can be interpreted as reflecting a "core" (Austria, Belgium, France, Germany, Italy, Portugal, and Spain) and a "periphery" (Finland, Greece, Ireland, and the Netherlands) in the EMU, where the core consists of countries that are more homogeneous than the countries in the periphery (Bayoumi and Eichengreen,

[35]Symmetry of business cycles and terms of trade changes is measured by calculating the correlation with the average of the euro area and trade intensity is measured as trade within the euro area.

[36]As this analysis is done for comparative purposes only, we do not explore the reasons for these groupings.

[37]Examining a larger group of European countries for a different time period based on the OCA and Maastricht Criteria, Artis and Zhang (2001 and 2002) also report the optimal number of clusters for the European Union to be two or three.

Figure 8.11. Hierarchical Clustering Analysis: West and Central Africa



Note: For country abbreviations, see Table A8.2.1.

1993; and Artis and Zhang, 2001 and 2002).[38] Thus, in contrast to the results obtained for WAMZ and ECOWAS, the euro area results show a much smaller optimal number of clusters (two versus five) and greater similarities among the countries.

Conclusion and Policy Implications

Using hard and soft clustering and other pattern recognition analysis of countries in West Africa, this paper examines the status of the candidate countries for the proposed ECOWAS monetary union in terms of the convergence and OCA criteria. It provides insights into the

[38]However, if the sample is split into two periods, pre-EU (1990–2001 or 1995–2001) and post-EU (2002–04), then we obtain the interesting result that the Netherlands is part of the first group in the post-EU period. This shows that after the adoption of the euro, the Netherlands became more similar to group one countries.

Table 8.4. Fuzzy Clustering for West and Central Africa

	1995–2004						
	I	II	III	IV	V	VI	SW
Benin	0.161	0.200	0.146	0.137	**0.327**	0.029	0.176
Burkina Faso	0.032	0.028	0.040	**0.725**	0.159	0.017	–0.081
Cameroon	**0.257**	0.248	0.158	0.122	0.158	0.057	0.382
Cape Verde	0.245	0.089	**0.375**	0.095	0.120	0.077	0.562
Central African Rep.	0.187	0.118	**0.465**	0.086	0.106	0.038	0.273
Chad	0.142	0.068	0.090	0.115	**0.547**	0.038	0.622
Congo, Rep. of	**0.883**	0.023	0.038	0.015	0.031	0.011	0.195
Côte d'Ivoire	0.097	0.070	0.196	**0.368**	0.157	0.112	0.601
Equatorial Guinea	0.035	**0.871**	0.026	0.022	0.036	0.010	0.097
Gabon	0.187	**0.289**	0.127	0.111	0.221	0.066	–0.112
Gambia, The	0.114	0.053	**0.547**	0.113	0.101	0.074	0.462
Ghana	0.098	0.070	0.113	0.109	0.106	**0.505**	0.563
Guinea	0.040	0.014	**0.898**	0.018	0.021	0.010	0.340
Guinea-Bissau	0.159	0.072	0.118	0.110	0.119	**0.422**	0.398
Mali	0.061	0.047	0.044	0.145	**0.686**	0.017	0.523
Niger	0.038	0.032	0.050	**0.749**	0.101	0.030	0.505
Nigeria	0.221	**0.278**	0.121	0.100	0.164	0.113	–0.130
Senegal	0.097	0.077	0.244	**0.332**	0.203	0.048	0.376
Sierra Leone	0.043	0.024	0.049	0.041	0.038	**0.805**	0.597
Togo	0.076	0.078	0.069	0.229	**0.509**	0.039	0.447
Average SW	0.289	–0.145	0.410	0.350	0.424	0.519	0.340
DPC (normalized)	0.280						
DPC	0.400						
XBI	0.871						

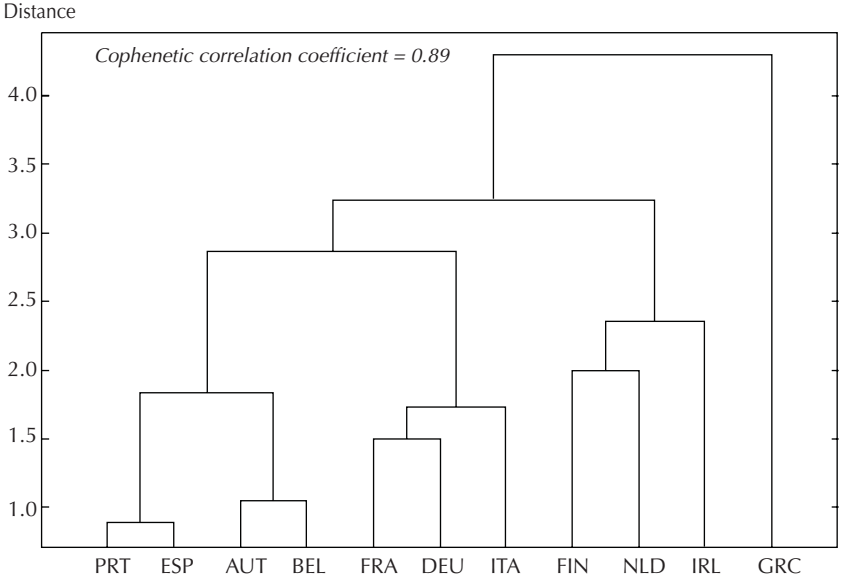
Source: Authors' calculations.

Note: SW, DPC, and XBI denote the silhouette width, Dunn's Partition Coefficient, and Xie and Beni's Index, respectively. Average SW represents the average silhouette width of clusters if objects are forced to belong to each cluster according to their membership coefficients.

similarities of countries' economic structures and identifies the existing homogeneous subgroups within the region. In addition, by studying the West and Central African regions together, this analysis helps to evaluate the feasibility of new monetary arrangements and the desirability of changing the existing ones to alternative configurations in West and Central Africa.

Our findings reveal considerable dissimilarities in the economic characteristics of the countries in West Africa (that is, the WAEMU and WAMZ countries viewed as one group), suggesting that the formation of ECOWAS may not be advisable at this stage. Of all the groups examined, the WAMZ countries exhibit the highest degree of dissimilarity and have little in common with the WAEMU countries, which, in principle, tend to cluster together. Furthermore, although Ghana and, especially, Nigeria usually appear as singletons and are independent of any other cluster, the remaining WAMZ countries

Figure 8.12. Hierarchical Clustering Analysis: The Euro Area



Note: For country abbreviations, see Table A8.2.1.

Table 8.5. Membership Coefficients for the Euro Area

	1995–2004		
	I	II	SW
Austria	**0.631**	0.369	0.512
Belgium	**0.724**	0.276	0.622
Finland	0.262	**0.738**	0.278
France	**0.775**	0.225	0.607
Germany	**0.772**	0.228	0.569
Greece	0.359	**0.641**	0.257
Ireland	0.275	**0.725**	0.172
Italy	**0.792**	0.208	0.576
Netherlands	0.195	**0.805**	0.19
Portugal	**0.546**	0.454	0.392
Spain	**0.629**	0.371	0.479
Average SW	0.54	0.224	0.423
DPC	0.599		
XBI	0.817		

Source: Authors' calculations.

Note: SW, DPC, and XBI denote the silhouette width, Dunn's Partition Coefficient, and Xie and Beni's Index, respectively. Average SW represents the average silhouette width of clusters if objects are forced to belong to each cluster according to their membership coefficients.

tend to group together. This outcome casts doubt on the inclusion of Nigeria and Ghana in the proposed zone and the feasibility of a separate monetary union that includes *all* the WAMZ countries, and raises the question of whether a more limited monetary arrangement within WAMZ would be more feasible. Finally, when West and Central Africa are examined as one group, we find heterogeneities within the CFA franc zone and some interesting similarities between CEMAC and WAMZ: WAEMU and CEMAC countries do not cluster together, and the WAMZ countries tend to group with the CEMAC countries.

On the one hand, identifying groups of countries that have achieved a high degree of macroeconomic convergence is only the first step and may raise more questions than it answers. On the other hand, the existence of differences or heterogeneities across countries does not necessarily imply that benefits cannot be achieved through monetary integration. Thus, while interpreting our results in terms of costs and benefits, one must consider that countries that do not form part of any group might still benefit from joining the union. For example, it is worth recognizing that (as noted by Frankel and Rose, 1998; and Boreiko, 2003), if the criteria are endogenous, then countries that are already members of a currency zone will have some competitive advantage over other candidate countries and the structural changes and the harmonization process will be less difficult for them. Nonetheless, the analysis in this paper raises questions about the geographical boundaries of the existing and proposed unions, and highlights the need for undertaking further analysis to assess the merits and de-merits of the proposed unions as well as of the possible alternatives. Viewed in this light, the conclusions of our analysis could be a valuable contribution to the scholarly and policy debate over whether creation of a monetary union should precede or follow other forms of integration.

Appendix 8.1. Fuzzy Clustering Validity Measures

Dunn's Partition Coefficient

Dunn's Partition Coefficient (DPC) is a measure of the degree of fuzziness in the clustering outcome. It is defined as the sum of squares of all the membership coefficients divided by the number of objects in the data. That is,

$$DPC = \sum_{i=1}^{N}\sum_{k=1}^{c}\frac{u_{ik}^2}{N}. \qquad \text{(A8.1)}$$

When each object has equal membership coefficients in all clusters, the clustering is entirely fuzzy and *DPC* is equal to 1/*c*. However, when each object has a membership coefficient of 1 in one cluster and 0 in the others, fuzzy clustering is similar to hard clustering, and the *DPC* is equal to one. Hence, higher values of *DPC* indicate less fuzziness in the structure of data. The *DPC* may be normalized to lie in the range of [0, 1]. The normalized Dunn's coefficient is given by

$$DPC = \frac{c \sum_{k=1}^{N} \sum_{i=1}^{c} \frac{u_{ik}^2}{N}^{-1}}{c-1}. \tag{A8.2}$$

Xie and Beni's Index

Xie and Beni's validity function, *XBI*, quantifies the ratio of total variation within clusters and the separation of clusters. It is defined as

$$XBI = \frac{\sum_{i=1}^{N} \sum_{k=1}^{c} (\mu_{ik})^2 d^2(x_i - \nu_k)}{n \min_{i,k} d^2(x_i - \nu_k)}. \tag{A8.3}$$

Unlike the *DPC*, the aim is to minimize the value of *XBI*, for which low values indicate less variation within clusters and greater dissimilarities between clusters.

Silhouette Plot

The silhouette plot is another useful tool for assessing how well an object, a cluster, or an entire data set is classified. For a partitioning of data into c clusters, the average dissimilarity of an object x_i to all other objects in the cluster ν_k is defined as

$$d(x_i, \nu_j) = \frac{1}{n_{\nu_{ki}}} \sum_{x_j \in \nu_k} | x_i - x_i |, \tag{A8.4}$$

where n_ν is the number of objects in the cluster ν_k. When x_i belongs to ν_k, $d(x_i, \nu_k)$ is the average dissimilarity of x_i with all other objects in that cluster, whereas if x_i does not belong to ν_k , then $d(x_i, \nu_k)$ indicates the average dissimilarity of x_i with the other cluster ν_k. The silhouette width $s(i)$ of x_i, is therefore defined as

$$s(i) = \frac{b(i) - a(i)}{\max[a(i), b(i)]}; -1 \leq s(i) \leq 1, \tag{A8.5}$$

where $a(i)$ denotes the average dissimilarity of x_i within a cluster, and $b(i)$ denotes the smallest dissimilarity between x_i and the other clusters. A value of $s(i)$ close to 1 indicates that dissimilarity within the cluster is much smaller than the dissimilarity between clusters; hence, the object is well classified. If $s(i)$ is close to 0, then $a(i)$ and $b(i)$ are approximately equal, and it is unclear which cluster the object belongs to. However, a value of $s(i)$ close to –1 indicates that dissimilarity within the cluster is greater than the smallest dissimilarity with other clusters and, hence, the object is misclassified.

The silhouette width of a cluster may be obtained by averaging the silhouette widths of the objects within a cluster. This is an indicator of how well a cluster is classified. Similarly, by averaging the silhouette widths of all clusters, the silhouette width of a data set may be calculated and may serve as an indicator of how well the data have been partitioned.

Appendix 8.2

Table A8.2.1. Countries and Regions

Country	Abbreviation	Region	Country	Abbreviation	Region
Austria	AUT	Euro area	Ghana	GHA	WAMZ
Belgium	BEL	Euro area	Greece	GRC	Euro area
Benin	BEN	WAEMU	Guinea	GIN	WAMZ
Burkina Faso	BFA	WAEMU	Guinea-Bissau	GNB	WAEMU
Cameroon	CMR	CEMAC	Ireland	IRL	Euro area
Cape Verde	CPV	WAMZ	Italy	ITA	Euro area
Central African Rep.	CAR	CEMAC	Mali	MLI	WAEMU
Chad	TCD	CEMAC	Niger	NER	WAEMU
Congo, Rep. of	COG	CEMAC	Nigeria	NGA	WAMZ
Côte d'Ivoire	CIV	WAEMU	Netherlands	NLD	Euro area
Equatorial Guinea	GNQ	CEMAC	Portugal	PRT	Euro area
Finland	FIN	Euro area	Senegal	SEN	WAEMU
France	FRA	Euro area	Sierra Leone	SLE	WAMZ
Gabon	GAB	CEMAC	Spain	ESP	Euro area
Gambia, The	GMB	WAMZ	Togo	TGO	WAEMU
Germany	DEU	Euro area			

Table A8.2.2. Business Cycle Correlations of ECOWAS Countries, 1995–2004[1]

	BEN	BFA	CPV	CIV	GMB	GHA	GIN	GNB	MLI	NER	NGA	SEN	SLE	TGO
BEN	1.00													
BFA	0.52	1.00												
CPV	0.52	0.07	1.00											
CIV	–0.68	–0.19	–0.31	1.00										
GMB	0.12	0.38	0.58	–0.11	1.00									
GHA	0.45	0.67	0.02	–0.70	0.32	1.00								
GIN	–0.03	0.03	0.33	0.59	0.01	–0.52	1.00							
GNB	–0.15	–0.40	–0.37	–0.12	–0.21	–0.06	–0.50	1.00						
MLI	0.45	0.82	–0.02	–0.14	0.08	0.45	0.19	–0.42	1.00					
NER	0.32	0.77	0.06	0.04	0.13	0.29	0.31	–0.75	0.88	1.00				
NGA	0.46	0.63	–0.14	–0.54	0.25	0.75	–0.69	0.30	0.35	0.14	1.00			
SEN	0.28	0.64	0.39	–0.38	0.84	0.73	–0.24	–0.14	0.33	0.24	0.59	1.00		
SLE	0.60	0.19	0.15	–0.94	–0.11	0.68	–0.52	–0.02	0.28	0.14	0.41	0.22	1.00	
TGO	0.09	0.49	–0.57	0.05	–0.21	0.40	–0.22	0.40	0.33	0.06	0.62	0.15	–0.06	1.00

Source: Authors' calculations.

[1]For country abbreviations, see Table A8.2.1.

Table A8.2.3. Changes in Terms of Trade Correlations of ECOWAS Countries, 1995–2004[1]

	BEN	BFA	CPV	CIV	GMB	GHA	GIN	GNB	MLI	NER	NGA	SEN	SLE	TGO
BEN	1.00													
BFA	0.46	1.00												
CPV	0.43	0.81	1.00											
CIV	0.35	0.47	0.55	1.00										
GMB	–0.11	0.14	0.43	0.76	1.00									
GHA	0.09	–0.15	0.08	0.54	0.56	1.00								
GIN	–0.12	–0.15	0.25	0.01	0.25	0.49	1.00							
GNB	–0.27	–0.32	–0.41	–0.31	–0.15	–0.27	–0.46	1.00						
MLI	0.94	0.33	0.36	0.26	–0.09	0.10	–0.05	–0.41	1.00					
NER	–0.45	0.13	0.29	–0.10	0.20	–0.19	0.48	–0.36	–0.30	1.00				
NGA	–0.13	–0.28	–0.57	–0.71	–0.77	–0.76	–0.51	0.60	–0.20	–0.23	1.00			
SEN	0.10	0.09	0.40	0.42	0.73	0.47	0.37	–0.52	0.28	0.24	–0.79	1.00		
SLE	0.20	0.28	0.61	0.74	0.78	0.70	0.50	–0.64	0.28	0.26	–0.98	0.80	1.00	
TGO	0.76	0.54	0.38	0.68	0.10	0.22	–0.42	–0.21	0.64	–0.56	–0.25	0.02	0.29	1.00

Source: Authors' caclulations.
Note: Terms of trade refers to the terms of trade index for goods and services.
[1]For country abbreviations, see Table A8.2.1.

Appendix 8.3

Table A8.3.1. Calinski-Harbasz Index for the Number of Clusters

WAMZ				ECOWAS			
1995–2004		2000–04		1995–2004		2000–04	
Clusters	F-index	Clusters	F-index	Clusters	F-index	Clusters	F-index
2	2.24	2	2.25	2	5.50	2	3.00
3	5.35	3	3.11	3	4.78	3	3.33
4	**5.89**	**4**	**6.10**	4	5.09	4	2.87
5	5.88	5	6.04	5	4.33	**5**	**5.40**
				6	**6.45**	6	5.28

Source: Authors' calculations.

Table A8.3.2. Principal Component Analysis Results: WAMZ

1995–2004								2000–04							
Principal Components							Variance	Principal Components							Variance
–0.51	0.03	–0.2	–0.05	0.21	–0.21	–0.78	3.66	–0.46	–0.06	0.49	0.22	–0.34	0.61	–0.08	3.19
–0.18	–0.60	0.05	–0.06	0.70	–0.13	0.31	2.21	–0.08	–0.62	0.25	0.26	–0.20	–0.47	0.47	2.32
0.50	–0.15	–0.24	–0.05	–0.10	–0.81	–0.08	0.70	0.07	0.65	0.01	0.13	–0.28	0.02	0.71	1.21
0.22	0.55	0.14	–0.66	0.45	–0.02	0.01	0.27	0.48	0.22	0.31	0.26	–0.52	–0.30	–0.45	0.18
0.28	–0.39	0.72	–0.19	–0.13	0.10	–0.43	0.16	0.30	–0.29	–0.63	0.42	–0.29	0.40	0.06	0.09
0.45	0.20	0.02	0.65	0.49	0.16	–0.25	0.00	0.47	–0.25	0.20	–0.69	–0.25	0.30	0.21	0.00
0.36	–0.34	–0.60	–0.32	0.00	0.50	–0.21	0.00	0.48	–0.05	0.40	0.39	0.61	0.26	0.11	0.00

Source: Authors' calculations.
Note: The results are for normalized data.

Table A8.3.3. Principal Component Analysis Results: ECOWAS

1995–2004							2000–04						
Principal Components						Variance	Principal Components						Variance
–0.03	0.74	–0.11	0.03	–0.21	0.63	2.18	0.40	–0.51	0.38	–0.17	0.58	–0.26	1.99
0.15	0.43	0.66	0.36	0.41	–0.26	1.65	0.28	–0.51	–0.01	0.72	–0.35	0.15	1.28
0.54	–0.31	–0.17	0.30	0.47	0.52	1.20	–0.53	0.03	0.40	0.35	0.45	0.49	1.07
–0.53	–0.21	–0.02	0.80	–0.17	0.12	0.49	0.25	0.62	0.29	0.49	0.11	–0.46	0.87
0.52	–0.17	0.38	0.15	–0.73	0.04	0.32	0.46	0.22	–0.56	0.11	0.47	0.43	0.42
–0.35	–0.31	0.62	–0.36	0.09	0.51	0.16	–0.46	–0.22	–0.54	0.27	0.32	–0.52	0.36

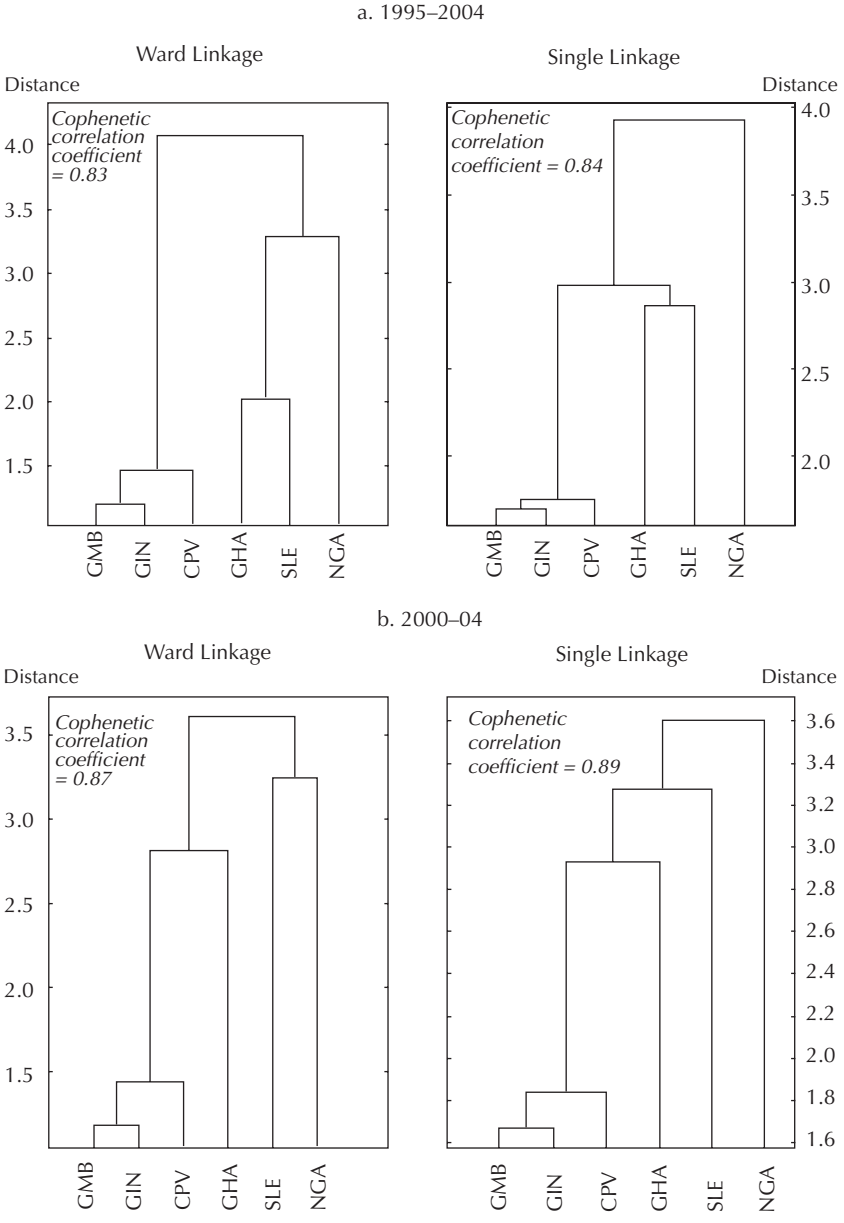
Source: Authors' calculations.
Note: The results are for normalized data.

Table A8.3.4. Forced Classification of ECOWAS Countries Based on Fuzzy Clustering[1]

1995–2004			2000–04		
Country	Closest Crisp Cluster	Closest Neighbor Cluster	Country	Closest Crisp Cluster	Closest Neighbor Cluster
BEN	2	5	BEN	3	4
BFA	5	2	BFA	4	3
CPV	1	4	CPV	1	3
CIV	4	5	CIV	1	4
GMB	1	4	GMB	1	4
GHA	3	4	GHA	1	5
GIN	4	1	GIN	1	4
GNB	3	2	GNB	5	1
MLI	5	2	MLI	3	4
NER	5	4	NER	4	3
NGA	2	5	NGA	2	3
SEN	4	5	SEN	4	3
SLE	3	4	SLE	5	1
TGO	5	2	TGO	4	3

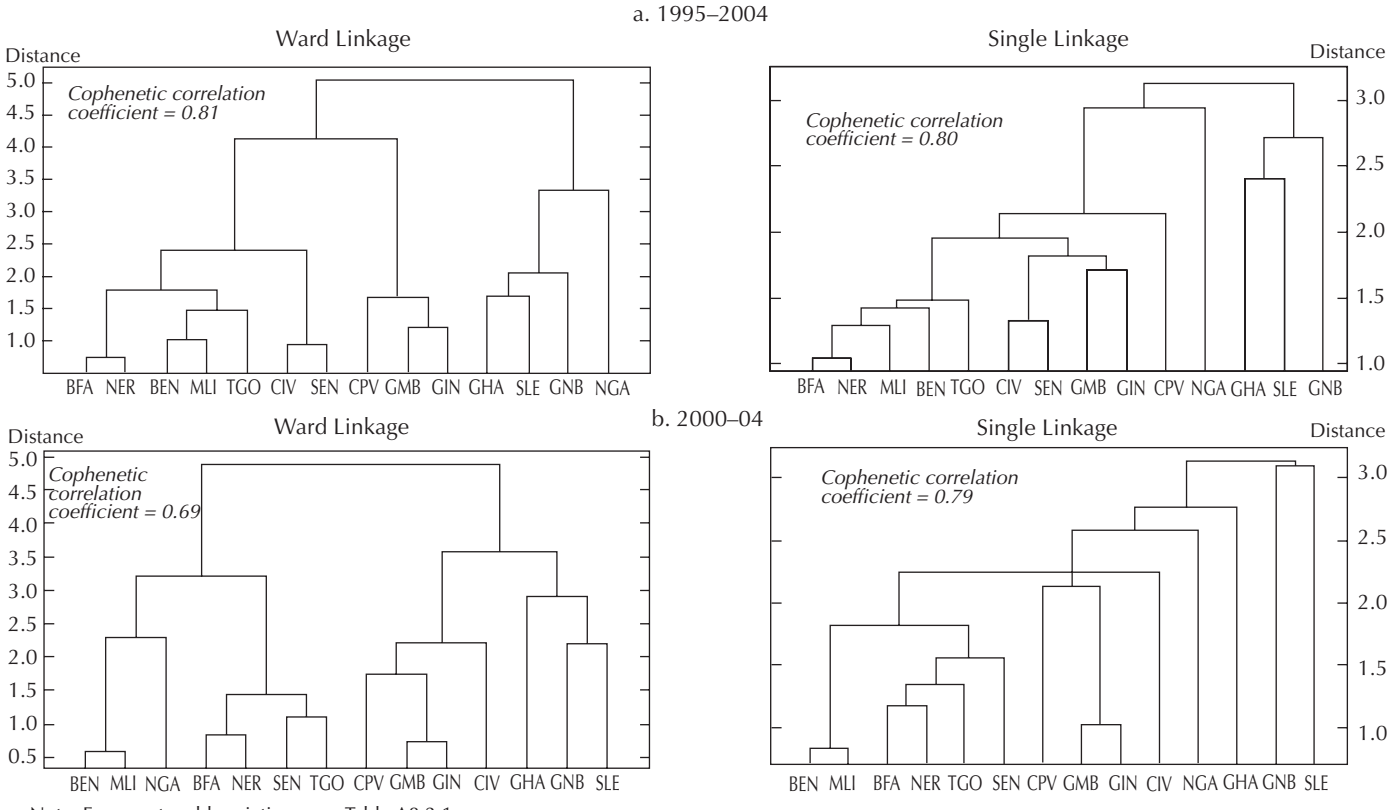
Source: Authors' calculations.
[1]For country abbreviations, see Table A8.2.1.

Figure A8.3.1. WAMZ Countries: Hierarchical Clustering Results for the Ward and Single Linkage Algorithms



Note: For country abbreviations, see Table A8.2.1.

Figure A8.3.2. ECOWAS: Hierarchical Clustering Results for the Ward and Single Linkage Algorithms



Note: For country abbreviations, see Table A8.2.1.

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Part III

Integration and Growth

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9

Financial Sector Integration in WAEMU

AMADOU SY

This study examines different aspects of financial integration in WAEMU in order to complement the literature on macroeconomic integration. Historically, the emphasis has been on the objective of macroeconomic integration in the Union resulting, for instance, in the establishment of macroeconomic convergence criteria as set in the 1999 Pact of Convergence, Stability, Growth, and Solidarity. In contrast, less attention has been paid so far to the process of financial integration in spite of its potential benefits to the union.

Financial integration can be defined as a process, driven by market forces. During the process separate national markets gradually enter into competition with each other and eventually become one financial market, characterized by converging prices, product supply, and converging efficiency/profitability among the financial services providers (EU, 2005). Accordingly, there are several channels that can further financial integration, namely, cross-border ownership and establishment or service provision.

Integration may also emerge because of formal efforts to integrate financial markets in a regional integration agreement (RIA). Integration in this sense may involve eliminating restrictions to cross-border financial operations by firms from countries in the same RIA, as well as harmonizing rules, taxes, and regulations between the member countries (see Galindo, Micco, and Serra, 2002).

There are three widely accepted interrelated benefits of financial integration: (1) more opportunities for risk sharing and diversification (2) better allocation of capital among investment opportunities and (3) potential for

higher growth. Moreover, in the context of a monetary union, financial integration facilitates the conduct of monetary policy. Overall, it is generally recognized that the benefits of a well-monitored financial integration process are likely to outweigh the implied costs (see Baele and others, 2004).

The Regional Financial Sector

Structure of WAEMU Banking System

Financial Depth and Size of the Banking System

Financial depth in WAEMU is low but comparable to the average for sub-Saharan Africa (Table 9.1). At 24.3 percent, the ratio of M2 to GDP is close to the sub-Saharan median of 23.4 percent.[1] Similarly, the ratio of net credit to the economy of 15.4 percent of GDP is comparable to the SSA average of 16.7 percent.

The regional banking system is relatively small. As of end-2003, banking assets were about 30 percent of GDP in WAEMU. In contrast, this ratio reaches 77 percent in the European Union's new member states (EU-NMS) and 280 percent in the 15 countries that were members of the European Union prior to expansion on May 1, 2004 (EU-15).

Reflecting their share in the regional economy, banks in Senegal and Côte d'Ivoire dominate the WAEMU's banking sector. These two economies account for about 54 percent of GDP and about the same share of regional banking assets (Table 9.2). In contrast, the smaller economies of Guinea-Bissau, Niger, and Togo together account for less than 10 percent of regional banking assets in WAEMU.

The small deposit base in the region is being intermediated. The average loan-to-deposit ratio is higher than in the EU-NMS and stands at about 80 percent in WAEMU. The loan-to-deposit ratio is still lower, however, than in more advanced economies such as the EU-15, where it reaches 123 percent.

Main Developmental Challenges

There is scope for increased intermediation in some countries (Figure 9.1). The ratio of domestic credit to GDP is in the range of 15 to 20 percent for all countries except Niger and Guinea-Bissau, which have the lowest

[1]The median is for the 2000–03 period. The average M2-to-GDP ratio for sub-Saharan Africa is 32.1 percent for the same period.

Table 9.1. Loans-to-GDP and Deposits-to-GDP Ratios in Developing Countries
(In percent)

	Loans-to-GDP	Deposits-to-GDP
Latin America	30.2	28.1
Sub-Saharan Africa	16.7	13.4
Middle East and North Africa	40.1	28.3
Asia	37.2	26.4
Europe and Central Asia	14.2	11.9
EMCCA (2002)[1]	9.5	12.4
WAEMU (2003)[2]	17.8	22.5

Sources: Detragiache, Gupta, and Tressel (2005); and IMF staff calculations.
[1]Economic and Monetary Community of Central Africa
[2]West African Economic and Monetary Union.

Table 9.2. WAEMU: Banking Intermediation, 2003
(In percent)

	Loans	Deposits	Loans/ Deposits	Banks Assets	Banks Assets/GDP
Benin	9.3	10.4	70.4	10.3	32.5
Burkina Faso	10.3	10.9	75.1	10.9	28.6
Côte d'Ivoire	35.6	31.6	89.7	32.0	26.0
Guinea-Bissau	0.1	0.2	30.4	0.2	9.0
Mali	14.5	13.2	86.8	14.3	35.7
Niger	2.5	2.8	68.6	3.0	12.1
Senegal	22.9	25.0	72.6	23.3	38.5
Togo	4.9	5.7	67.7	5.9	33.8
WAEMU	100.0	100.0	79.4	100.0	29.5
EU-NMS[1]			74.3		77.4
EU-15[2]			123.0		280.0

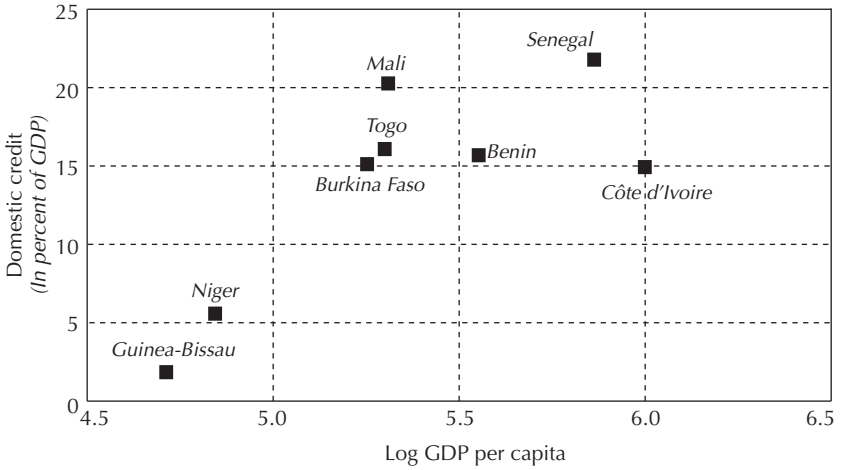
Sources: BCEAO; EU; and IMF staff calculations.
[1]The EU new member states (NMS) include Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic, and Slovenia.
[2]The EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

GDP per capita. In contrast, financial intermediation in Côte d'Ivoire seems below its potential.

Bank credit—mostly at short-term maturities—goes to a few large corporations operating in a limited number of sectors. The structure of the regional economy is characterized by a small number of large borrowers because the corporate sector is not well developed and all countries are still dependent on a few commodities. As a result, risk concentration coupled with sensitivity to terms of trade shocks remain key sources of vulnerability.

Access to and cost of finance remain major obstacles for small and medium-sized enterprises (SMEs) (see World Bank, 2005). Barriers to

Figure 9.1. WAEMU: Potential for Intermediation, 2003



Source: IMF staff estimates.

finance for SMEs include the unavailability or unreliability of financial statements and uncertainties and delays in judicial procedures for recovering claims and realizing collateral.

Given the low level of intermediation through banks, the regional authorities have put in place the necessary legal framework for the development of the nonbank financial sector. In addition to microfinance institutions, a number of nonbank financial institutions, such as leasing companies and venture capital firms, have emerged. The WAEMU region has also seen an increasing number of "policy banks" dedicated to, among other areas, housing and the provision of loans to borrower groups lacking guarantees and collateral. The regional government securities market has grown very rapidly (see below) and the regional authorities are considering ways to develop the mutual fund industry and modernize the infrastructure of the regional securities exchange. There is also considerable scope regarding the provision of housing finance as well as considerable pent-up investment opportunities from public institutional investors.

Although small, with about 7 percent of outstanding credit, the microfinance sector is growing rapidly. Microfinance institutions (MFIs) reach about 13.4 percent of the WAEMU population and account for about 6.6 percent and 6.9 percent of regional banking deposits and loans, respec-

Table 9.3. WAEMU Microfinance Institutions: Share of Nonperforming Loans in Total Loans[1]

(In percent)

	June 2004	March 2005	June 2005
WAEMU[2]	7.6	5.6	6.1
Benin	5.0	6.1	6.9
Burkina Faso	5.8	5.5	5.6
Côte d'Ivoire	27.4	9.6	12.4
Mali	7.6	8.1	8.2
Niger	16.5	14.3	12.2
Senegal	2.7	2.3	2.4
Togo	5.8	4.6	5.5

Source: BCEAO.
[1]Gross amounts.
[2]Excluding Guinea-Bissau.

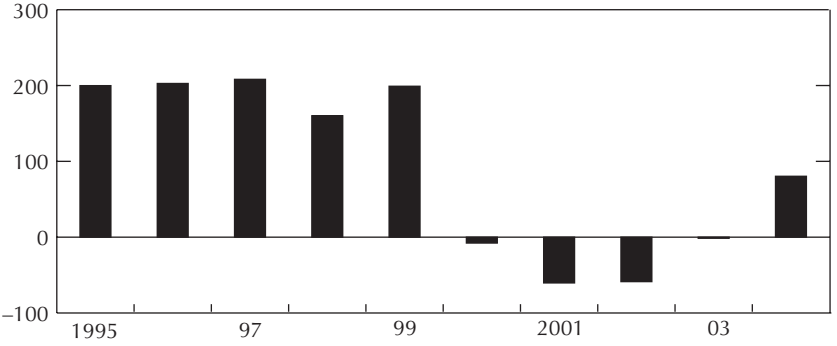
tively (as of June 2005). MFIs have also been extending credit and building deposits at a rate much faster than banks. For instance, microfinance institutions contributed to about one-third of the increase in the ratio of total assets to GDP in 2003.

The authorities are closely monitoring the asset quality of microfinance institutions (Table 9.3). The WAEMU average nonperforming loans (NPLs) ratio of 6 percent for MFIs is comparable to the Banque Centrale de l'Afrique de l'Ouest (BCEAO) benchmark of 5 percent for "adequate" asset quality. Institutions in Niger, Côte d'Ivoire, and Mali have the worst asset quality in the region. However, apart from Côte d'Ivoire, where the sociopolitical crisis has had dire effects on the industry, problems seem to be localized to a number of institutions. With the increasing importance of the sector, appropriate prudential regulation and depositor protection in the sector are likely to take on added importance. The BCEAO is currently assessing a strategy that would bring at least the largest institutions under regional supervision.

Government Ownership

Government ownership has decreased substantially following a series of restructurings and privatizations after the 1980s–1990s banking crisis (Figure 9.2). However, government ownership is relatively high in Burkina Faso, Togo, Mali, and Côte d'Ivoire, where government share of capital—often in large banks—reaches or exceeds 25 percent (Table 9.4). In contrast, net credit to the government by commercial banks has fallen significantly since 2000 as monetary financing of public spending was restricted. However, banks' exposure to large public enterprises can be high.

Figure 9.2. WAEMU: Net Credit to Government by Commercial Banks
(In billions of CFA francs)



Sources: IMF staff estimates.

Foreign Banking Groups

A few foreign groups dominate the WAEMU banking sector (Table 9.5). Foreign banks account for about 56 percent of banks' capital and banks with foreign ownership represent about 80 percent of total banking assets. Foreign presence in WAEMU is lower than in the Economic and Monetary Community of Central Africa (EMCCA) and is comparable to the EU-NMS. The relatively large foreign—mostly French—presence is a legacy of the colonial era, as banks were set up to accompany the operations of colonial trading groups with France.[2] New groups with African capital such as Ecobank and African Financial Holding/Bank of Africa (AFH/BOA) have, however, recently emerged and have regional ambitions.

Almost all foreign banking groups operate through subsidiaries established in most member countries (Table 9.6). It is not clear whether this structure tends to inhibit cross-border lending. Each subsidiary typically extends loans in the country in which it is located and intra-group loans can be used to substitute for cross-border lending. However, there is evi-

[2]In all WAEMU countries except Benin after 1972 and Guinea-Bissau, the banking system consisted of subsidiaries of BNP (BICI), Société Générale, BIAO (controlled by SFOM, a financial holding owned by BNP), and Crédit Lyonnais, as well as various public development or specialized banks. In the late 1980s and early 1990s, the banking crisis in WAEMU led to many bank closures or mergers, and some government partial (sometimes total) divestiture from French banks' subsidiaries. Later entrants in the market included Ecobank and AFH/BOA, as well as Belgolaise.

Table 9.4. WAEMU: Government Ownership of Banks and Share of Banking Assets, 2003

	Number of Banks[1]	Share of Capital	Share of Assets[2]
Benin	2/7	7.9	6.6
Burkina Faso	5/7	31.3	26.3
Côte d'Ivoire	6/16	24.7	22.9
Guinea-Bissau	0/1	0.0	0.0
Mali	6/9	28.5	29.2
Niger	4/7	18.6	13.6
Senegal	7/11	10.2	9.9
Togo	6/7	30.4	37.8
WAEMU		18.9	

Sources: BCEAO and IMF staff calculations.
[1]Number of banks with government ownership over total number of banks.
[2]Average share of assets weighted by government share of capital.

Table 9.5. WAEMU: Foreign Ownership, 2003

	Number of Banks[1]	Share of Capital	Share of Assets[2]
Benin	6/7	67.8	92.9
Burkina Faso	6/7	51.6	75.8
Côte d'Ivoire	12/16	56.0	78.8
Guinea-Bissau	1/1	63.7	100.0
Mali	6/9	54.7	75.7
Niger	6/7	66.4	70.4
Senegal	9/11	54.9	88.6
Togo	3/7	45.5	44.3
WAEMU	49/65	56.0	79.5
EMCCA[3]			79.0
EU-NMS[4]			70.0
EU-15[5]			24.0

Sources: BCEAO, IMF staff estimates, and European Commission.
[1]Number of banks with foreign ownership over total number of banks.
[2]Share of assets of banks with foreign ownership.
[3]EMCCA refers to the Economic and Monetary Community of Central Africa.
[4]The EU new member states (NMS) include Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic, and Slovenia.
[5]The EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

dence of a similar behavior of foreign banking groups with a branch network. The presence of large banking groups, again a historical legacy, has resulted in a segmented market structure (Table 9.7). In particular, the market share of the three largest banks in each country ranges from 50 percent in Côte d'Ivoire to 100 percent in Guinea-Bissau.[3]

[3]These figures are for operating banks only.

Table 9.6. WAEMU: Banking Groups, 2003

Major Groups	Number of Countries	Number of Banks	Market Share[1]	Number of Branches	Number of Accounts	Number of Employees
Société Générale	4	5	14.9	111	405,897	1,407
BNP Paribas	5	6	12.6	65	404,970	1,537
AFH/BOA	6	6	9.0	30	2,158,009	659
Ecobank	7	7	8.9	30	107,877	832
Belgolaise	3	3	4.9	40	269,516	475
Crédit Lyonnais	2	2	4.4	16	106,168	563
Citibank	2	2	3.1	2	1,475	105
Share of WAEMU	100	39.8	57.6	40.8	59.4	54.8
Other groups[2]	. . .	. . .	3.1	8.1	3.1	5.6
Total share of WAEMU	. . .	. . .	60.7	48.9	62.5	60.4

Source: BCEAO.
[1]In percent of assets.
[2]LAFB, DMI, GIEFCA, and Cotivoirienne.

Table 9.7. WAEMU: Bank Concentration—Market Share of the Three Largest Banks, 2003
(In percent of assets)

	Market Share
Benin	75.2
Burkina Faso	59.2
Côte d'Ivoire	50.4
Guinea-Bissau[1]	100.0
Mali	61.3
Niger	71.3
Senegal	58.8
Togo	66.3
WAEMU	18.3

Sources: BCEAO and IMF staff estimates.
[1]One bank only in operation.

Financial Soundness Indicators

Financial soundness indicators point to a fragile regional banking sector (Table 9.8). In particular, banking problems are more serious in Togo and Côte d'Ivoire, while in Mali and Niger, the situation of some specialized institutions has deteriorated. In addition, the profitability of small and medium-sized banks remains low. Although the average solvency ratio reached 11.4 percent in 2004, a number of banks (representing 26 percent of deposits) did not respect the minimum 8 percent capital adequacy ratio. Asset quality remains poor, as the average share of nonperforming loans

Table 9.8. WAEMU: Financial Soundness Indicators, 2003–04

	Number of Financial Institutions		Share of Assets (In percent)		Risk-Weighted Capital Asset Ratio (In percent)		Share of Non-performing Loans in Total Loans[1] (In percent)		Ratio of Provisions to Non-performing Loans (In percent)		Return on Equity (In percent)	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
WAEMU	87	93	100.0	100.0	10.6	11.4	19.7	20.4	67.7	61.1	7.4	9.9
Benin	9	9	10.3	10.0	6.2	9.5	10.3	12.9	51.0	45.0	1.9	5.4
Burkina Faso	12	13	10.9	10.7	7.9	11.0	12.4	13.3	71.4	66.1	15.6	14.4
Côte d'Ivoire	20	18	32.0	31.3	16.3	12.2	25.1	26.5	66.0	61.2	3.0	5.8
Guinea-Bissau	1	2	0.2	0.3	53.3	38.7	27.4	. . .	56.4	. . .	18.5	19.4
Mali	13	14	14.3	14.0	7.9	17.8	15.6	23.1	57.5	47.8	7.6	-22.6
Niger	8	9	3.0	3.2	15.7	13.3	26.5	19.2	76.5	75.0	7.5	12.9
Senegal	14	15	23.3	24.4	11.6	11.6	14.0	12.9	75.1	75.8	17.2	17.5
Togo	11	11	5.9	6.1	–6.6	–3.5	. . .	29.5	75.7	61.7	–11.2	. . .
Large banks[1]	19	19	63.0	61.5	12.6	13.0	20.7	21.7	69.3	65.2	10.1	11.9
Medium banks[2]	20	24	24.8	27.1	4.4	8.5	14.6	17.0	57.0	48.9	7.9	9.3
Small financial institutions[3]	48	47	12.2	11.4	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Small banks	25	27	10.2	9.4	13.6	10.4	24.5	21.5	72.3	61.8	–1.0	4.6
Small nonbank financial institutions	23	20	2.0	2.0	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

Sources: WAEMU Banking Commission and IMF staff estimates.
[1]Including provisions.
[2]Banks with assets greater than CFAF 100 billion.
[3]Banks with assets greater than CFAF 50 billion but lower than CFAF 100 billion.
[4]Banks with assets lower than CFAF 50 billion and all nonbank financial institutions.

increased to 20.4 percent in 2004 and most countries have a ratio above this figure (Côte d'Ivoire, Guinea Bissau, Mali, Niger, and Togo).

A number of factors have had a negative impact on financial soundness indicators. The problems in Côte d'Ivoire are largely due to the sociopolitical crisis that started in 1999. As a result, large groups have refocused their activities on a smaller number of core clients while small and medium-sized banks are trying to expand their operations. More generally, poor asset quality in the region has been a structural problem relating to a high concentration of credit, links to the public sector, and the vulnerability to terms of trade shocks. Finally, accounting practices in WAEMU typically result in very few write-offs, and provisioning efforts have affected the profitability of a number of banks (the average provisioning rate stood at about 61 percent at end-2004).

The current systemic banking problem in Togo, however, has its roots in the accumulation of government arrears to public sector enterprises, which in turn were unable to meet their obligations to the financial system, including state-owned banks. This problem is systemic (the banking system as a whole has negative capital and all large banks are affected). The Togolese authorities have embarked on a recapitalization exercise for some banks involving the issuance of government bonds to purchase nonperforming loans.

Interbank and Money Markets

In the context of a monetary union, the common currency and the associated money market play a very important role as a catalyst for financial integration.[4] Complete integration in the markets closer to the common currency, such as the interbank money markets, can be achieved rapidly with clear benefits for the conduct of monetary policy. An integrated interbank market, as illustrated by the experience in the EU, can ensure an even distribution of central bank liquidity and a homogenous level of short-term interest rates across the union (see Papademos, 2005).

The WAEMU interbank market is, however, thin and activity is limited to intragroup transactions. Interbank transactions fell to CFAF 66 billion in 2005 or a little more than 2 percent of domestic credit (Table 9.9). Obstacles to the development of the interbank market include the absences of a legal framework, appropriate collateral (most transactions are not collateralized), a network to match supply and demand, and a

[4]In WAEMU, the CFA franc arrangement with its common currency dates back to the 1960s and can be traced back to the colonial period.

Table 9.9. CFA Franc Zone: Interbank Market Transaction Volumes
(Monthly average, in billions of CFA francs)

	1997	1998	1999	2000	2001	2002	2003	2004	2005
WAEMU	105.6	152.4	199.6	155.6	126.8	105.6	52.8	48.0	66.0
CEMAC	3.9	19.4	21.2	14.7	23.6	13.1	9.2	7.5	. . .

Sources: BCEAO and BEAC.

Table 9.10. WAEMU: Banking Sector's Excess Liquidity[1]

	Excess Liquidity (In billions of CFA francs)	Excess Liquidity (In percent of broad money)
2000	293.1	7.0
2001	186.1	4.0
2002	348.2	6.5
2003	370.9	6.7
2004	430.0	7.4
May 2005	402.2	. . .

Source: BCEAO.
[1]Banks' reserves in excess of required reserves.

counterparty risk assessment framework (see Banque de France, 2004). The excess liquidity in the banking system may also be an impediment to further interbank transactions (Table 9.10).[5]

A well-functioning payment system is a key determinant of integrated money markets and great progress has been achieved in the WAEMU. For instance, money market integration was made possible in the EU thanks to, among other things, the establishment of the pan-European payment infrastructure (TARGET system). In WAEMU, a reform of the payment and settlement system is well under way with the setting up of a real-time gross settlement system (STAR-UEMOA), an interbank settlement system (SICA-UEMOA) and plans for an interbank payment system for bank cards (GIM-UEMOA and CTMI-UEMOA).

The conduct of monetary policy in the union will have to be adapted as financial markets become more integrated. In WAEMU, reserve requirements have been used extensively because other sterilization instruments have proved to be less effective in a context of excess liquidity and thin interbank money markets. These reserve requirements are, however, differentiated as they differ by country, indicating that there is scope for further financial integration (Table 9.11).

[5]Excess reserves are measured as actual minus required reserves.

Table 9.11. WAEMU: Reserve Requirements

(In percent)

	Oct. 16, 1993–Aug. 15, 1998	Aug. 16, 1998–Nov. 15, 1998	Nov. 16, 1998–Dec. 15, 1998	Dec. 16, 1998–Apr. 15, 2000	Apr. 16, 2000–Aug. 15, 2000	Aug. 16, 2000–Sep. 15, 2000	Sep. 16, 2000–Apr. 15, 2002	Apr. 16, 2002–Mar. 15, 2004	Mar. 16, 2004–Jun. 15, 2005	Since June 16, 2005
Benin	1.5	9.0	9.0	3.0	3.0	9.0	9.0	9.0	13.0	15.0
Burkina Faso	1.5	9.0	9.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0
Côte d'Ivoire	1.5	9.0	1.5	1.5	3.0	3.0	5.0	5.0	5.0	5.0
Guinea-Bissau	. . .	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Mali	1.5	9.0	9.0	3.0	3.0	3.0	3.0	9.0	9.0	9.0
Niger	1.5	5.0	5.0	1.5	3.0	5.0	5.0	5.0	5.0	9.0
Senegal	1.5	5.0	1.5	1.5	3.0	9.0	9.0	9.0	9.0	9.0
Togo	1.5	9.0	3.0	1.5	3.0	3.0	3.0	3.0	3.0	3.0
Average	1.5	7.5	5.4	2.3	3.0	4.8	5.0	5.8	6.3	7.5
Standard deviation	0.0	1.9	3.1	0.8	0.0	2.5	2.4	2.6	3.5	3.7

Source: BCEAO.

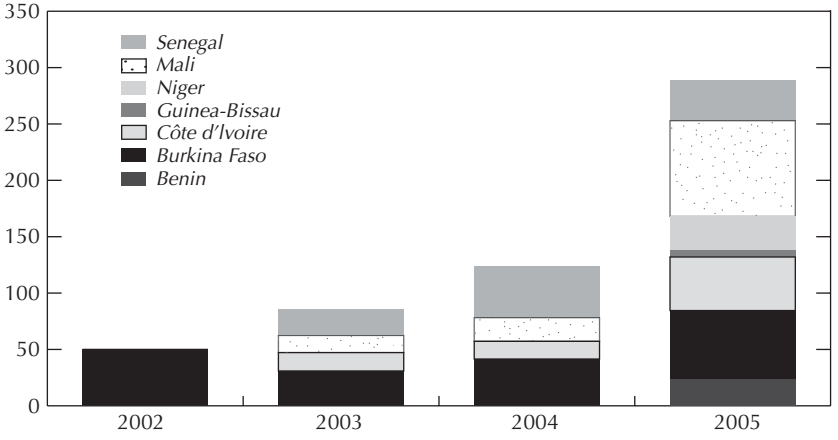
Capital Markets

The treasury bill market has been growing rapidly in recent years (Figure 9.3). Total issuance has grown from about CFAF 55 billion in 2002 to about CFAF 290 billion in 2005. All countries except Togo have been able to issue such securities. Maturities have ranged from 3 to 12 months, with most issuance at 6 months. Interest rates, which are payable in advance, have been in the 2.5–5.5 percent range depending on the issuer and the maturity of the issue.

Cross-border transactions in the treasury bills market are very high except for Côte d'Ivoire (Table 9.12). In 2004–05, nonresident WAEMU banks (including the West African Development Bank, BOAD) have purchased half of treasury bills issuance on average. This figure reaches almost 60 percent if Côte d'Ivoire is excluded from the sample.

A number of factors can explain banks' appetite for treasury bills. In a situation of excess liquidity, banks can find a better remuneration for their funds at relatively short maturities. In addition, interest earned on the treasury bills is tax exempt, carries a zero-weight risk in the calculation of the capital adequacy ratio, and can be refinanced at the BCEAO to obtain liquidity (although the BCEAO reserves the right not to refinance a bank based on a number of considerations such as insolvency). Similarly,

Figure 9.3. WAEMU: Treasury Bill Issuance
(In billions of CFA francs)



Source: BCEAO.

Table 9.12. Cross-Border Transactions in the Regional Treasury Bill Market, 2004–05

	Total Issued (In billions of CFA francs)	Maturity (Days)	Yield (In percent)	Nonresident Purchases[1] (In billions of (CFA francs)	Nonresident Purchases[1] (In percent)
Benin	23.4	182	2.76–3.50	4.8	20.5
Burkina Faso	67.0	91–182	2.76–4.0	45.3	67.6
Côte d'Ivoire	63.2	91–182	2.76–4.5	4.9	7.8
Guinea-Bissau	6.0	182	4.0–5.5	5.0	83.3
Mali	76.9	182	2.84–4.54	51.3	66.7
Niger	30.0	182	3.12–4.25	20.5	68.3
Senegal	80.8	364	2.5–4.0	29.9	37.0

Source: BCEAO.
[1]Weighted average, WAEMU banks and BOAD.

the regional regulation allows insurance companies to use treasury bills to cover their obligations.

A regional capital market, the Bourse Régionale des Valeurs Mobilières (BRVM) has been created but it remains small. Market capitalization of the regional capital market is about 5 percent of GDP in 2003 or about half that of comparable countries. For instance, Kenya, Mauritius, Nigeria, and Tunisia have GDP comparable to that of WAEMU and have market capitalization greater than 10 percent.

Activity at the BRVM is concentrated in the bond market, whereas the stock market has not fully recovered since 1999 (Table 9.13). Activity in the stock market has declined substantially because of the crisis in Côte d'Ivoire, since 36 of the 39 firms listed are Ivoirien. A project to promote a regional capital market is under way with donor support. In particular, this has led to the issuance of bonds by a regional institution, the BOAD.

Financial Integration Through Regional Institutions

Similarity of Access, Rules, and Treatment

Similarity of access, rules, and treatment is useful in assessing financial integration. More specifically, a given set of financial instruments and/or services can be considered as being fully integrated if all potential market participants have the same relevant characteristics: (1) equal access to the above-mentioned set of financial instruments and/or services; (2) a single set of rules when they decide to deal with those financial instruments

Table 9.13. WAEMU: Capital Markets
(In billions of CFA francs)

	1998	1999	2000	2001	2002	2003
Primary markets						
Total issuance	60.2	89.6	20.4	86.66	117.9	108.5
Bond issuance	59.1	80.4	15.5	67.7	112.4	107.4
Equity issuance	1.1	9.2	4.9	18.96	5.5	1.1
Secondary markets						
Trading volume	489	4,819	1,520	912	1,015	1,118
Trading value	11	41	37	13	12	6
Total capitalization	1,675	1,057	948	976	1,010	1,108
Stock market	657	974	828	858	852	858
Bond market	1,018	83	120	118	158	250
Market indices						
BRVM 10 index	95	97	77	84	82	88
BRVM composite index	98	91	75	77	73	77
Number of shares listed	35	39	41	38	38	39
Number of bonds listed	13	21	17	17	19	19

Source: Conseil Régional de l'Épargne Publique et des Marchés Financiers (CREPMF).

and/or services; and (3) equal treatment when they are active in the market (Baele and others, 2004). In this section, we consider financial integration in the WAEMU through these three criteria.

Regional Institutional Arrangements

A number of initiatives have been undertaken to promote regional financial integration in the WAEMU region. These include the following:

- Since 1962, the West African Monetary Union (WAMU) treaty has laid the basis for a monetary union with a single currency and regional central bank (Banque Centrale des États de l'Afrique de l'Ouest—BCEAO) responsible for the conduct of monetary policy. There are no capital controls within WAEMU.
- A single banking commission (Commission Bancaire de l'UMOA) was created in 1990 to strengthen regional banking supervision. The commission is managed by a secretary general and headed by a president, who is also the governor of the BCEAO. Since 2004, a single banking license is sufficient to set up banking operations in WAEMU. The decision to grant or withdraw a banking license involves both the banking commission and the relevant national finance minister.

- There are no cross-border restrictions on banking and other financial services except insurance. Approval is granted on a nondiscriminatory basis. However, for "prudential" reasons, countries will not be prevented from taking certain measures, such as requiring approval by the minister responsible for finance or the central bank and/or any other measures, which have or may have a prudential effect.
- Insurance contracts for residents or for property located in a given WAEMU country can only be concluded with entities that have been approved for such purpose in that country. The minister responsible for insurance grants approval after consultation with the Insurance Control Commission.
- The 1995 PARMEC law (Projet d'Appui à la Réglementation sur les Mutuelles d'Epargne et de Crédit) for savings and credit institutions laid the basis for a regulatory framework for cooperative financial institutions in the region. The BCEAO introduced in 1994 a microfinance monitoring system.
- The regional capital market includes a common interbank market and a single market (BRVM) for both bond and stock trading, and fund management (Société d'Investissement à Capital Variable—SICAV), which is supervised by a regional securities commission (Conseil Régional de l'Epargne Publique et de Marchés Financiers—CREPMF). In addition, pension funds have been supervised since 1996 by a regional body (Conférence Interafricaine de la Prévoyance Sociale—CIPRES).
- Insurance companies are supervised under the 1992 Inter-African Conference on Insurance Markets (Conférence Interafricaine du Marché des Assurances—CIMA) treaty among the African franc zone countries by a single regional authority (Commission Régionale de Contrôle des Assurances—CRCA). There is a regional reinsurance company (CICA-RE).
- Since 1996, a regional commercial legal framework (Organisation pour l'Harmonisation du Droit des Affaires en Afrique—OHADA) has been in place.
- Accounting standards for financial institutions have been modernized to bring them in line with international standards. Similarly, accounting standards for corporations have been harmonized in the context of the West African Accounting System (Système Comptable

Ouest Africain—SYSCOA). Moreover, a balance sheet center (centrale des bilans) is maintained at the BCEAO and includes balance sheet information for a number of borrowing firms.

- A reform of the payment system is underway with key steps finalized in the area of the RTGS and interbank settlement system. A centralized database tracking unpaid checks (centrale des incidents de paiement) is also maintained by the BCEAO.
- In the area of microfinance, a regional institution (Banque Régionale de Solidarité) with regional institutional shareholders has been created and branches are being opened in member countries.

As can be seen from the above summary, financial integration in the CFA franc zone is advanced when it comes to market participants facing a single set of rules. Progress has also been encouraging in broadening similar access to capital market instruments. The treasury bill and debt securities markets have been growing rapidly and although trading is thin, the stock exchange is a regional institution. However, cross-border bank lending within the union appears limited, although there are signs of increased activity.

There is nonetheless considerable scope for deepening financial integration, as financial institutions are still not treated equally in a number of areas. For instance, taxation of banks and capital market investors has not been harmonized. Involvement of national authorities in the licensing or delicensing of financial institutions is not conducive to uniformity of treatment. Moreover, differences in the legal and judiciary frameworks (such as those pertaining to insolvency) lead to unequal treatment.

Measuring Financial Integration in WAEMU

Have institutional developments been followed by increased integration of financial markets in WAEMU? Typically, financial integration is closely linked to the law of one price, which states that if assets have identical risks and returns, they should be priced identically regardless of where they are transacted. In practice, the law of one price can only be tested on instruments that are listed or quoted. In the context of WAEMU, the recent history of the stock and bond markets makes it difficult to measure capital market integration. However, it is possible to use interest rates to measure the efficiency gains from the regional institutional setup.

Methodology

Given data limitations, we restrict our analysis to the bank credit markets. We do not differentiate between the retail and the wholesale banking markets, but this may not constrain our analysis because most credit in the CFA franc zone is directed to the corporate sector. Although indicative lending rates for prime borrowers are published by banks, they are sticky and not representative because there are additional premiums that are added depending on the characteristics of the borrower and the loan.

More specifically, we use data on banks' spreads to measure financial integration[6] (Figure 9.4). Bank interest rate levels reflect both macroeconomic and microeconomic factors. The macro factors include market interest rate levels, whereas the micro factors relate more to banks' pricing behavior and market power. Cabral, Dierick, and Vesala (2002) use banks' spreads to disentangle the impact of both macro- and microeconomic factors. Convergence of these spreads over time could be seen as signaling greater integration, whereas a decline in the level can be interpreted as a sign of increased competition.

We estimate two measures of financial integration: (1) sigma-convergence and (2) beta-convergence. Sigma-convergence measures the *degree of integration*, that is to what extent markets are already integrated (Adam and others, 2002). To estimate the degree of integration, we build a time series of the cross-sectional dispersion in lending interest rates, R_i in a country *i*. At each period, we calculate the standard deviation of interest rates across countries:

$$\sigma_t = \left[\frac{1}{n-1}\sum(R_{i,t} - \bar{R}_t)^2\right]^{1/2}. \tag{9.1}$$

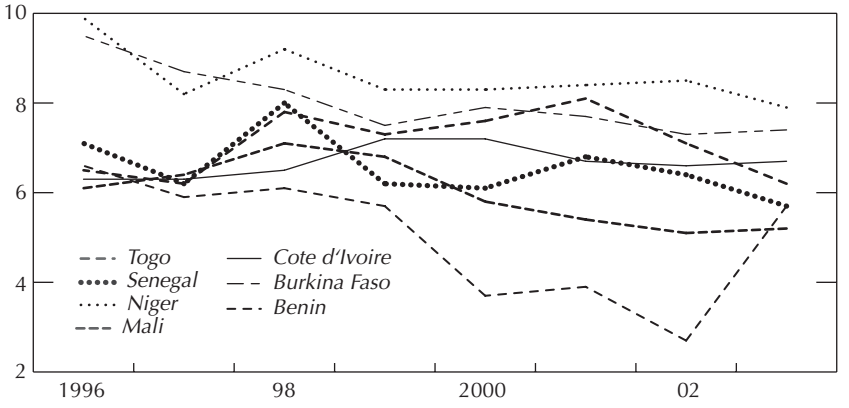
One can also calculate the speed at which the cross-sectional dispersion decreases over time. This measure is obtained from a regression of the cross-sectional dispersion on a time trend:

$$\sigma_t = \beta t + \varepsilon. \tag{9.2}$$

Cross-sectional dispersion is the cross-sectional counterpart to correlations. The main advantage of using cross-sectional dispersions is that, contrary to correlations, they can be calculated at each point in time. Correlations and cross-sectional dispersions are inversely related. When series are highly correlated, as they should be in integrated markets, inter-

[6]Spreads between the average bank lending and deposit rates calculated using income statement data (marges globales d'intermediation).

Figure 9.4. WAEMU: Interest Rate Spreads
(In percent)

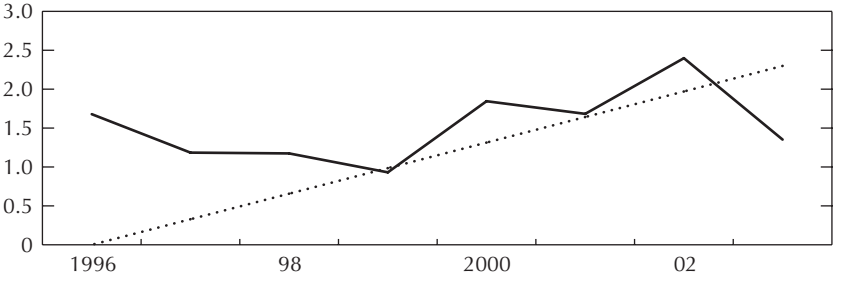


Source: IMF staff estimates.

est rates will generally move in the same direction and instantaneous cross-sectional dispersion will be low. Alternatively, dispersion will be high when interest rates in different countries drift apart.

The cross-sectional standard deviation of banks' spreads indicates that banking sector integration in WAEMU increased in the post-devaluation period from 1996 to 1999 (Figure 9.5). However, banking sector integration has decreased post-1999. In the overall sample, a regression of interest rates on a time trend indicates that convergence has been decreasing. The coef-

Figure 9.5. WAEMU: Sigma-Convergence
(In percent)



Source: IMF staff estimates.

ficient of the time trend is significant but the regression's *R*-squared is low. There is a parallel with macroeconomic convergence. For instance, van den Boogaerde and Tsangarides (2005) divide the 1990–2003 period into three subperiods. In 1990–93, the then WAMU economies were buffeted by adverse terms of trade movements, a significantly overvalued exchange rate, fiscal imbalances, insufficient efforts at internal adjustment, and a rapid accumulation of external debt. In 1994–98, the devaluation of the CFA franc was accompanied by substantial and structural adjustment programs resulting in strong economic expansion, a more balanced macroeconomic performance, and progress in transforming the structure of their economies. In 1999–2003, the strong economic momentum brought about by the CFA franc devaluation gradually dissipated, with weaker output growth and improvements in fiscal and external deficits reversed in several countries.

Beta-convergence measures the speed of convergence (Adam and others, 2002). This measure estimates whether banks' spreads in countries with relatively high spreads have a tendency to decrease more rapidly than in countries with relatively low spreads. More specifically, we estimate the following panel regression:

$$\Delta S_{i,t} = \alpha_i + \beta S_{i,t} + \sum_{l=1}^{L} \gamma \Delta S_{i,t-1} + \varepsilon_{i,t}, \tag{9.3}$$

where $S_{i,t}$ represents the difference R_i between banks' spreads in country i and a relevant benchmark, R_b. Δ is the difference operator, and α_i country dummies. We choose banks' spreads in Senegal or Benin as benchmarks as they have been the lowest in the region during most of the period.

A negative β coefficient indicates that banks' spreads in countries with relatively high interest rates have a tendency to decrease more rapidly than in countries with relatively low spreads. Moreover, the size of β is a direct measure of the speed of convergence in the region. We do not find evidence of convergence in banks' spreads in WAEMU because the slope coefficient, although statistically significant, is positive (Table 9.14).

Regional Policy Issues and Conclusions

From the previous analysis, financial integration in WAEMU appears to be well advanced in some aspects. In particular, the regional government securities markets has grown rapidly and exhibits a high degree of cross-border transactions. Similarly, a high degree of similarity of rules is achieved

Table 9.14. WAEMU: Spreads Beta-Convergence, 1996–2003

	WAEMU
Beta	1.19
p-value	0.00
Country dummies	(not shown)
Adjusted *R*-square	0.78
Number of observations	36

Source: IMF staff estimates.

through common institutions, including a regional central bank and banking commission. Some degree of similarity of access to the regional capital market exists. In addition, common ownership in the banking sector is very high because a few foreign banking groups dominate the industry.

There is, however, scope for further financial integration. Similarity of treatment appears uneven as some regional institutions share their responsibilities with the ministries responsible for finance. Deviations from the law of one price in the banking sector have proved to be persistent. Finally, cross-border and interbank transactions appear limited.

The WAEMU institutions have embarked on a program to accelerate financial integration in the WAEMU. In particular, the BCEAO has initiated a reform of the regional payment system, which should provide banks with the necessary infrastructure to conduct their operations more efficiently. In addition, the common central bank has been instrumental in the setting up of the regional treasury bill market, which is growing rapidly.

To maintain and increase the efficiency gains from financial integration, it is important to identify the remaining barriers and bottlenecks to financial integration in WAEMU. A number of factors may explain why the important progress in harmonizing rules has not resulted in a higher degree of financial integration to date:

- Excess liquidity and its distribution in the system are obstacles to a regional monetary policy;
- Financial depth in WAEMU is still low when compared to non-SSA developing countries because access to banking services remains limited;
- Most bank lending goes to a limited number of large borrowers in very few sectors. Given the economic structure of individual countries, the supply of investment opportunities is rather limited;
- Intraregional trade is low and the accompanying demand for cross-border financial services has not materialized;

- Harmonization has not been achieved in certain areas and shared responsibilities between regional institutions and ministries responsible for finance has led to a lack of uniformity of treatment;
- The regional banking system remains fragile; and
- Regional banking groups dominate the region.

Against this background, policymakers could take the following steps to further financial integration.

- Reduce the excess liquidity in the system and in so doing assess whether the current limitations on the use of indirect monetary policy instruments are driven by cost considerations or lack of burden sharing with national authorities; similarly, reduce restrictions to the recycling of excess liquidity by, for instance, developing the regional interbank market;
- Assess policies to increase access to banking services;
- Accelerate macroeconomic convergence;
- Continue in harmonizing rules, taxes, and regulations, and especially their applications;
- Strengthen the regional banking system and address problems in weak banks; and
- Analyze the strategies of regional banking groups as well as new entrants to assess possible impediments to financial integration.

Finally, on financial stability, the very high foreign presence in the CFA franc zone raises questions as to whether the risk transmission by ownership is significant. Subsidiaries of foreign banks have their own capital, which can be used as a buffer. Historically, problems in parent banks have had no significant effects on the regional banking system (Crédit Lyonnais, BIAO, and BCCI). Home-host supervision remains, however, an important function of supervisors.

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10

Banking Sector Integration and Competition in CEMAC

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This chapter examines the issue of banking sector integration and competition in CEMAC, with a focus on the integration of products and services in retail banking, as financial markets are limited in size (Box 10.1). A common currency and monetary policy and the adoption of a common set of convergence criteria for the monetary union may be expected to lead to a process of financial integration. Banking sector integration can be viewed as a process of convergence into a single market for banking products and services, where all buyers and sellers within CEMAC have opportunities to transact on the most favorable terms. However, integration may not materialize because a number of factors have to be taken into account: (1) incentives of the economic agents to operate in other countries within CEMAC; (2) institutional conditions of the countries of origin and reception (for instance in terms of property rights protection); and (3) impact of the regulatory framework, especially in the case of banking markets. This chapter assesses the degree of integration achieved by the banking systems in CEMAC, explores the major obstacles to further integration, and seeks to quantify the effects of integration on the efficiency and profitability of banks.

Although no quantitative study has so far examined banking sector integration and competition in the CEMAC zone, several key indicators can be used to gauge the degree of financial integration. Extensive literature on the subject exists for European Union (EU) countries, with several papers analyzing the extent to which the "single market" has led to more integrated

Box 10.1. CEMAC Institutional and Economic Background

Previously known as the Union Douanière et Economique de l'Afrique Centrale (UDEAC), CEMAC was created in March 1994 as a customs and monetary union among six former French Central African countries. CEMAC includes Cameroon, the Central African Republic, Chad, the Republic of Congo, Equatorial Guinea, and Gabon. Along with WAEMU, it is one of the most important and structured regional groupings in Africa.

The Conference of the Heads of State meets at least once a year to define overall guidelines for the group's policies. CEMAC's Executive Secretariat is in charge of monitoring the implementation of agreed measures. The main policy objectives consist in creating a fully functional and effective customs union, ensuring a system of macroeconomic surveillance, and promoting sectoral policies that help create a common market for goods, capital, and services.

The regional banking supervision commission, the Commission Bancaire de l'Afrique Centrale (COBAC) was established on October 16, 1990. On January 17, 1992, a convention was signed, establishing the harmonization of banking regulations across CEMAC. Although legally independent, COBAC is closely related to the Banque des Etats d'Afrique Centrale (BEAC), whose governor is also the chair of COBAC, and depends on BEAC for its financial and human resources. COBAC's main role is ensuring banks' compliance with prudential norms, as well as issuing and withdrawing (in coordination with the country's ministry of finance) banking licenses.

The recent policy environment for the CEMAC region has been shaped by increasing oil prices, higher oil output and revenues, and the sharp appreciation of the franc (along with the euro) against the U.S. dollar. The zone as a whole has benefited from a substantial increase in growth (reaching nearly 7 percent in 2004 and 4 percent in 2005), inflation below euro area levels, and substantial increases in foreign exchange reserves. These overall positive economic developments, however, also pose challenges to the conduct of monetary and fiscal policies. Main policy challenges relate to the use of oil-related inflows and to setting common policies in the context of significant cross-country differences in economic performance.

Since the ratification of the CEMAC treaty in 1999, the subregion has been moving, albeit slowly, toward fuller economic and monetary integration. Macroeconomic convergence has improved with greater country adherence to both fiscal and nonfiscal criteria of convergence modeled on the EU experience. However, limited progress has been achieved in enhancing the functioning of the customs union. Administrative hurdles and an absence of economic complementarities continue to hinder the flow of goods, services, and people in the subregion. Intraregional trade still remains low—even in comparison to its West African counterpart. Moreover, regional integration is still not viewed in the zone as a vehicle for greater integration in the global trading system.

banking markets, and offering insights on the mechanisms at play.[1] Various methods allow a quantitative assessment of the degree of financial integration and are based on: (1) interest rate data; (2) a breakdown of branches and subsidiaries; (3) mergers and acquisitions data; and (4) bank concentration data. For instance, comparable interest rate data across the EU fail to show a significant reduction in spread differentials. This would be consistent with the relatively limited increase in the presence of foreign credit institutions in individual EU retail banking markets. A clear trend toward dominance of branches over subsidiaries also emerges from EU data (Adam and others, 2002), although, as pointed out by Dermine (2002) and Rosengren (2002), subsidiaries remain important, potentially indicating insufficient integration. A geographical breakdown of mergers and acquisitions shows very clearly that the consolidation that took place during the second half of the 1990s was characterized (as in earlier periods—see Gual, 2004) by its domestic nature. Finally, a comparison of the evolution of concentration figures at the national level, the EU level, and in the United States was conducted by DeYoung (1999). If mergers are primarily taking place within national borders, concentration at the country level increases whereas EU-wide concentration need not increase.

This chapter considers first the extent to which financial sector integration has developed in CEMAC, before carrying out an assessment of impediments to greater financial integration and of the degree of competition. An overview of CEMAC's banking sectors shows the very limited degree of financial intermediation reached so far in CEMAC. Although important progress has been made to regulate the financial sector at the regional level, little has been achieved in facilitating integration of banking markets, because regional infrastructure and markets are not sufficiently well developed. Moreover, within CEMAC and beyond the national boundaries of the six countries, bank competition seems to stay at a relatively low level. To assess the degree of bank competition at the regional level, we used an estimated *H* statistic (using a standard Panzar Rosse model to assess bank competition) that places CEMAC—as a region—among the least competitive environments. Finally, we examine a number of policies that could be implemented to facilitate regional integration. Policy recommendations include, on the legal and regulatory framework side, lifting obstacles to the implementation of the *agrément unique* and, on the infrastructure side, developing a coherent strategy to

[1]Adam and others (2002), Dermine (2002), Manna (2004), and Gual (2004), to name a few.

promote regional interbank and debt markets consistent with efforts aimed at improving the systemic liquidity framework.

Overview of CEMAC's Banking Sectors

The financial system in CEMAC is bank dominated and mostly foreign owned (Table 10.1). Cameroon and Gabon, the two largest economic powers in the subregion, account for about three-quarters of total assets and loans. There are 33 deposit-taking banks in operation in CEMAC as of end-2005, 31 of which are privately owned and 23 of which are foreign owned by entities outside CEMAC. Eight banks do not comply with the minimum capital adequacy ratio (8 percent), including five with negative equity.

Government ownership of banks in CEMAC is limited and has been declining since the restructuring of the sector in the mid-1990s. At the regional level, as of end-2005, the average government share of bank capital is about 20 percent, and central government share of deposits is about 9 percent. In contrast to the situation prevailing in other countries in sub-Saharan Africa, banks typically do not lend to governments.

Financial depth in CEMAC is low by international standards (Table 10.2). The ratio of credit to the private sector to GDP (about 7 percent), and the ratio of bank deposits to GDP (17 percent) are much lower than in the WAEMU, but comparable to the median ratio for sub-Saharan Africa. As of end-2004 (Table 10.3), commercial banks employed relatively few employees (5,700), in a limited number of branches (190, against 120 in 2000). Branch density is limited—just reaching the density of Ghana or Nigeria would require a tripling of the number of branches (Figure 10.1).[2] There is significant scope for further intermediation in several countries, whereas other countries seem overextended: Chad and the Central African Republic have loan-to-deposit ratios above 100 percent, reflecting a narrower deposit base and a tighter liquidity situation relative to Cameroon and the Republic of Congo, for example. In Cameroon, as a result of past bank restructuring episodes, banks hold a large share of government securities, which tends to limit their capacity and willingness to extend loans.

Banking sectors are highly concentrated in four out of six CEMAC countries (Table 10.4). However, concentration levels have somewhat decreased since 2002 and are considered moderate for Cameroon and

[2]Branch density in CEMAC is about 100 times lower than in a number of densely banked countries, such as Germany, France, Austria, Belgium, or Canada.

Table 10.1. CEMAC: Major Banking Groups, December 2004

Country	Bank Name	Assets (In millions of CFA francs)	Capital (In millions of CFA francs)	Branches
Cameroon (10 banks)	Banque Internationale du Cameroun pour l'Epargne et le Crédit	333,994	25,367	27
	Crédit Lyonnais Cameroun S.A.	258,315	14,439	12
	Société Générale de Banques au Cameroun	314,302	34,049	16
	Standard Chartered Bank Cameroon	144,260	20,678	3
	Afriland First Bank	181,028	6,680	12
	Amity Bank Cameroon	36,838	6,026	8
	Citibank N.A. Cameroon	55,682	6,369	2
	Commercial Bank of Cameroon	153,263	13,059	6
	Union Bank of Cameroon PLC	28,118	5,405	5
	Ecobank Cameroun S.A.	59,670	3,325	2
Central African Rep. (3 banks)	Banque Populaire Maroco-Centrafricaine	17417	6024	1
	Banque Internationale pour le Centrafrique	20,877	1,928	2
	Commercial Bank Centrafrique	23,563	3,423	2
Chad (7 banks)	Banque Agricole du Soudan au Tchad	3,165	968	1
	Banque Commerciale du Chari	29,027	4,099	3
	Commercial Bank Tchad	40,037	6,999	2
	Banque Internationale pour l'Afrique au Tchad	29,911	3,014	4
	Société Générale Tchadienne de Banque	43,840	4,524	5
	Financial Bank Tchad	22,658	1,879	1
	Banque Sahélo-saharienne pour Investissement et Commerce Tchad	5,280	2,000	1
Congo, Rep. of (4 banks)	Cofipa Investment Bank Congo	50,699	3,000	13
	Crédit Lyonnais Congo S.A.	72,476	4,211	2
	BGFIBANK Congo	72,421	7,504	2
	La Congolaise de Banque	50,177	4,457	5
Equatorial Guinea (3 banks)	BGFIBANK-Guinee Equatoriale	25,914	1,559	1
	Société Générale des Banques en Guinée Equatoriale	111,474	6,619	4
	CCEI Bank Guinee-Equatoriale	91,306	7,085	3
Gabon (6 banks)	Banque Internationale pour le commerce et l'industrie du Gabon	271,844	33,799	15
	Banque Gabonaise de Développement	52,613	33,212	6
	BGFIBANK Gabon	281,217	56,997	4
	Citibank N.A. Gabon	72,368	14,371	2
	Union Gabonaise de Banque	170,778	14,021	4
	Financial Bank Gabon	7,758	2,019	1

Source: COBAC.
[1]Ultimate owner is owner of biggest share of total capital.
[2]Represents percentage share of capital owned by ultimate owner out of total capital of associated bank.

Ownership (Percent of capital)				Associated Banks in CEMAC		
State	Foreign	Local	Ultimate Owner[1]	Name (Country)	Ultimate Owner[1]	Share[2]
52.5	47.5	0	Natexis/BP	. . .	. . .	. . .
35	65	0	CALYON	UGB (Gabon)	CALYON	56.25
				CL (Congo)	CALYON	80.99
25.6	58.08	16.32	SG	SGBT (Chad)	SG France	30
				SGBGE (GE)	SG France	57.24
0	100	0	SC	. . .	. . .	. . .
0	0	100		CCEI (EG)	Afriland	51
0	. . .	. . .		. . .	. . .	. . .
0	100	0	CitiCorp	Citibank (Gabon)	CitiCorp	100
0	15	85	DEG	CBCA (CAR)	FOTSO	59.5
				CBT (Chad)	FOTSO	50.68
92.9	7.13	0	Cr. Unions	. . .	. . .	. . .
0	97	3	Ecobank	. . .	. . .	. . .
37.5	62.5	0	Morocco	. . .	. . .	. . .
11.7	50	38.3	Belg.-COFIPA	BIAT (Chad)	COFIPA	80.6
				COFIPA (Congo)	COFIPA	69.43
10	59.5	30.5	FOTSO	CBC (Cameroon)	DEG	15
				CBT (Chad)	FOTSO	50.68
0	100	0	Sudan	. . .	. . .	. . .
50	50	0	Libya	. . .	. . .	. . .
17.5	82.52	0	FOTSO	. . .	. . .	. . .
0	80.6	19.4	COFIPA	COFIPA (Congo)	COFIPA	69.43
20	76	4	SG	SGBC (Cameroon)	SG France	58.08
				SGBGE (EG)	SG France	57.24
0	100	0	FB Togo	FB (Gabon)	FB Togo	70
0	100	0	Libya	. . .	. . .	. . .
10	77.43	12.57	COFIPA	. . .	. . .	. . .
9	81	10	CALYON	CL (Cameroon)	CALYON	65
				UGB (Gabon)	CALYON	56.25
0	85	15	BGFI Gabon	BGFI (Gabon)	private inv.	29.81
				BGFI (EG)	BGFI Gabon	55
10	25	65	. . .	. . .	. . .	. . .
15	55	30	BGFI Gabon	BGFI (Gabon)	private inv.	29.81
				BGFI (Congo)	BGFI Gabon	60
31.8	57.25	10.95	SG	SGBC (Cameroon)	SG France	58.08
				SGBT (Chad)	SG France	30
10	77	13	Afriland	Afriland (Cameroon)	Cam.private	100
26.3	46.67	27.03	BNP	. . .	. . .	. . .
69	30.99	0	State	. . .	. . .	. . .
23	14	63		BGFI (Congo)	BGFI Gabon	60
				BGFI (EG)	BGFI Gabon	55
0	100	0	CitiCorp	CitiBank (Cameroon)	CitiCorp	100
25	74.2	0.8	CALYON	CL (Cameroon)	CALYON	65
				CL (Congo)	CALYON	80.99
1.58	70	28.42	FB Togo	FB (Chad)	FB Togo	67.83

Table 10.2. CEMAC: Financial Intermediation, December 2005
(In percent)

	Private Credit/GDP	Bank Deposits/GDP	Loan-Deposit Ratio	Overhead Costs[1]
Cameroon	9.4	25.2	40.9	2.89
Central African Rep.	6.6	5.3	152.0	3.13
Chad	5.2	6.2	111.2	5.15
Congo, Republic of	2.5	10.5	25.9	3.32
Gabon	8.1	15.0	68.2	2.58
Equatorial Guinea	2.5	10.5	40.7	4.57
CEMAC	6.8	16.8	48.0	3.03
WAEMU	15.4	22.5	79.4	. . .
Sub-Saharan Africa	. . .	13.4	. . .	. . .

Sources: COBAC; IMF, *International Financial Statistics*; and IMF staff calculations.
[1]In percent of total earning assets.

Chad, both with Herfindahl-Hirchman index (HHI) values below 2,000.[3] The number of banks increased from 29 in 2002 to 33 in 2005, and no major consolidation occurred during that period.

Foreign banks dominate the banking sector (see Table 10.1). With foreign banks controlling 63 percent of total assets in the banking system, or 10.9 percent of GDP, several large foreign banking groups are particularly dominant. Two French groups each operate in three out of the six CEMAC countries; other foreign groups include COFIPA, Financial Bank, and Citibank. On the other hand, local groups, in particular Afriland and BGFIBANK, have commanding market shares (both in assets and in capital) in the Republic of Congo, Gabon, and Equatorial Guinea. In Chad, the only country with no local privately owned banks, two banks are majority owned by the Libyan government, and one by the Sudanese government.

The soundness of banks in CEMAC differs greatly across countries or groups of banks (Table 10.5). We have grouped the banks into four categories: Group I: foreign-owned banking groups (outside CEMAC); Group II: locally owned banks or groups (inside CEMAC);[4] Group III: local groups; and Group IV: state-owned banks, including banks owned by foreign states.

[3]HHI values between 1,000 and 2,000 indicate a moderate level of concentration; values above 2,000 indicate high levels of concentration. The index is calculated by summing up the squared relative market shares (in percentage points) of all the banks:

$$INDEX = \sum_{n}^{1} X_n^2 ,$$

where X is the market share in percentage points.

[4]Group II includes banks in Group III.

Table 10.3. Commercial Bank Branches and Employees in CEMAC, December 2004

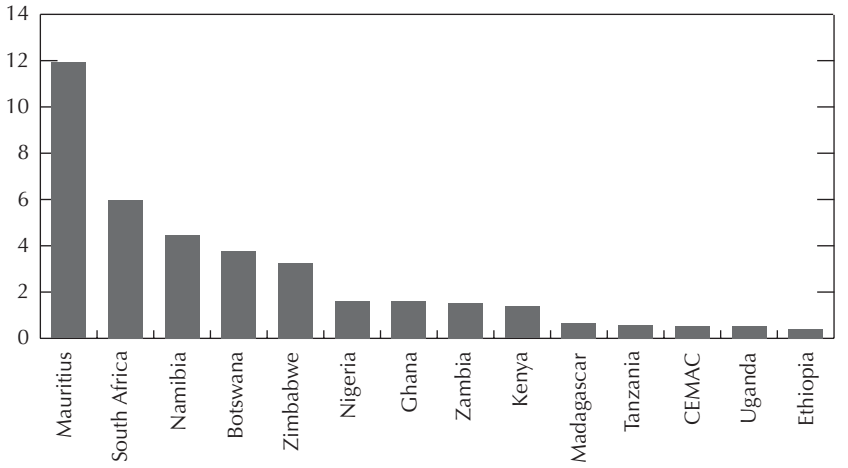
Banks	Employees	Branches
Afriland First Bank Cameroun	311	12
Amity Bank Cameroon PLC.	168	9
Banque Agricole du Soudan au Tchad	22	1
Banque Commerciale du Chari	105	3
Banque Gabonaise de Développement	214	7
Banque Internationale du Cameroun pour l'Épargne et le Crédit	548	27
Banque Internationale pour l'Afrique au Tchad	113	4
Banque Internationale pour le Centrafrique	91	3
Banque Internationale pour Commerce et Industrie du Gabon	473	15
Banque Populaire Maroco-Centrafricaine	54	1
Banque Sahélo-saharienne pour Investissement et Commerce Tchad	45	1
BGFIBANK	380	4
BGFIBANK Congo	89	3
BGFIBANK Guinée Equatoriale	22	1
CCEI Bank Guinée Équatoriale	86	4
Citibank N.A. Cameroon	51	2
Citibank N.A. Gabon	42	2
Commercial Bank Centrafrique	84	2
Commercial Bank of Cameroon	292	6
Commercial Bank Tchad	80	2
Cofipa Investment Bank	147	13
Crédit Lyonnais Cameroun S.A.	506	13
Crédit Lyonnais Congo	108	5
EcoBank Cameroun	72	2
Financial Bank Gabon	18	1
Financial Bank Tchad	40	1
La Congolaise de Banque	183	7
Société Générale de Banque au Cameroun	563	18
Société Générale de Banques en Guinée Équatoriale	176	5
Société Générale Tchadienne de Banque	160	5
Standard Chartered Bank Cameroon S.A.	130	2
Union Bank of Cameroon PLC.	93	6
Union Gabonaise de Banque	241	4

Source: COBAC.

We observed the following points regarding banking soundness:

- Group I banks appear at end-2005 to be better capitalized than the regional average (owing to financial connections to parent companies). They have a lower level of nonperforming loans (NPLs) and a better-than-average rate of NPL provisioning.

Figure 10.1. Bank Branch Density in CEMAC and Selected African Countries
(Branches per 100,000 people)



Source: IMF staff estimates.

Table 10.4. CEMAC: Banking Concentration, 2002–05

	HH Index 2002	HH Index 2005
Cameroon	1,621	1,416
Central African Rep.	3,673	3,421
Chad	2,154	1,933
Congo, Rep. of	3,098	2,689
Gabon	2,716	2,734
Equatorial Guinea	4,346	3,832

Source: IMF staff calculations.

- Higher provisioning has, among other factors, reduced the profitability for banks in Group I relative to other banks.
- Group IV banks operate for the most part at a loss and have high levels of NPLs, consistent with the performance of most state-owned banks in sub-Saharan Africa.

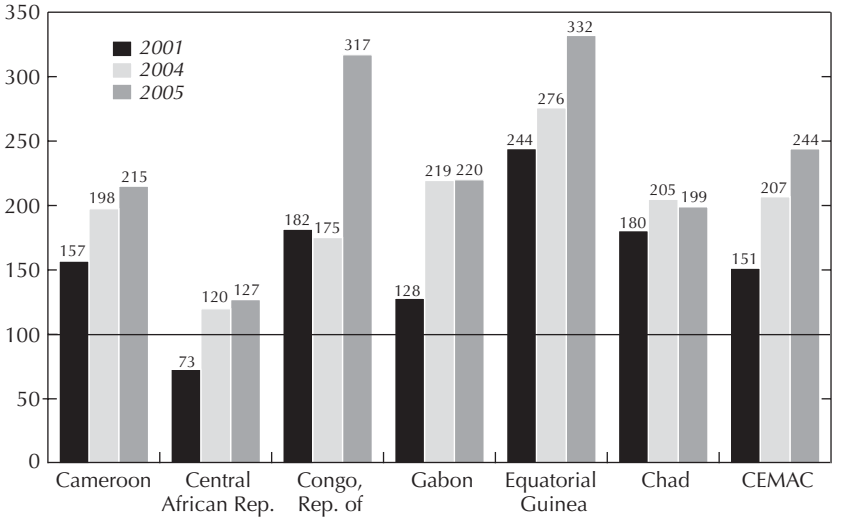
Excess liquidity in the banking system has been growing significantly since 2001 and has now reached high levels (Figure 10.2). This phenomenon is further exacerbated by the lack of well-functioning money, interbank, and capital markets, and substantial lags in monetary policy to address this situation. Excess liquidity is unequally distributed among countries, with most

Table 10.5. CEMAC: Selected Financial Soundness Indicators by Bank Groups
(In percent, unless otherwise noted)

	Group I	Group II	Group III	Group IV	CEMAC
Capital adequacy					
Regulatory capital over risk-weighted assets	11.0	6.9	8.3	. . .	10.8
Equity over total assets	9.4	11.0	12.1	. . .	10.8
Asset quality					
Doubtful loans net of provisions over gross loans	2.0	3.4	2.2	5.6	2.9
Provisions over doubtful loans	84.4	73.0	78.6	78.7	79.1
Profitability					
Average return on assets	1.8	2.2	2.3	–0.2	1.8
Average return on equity	19.4	19.8	19.0	–0.6	16.9
Liquidity					
Liquid assets over sight deposits	42.8	46.5	51.4	53.5	44.1
Liquid assets over total assets	24.6	28.1	30.4	15.3	25.4

Sources: COBAC and IMF staff calculations.

Figure 10.2. CEMAC: Liquid Assets Over Short-Term Liabilities, 2001–04[1]
(In percent)



Sources: COBAC; and IMF, *International Financial Statistics*.
[1]Maturities of one month or less.

countries showing excess liquidity and two countries experiencing a tighter liquidity situation (Central African Republic and Chad).

The State of CEMAC's Banking Integration

The ultimate goal of CEMAC's banking integration policies is a more efficient market for financial services, which ultimately will contribute to higher economic growth and employment across the union. A larger market should, in theory, lead to a more competitive environment, with the development of stronger credit institutions that are able to offer a wider and more complex array of financial products and services. Several reports (commissioned by the EU, for example) have stressed the relationship between market size and efficiency and have attempted to estimate the magnitude of these effects. It is therefore necessary to assess first the degree of integration of CEMAC markets and then the extent to which such integration is having its expected positive effects on the structure and performance of CEMAC banking. We also examine the degree of efficiency and competition.

Degree of Integration

Banking integration can be viewed as a *process* of convergence into a single market for banking products and services, where all buyers and sellers within the union have opportunities to transact on the most favorable terms. The law of one price remains the benchmark for studies on banking integration, focusing on interest rate convergence: a single market must be characterized by only one price for the product that defines the market. Another strand of the literature on banking integration focuses on quantities. When the enlargement of a market coincides with a change in the competitive advantages of the firms in old markets, changes in equilibrium market shares are expected and more efficient banks will have larger equilibrium market share (Manna, 2004). In effect, if initially segregated national banking markets evolve into a single market, domestic banks will start to compete and those that are more efficient will gain market share at the expense of the less efficient ones. Cross-border flows of deposits may be observed in response to the new competitive conditions, which just reflect the transition from the old to the new equilibrium. Such a process will eventually lead to greater efficiency of the banking markets.

Differing levels of competition among market segments and of market integration are to be expected. For each market segment (house-

holds, small and medium-sized enterprises (SMEs), large corporates), the extent of integration can be assessed as is usually done in trade economics, by focusing on the evolution of price convergence, or through a quantity indicator, such as cross-border flows or the market share of foreign entities.

- Price convergence implies that price differentials for the same financial service should be eliminated over time, or at least reduced, down to a level explained mostly by the existence of arbitrage or transportation costs.
- Integration measured by quantities usually comes as a complement. The absence of cross-border flows (or the small market share of foreign competitors) need not be incompatible with a substantial degree of integration, provided that the threat of foreign entry or competition keeps the markets integrated—notably with price differences not exceeding the costs of arbitrage (Gual, 2004).

Price-Based Indicators

Given data limitations, we only look at CEMAC's retail bank credit markets. The interbank money market is shallow and the capital market is not yet operational. Furthermore, wholesale banking (or banking services between merchant or investment banks and other financial institutions) is virtually nonexistent in CEMAC.

Bank profitability is relatively high, but reflects large differences in operating environments. In 2005, the average retun on assets (ROA) and the return on equity (ROE) were 2 percent and 18 percent, respectively, with significant differences between countries. The share of fee income is significantly higher than the gross margin on loans for all countries except the Republic of Congo reflecting reliance on fee income to compensate for the low level of income derived from lending activities and for the effects of interest rate regulations (Table 10.6). Margins in CEMAC can appear substantial, but they also reflect the risks associated with banking activity in the region, and notably a high degree of credit and operational risk. Foreign banks, which tend to be better capitalized, also show a slightly smaller ROE than that for local banks, notably owing to a higher provisioning rate (about 84 percent). Country differences in profitability (see Table 10.6) can be explained by three factors: (1) the weight of NPLs and provisions; (2) differences in operational efficiency; and (3) the different weights of taxation on profits. The latter is a distortion to competition within the CEMAC region given the wide differences in taxation regimes for banks (in Gabon, the nontax deductibility of provisions is a long-standing issue).

Table 10.6. Intermediation Margins, December 2004
(In percent of total earning assets (TEA), unless otherwise noted)

	Cameroon	Central African Rep.	Chad	Congo, Rep. of	Gabon	Equatorial Guinea	CEMAC
Earning assets (TEA)[1]	1,201	65	132	153	743	118	2,411
Gross margin on TEA[2]	8.0	8.3	9.6	9.3	8.6	10.0	8.5
NPLs provisioning	0.8	2.4	1.1	0.1	0.8	0.8	0.8
Net margin on TEA	7.1	5.9	8.5	9.2	7.8	9.2	7.7
Other income net[3]	9.5	9.2	13.0	9.1	9.3	14.6	9.9
Total margin on TEA	16.7	15.1	21.5	18.3	17.2	23.8	17.6
Overhead expenses	2.9	3.1	5.1	3.3	2.6	4.6	3.0
Personnel expenses	2.3	2.0	3.5	2.7	3.2	2.0	2.6
Margin before taxes	11.5	9.9	12.8	12.2	11.4	17.2	11.9
Taxes	1.2	0.4	1.1	0.7	1.5	0.7	1.2
Margin after taxes	10.3	9.5	11.7	11.6	9.9	16.5	10.7

Source: COBAC and IMF staff estimates.

[1]Total earning assets (in billions of CFA francs) include BEAC and national bills and bonds, net interbank loans, and gross loans.

[2]Gross margin on assets is the difference between average return on loans and average cost of funding as calculated by COBAC.

[3]Includes net income on clientele operations, treasury operations, and loan-lease operations.

However, notwithstanding these factors affecting profitability, interest rate margins have converged across countries. The average ROA and ROE are on the decline, as are intermediation margins, which declined by 2 percentage points to 8.5 percent from 2000 to 2004 (Figure 10.3). This decline, most notable in the Republic of Congo, Equatorial Guinea, and the Central African Republic, reflects primarily lower returns on loans (11 percent as of end-2004), whereas the average cost of funds (at 2.5 percent) has been stable, but with differences between countries.[5]

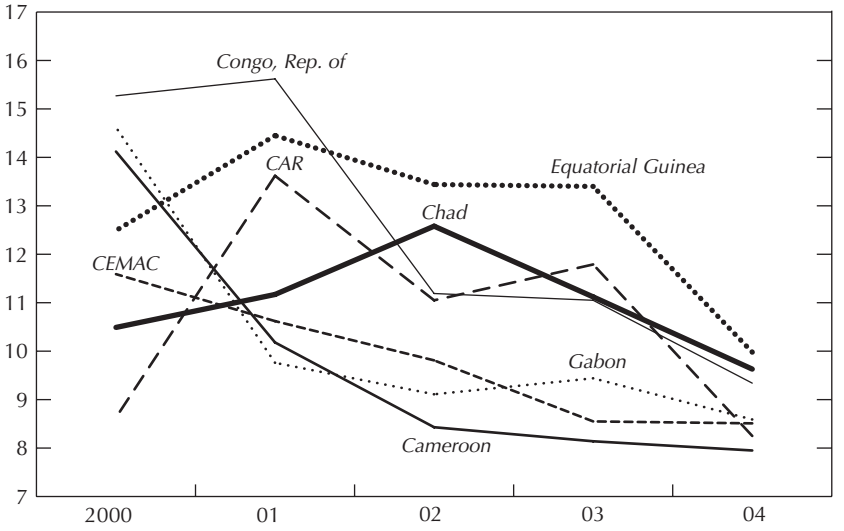
The evolution of average bank spreads in CEMAC countries between 2000 and 2004 points to a significant price convergence.[6] Borrowing from a simplified methodology used by Adam and others (2002) and Sy (2006), we estimate one measure of financial integration: sigma-convergence (Figure 10.4).[7] The large decrease of sigma-convergence from 1999 to 2004 in CEMAC

[5]The decrease in margins could act as an incentive for banks to broaden their clientele. However, this would require that efforts be made to improve the operating environment of banks and debt recovery in the region.

[6]Average spread is calculated ex post as average return on credit minus average cost of credit.

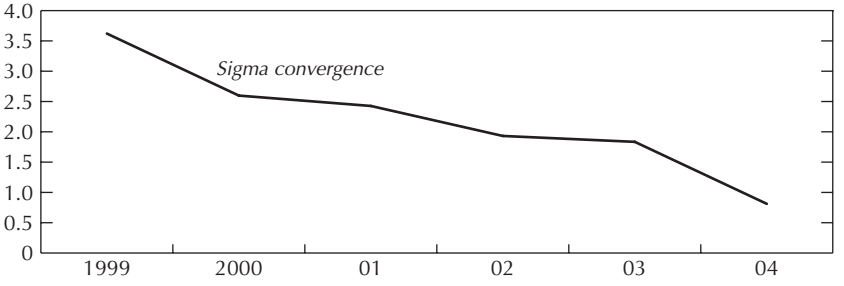
[7]Sigma-convergence captures the standard deviation of interest rates across countries at each point in time. It is often used to measure the degree of integration in monetary unions. Using COBAC's cross-sectional time series of average interest rate spreads, we estimate and plot the evolution of sigma-convergence over time.

Figure 10.3. CEMAC: Evolution of Average Interest Rate Spreads
(In percent)



Source: COBAC.

Figure 10.4. CEMAC: Sigma-Convergence of Spreads



Sources: COBAC; and IMF staff calculations.

points toward a significant degree of price convergence in retail banking interest rates during that period. We also note a significant decrease in the *volatility* of spreads, recorded at end-2004 as being 0.8 standard deviation units, down from almost 4 standard deviation units in 1999. In other words, average bank spreads in CEMAC have now converged toward a common

level (currently about 8.5 percent), with increasingly diminishing variations between countries since 1999.

The convergence in spreads could be due to a number of factors. Notably, the current situation of excess liquidity in the region (Figure 10.5) is likely to contribute to a decrease in margins, and more importantly to a decrease in lending rates, especially in regard to the best corporate risks. Government deposits in banks and the settlement of government arrears have produced a strong increase in bank deposits (up nearly 25 percent in 2005). The accelerated growth in bank deposits, combined with a scarcity of investment opportunities, has led to an escalation of surplus bank liquidity.[8] In times of high liquidity and limited lending opportunities, the dispersion of spreads is likely to go down. This evolution can be explained not by cross-border flows of liquidity but by the mere fact that a situation of excess liquidity has occurred simultaneously in several countries of the region. In essence, although spread convergence is often regarded as real evidence of financial integration, we find that, for CEMAC this phenomenon is not corroborated by further evidence (see below) and is the likely manifestation of masking factors, such as excess liquidity and limited lending opportunities.

Quantity-Based Indicators

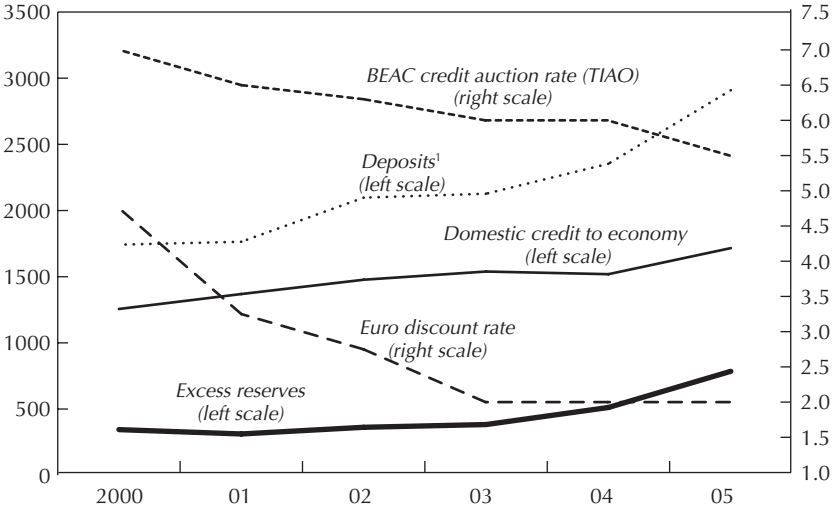
Regarding quantity-based indicators of integration, anecdotal evidence suggests that cross-border flows are still negligible in retail loans and deposits. Based on data collected from COBAC, banks in CEMAC still work primarily with their domestic customers, which explains the lack of cross-border flows.[9]

Using a different quantitative indicator (cross-border entry and ownership), we show well-established links between foreign and CEMAC retail markets. Foreign bank branches often concentrate on corporate finance services, trading activities, and private banking, rather than retail activities. Retail businesses are much more difficult to enter because domestic

[8]Limited investment opportunities in CEMAC can be linked to a number of factors: (1) a restricted economic diversification with a few high-profile customers, with risk concentration rules rapidly binding in this context; (2) interest rate regulations (notably a ceiling on bank lending rates currently set at 15 percent), which are likely to limit the feasibility of bank lending to credit constrained SMEs and households; and (3) the absence of a modern financial market where banks can diversify their assets. The lack of opportunities to shape an adequate risk/return profile also means that banks have to increase the return on their operations, either through interest or fees, with customers who actually present a tolerable level of risk.

[9]Even in the euro area, banks still work exclusively with their national customers on average in the case of 89 percent of their loans and 84 percent of their deposit base (Cabral, Dierick, and Vesala, 2002).

Figure 10.5. CEMAC: Evolution of Deposits, Credit, and Interest Rates
(In billions of CFA francs and percentage, unless otherwise noted)



Source: IMF, *International Financial Statistics*.
[1]Including government deposits.

banks usually enjoy substantial competitive advantages. Thus, the most effective way of gaining entry to the CEMAC retail sector has been to merge with or acquire an existing local bank. A number of such operations have indeed taken place over the past 10 years or so, mostly by French banking groups as the current market structure in CEMAC clearly shows (see Table 10.3). After a series of bank failures in the late 1980s and early 1990s, several banks were restructured and government ownership was reduced, whereas foreign ownership increased. Although this might indicate that integration is present and progressing, a mere change in the ownership structure may not necessarily affect the pricing behavior of financial institutions. The significant amount of foreign ownership reflects, at least, tangible links between local banking and global groups.

Obstacles to Integration

So far, the common currency and a comprehensive regional institutional setup have not led to financial integration in the region. The regional insti-

tutional setup notably includes a common central bank and bank supervisor, a common legal framework, and regional decision-making bodies at the political level. Some important progress has been made to regulate the financial sector at the regional level, but limited progress has been made in facilitating integration of banking markets. Obstacles include: (1) limited effectiveness of the instruments that have been set up (notably the *agrément unique*); (2) lags in infrastructure and markets; and (3) reputation effects and consumer preferences.

The *agrément unique* or single banking license procedure—a major step for integration—is not functioning as expected. In 2001, following the example of the EU and the WAEMU, an *agrément unique* procedure was approved in CEMAC (Box 10.2). In practice, no application for a single banking license has been submitted to COBAC for a number of possible reasons, including the fact that banks interested in the procedure are already present in several countries. The chosen method for developing bank networks in CEMAC has so far been to purchase existing institutions, often during restructuring episodes. In slight contrast with the situation prevailing in the EU, the issue of different national supervisors and supervisory practices does not pose a problem in CEMAC (given the existence of the COBAC), but barriers of a rather political and administrative nature (for example, the role of the ministries of finance of CEMAC countries in preapproving licensing applications) do contribute to the inefficient functioning of the *agrément unique*.

Even with the eventual lifting of regulatory restrictions and barriers of a political nature, it appears difficult to gauge the extent to which banks would be pushed by market forces to develop their networks in the region. Banks may be enticed to develop their networks if there is evidence of overbanking at the country level (with inefficiently overlapping branch networks, which does not appear to be the case in the region), and/or banks are failing to operate at an appropriate level of efficiency for other reasons. Financial depth is very low in the case of CEMAC and thus points toward significant potential growth of the banking sector through monetization, but probably only to the extent that member countries manage to achieve a greater diversification of their economies and a more conducive business environment.

Regional infrastructure and markets are not sufficiently developed to facilitate banking integration (Box 10.3). There is virtually no regional interbank market and debt market. In particular, there is a limited flow of liquidity between countries with excess liquidity and those (Central African Republic and Chad) with a tighter liquidity situation. Efforts to mobilize various sources of funding are restricted by the situation

Box 10.2. *Agrément Unique* in the European Union, WAEMU, and CEMAC

European Union

In 1989, the "Second Banking Directive" instituted the *agrément unique*, as a means to achieve the objectives of the Single Market. The *agrément unique* was broadened in 1993 to cover investment services and came into force the same year. It now covers 25 states, plus Iceland and Norway, and all the related texts were consolidated in 2000 into Directive 2000/12/EC. A credit institution is allowed to open branches in other EU member states, as it is authorized to do so by its home country supervisor. The home country supervisor has the power to scrutinize the adequacy of the institution's administrative structure and financial situation and, if appropriate, to prohibit the bank from opening a branch in another member state. However, the justification for any negative decision must be disclosed, allowing the bank to contest the supervisor's decision in court. In the EU, the expansion of cross-border banking services has occurred equally through branches and subsidiaries (Walkner and Raes, 2005). Despite a lower initial cost in terms of capital of establishing branches, banks seem to hesitate to enter other European markets through greenfield operations and as a result seem to opt for mergers and acquisitions as a preferred expansion strategy.

WAEMU

The Council of Ministers opted for an *agrément unique* procedure in 1998 that took effect on January 1, 1999. For an already established bank, the application for *agrément unique* is presented at the BCEAO national office and a decision is made within three months by the Regional Banking Commission, after consultation with the ministry of finance of the country of origin and of the country of destination. In December 2004 (Avis 01/RB/2004, December 6, 2004), following a meeting of the Council of Ministers in July 2004 to revive the procedure, which had not borne fruit as expected, it was decided to end the minimum capital requirement for branches in other countries of the union.

CEMAC

In 2001, an *agrément unique* was instituted with CEMAC Regulation R-01/100, based on what has been the practice within the EU. The *agrément unique* allows a bank to supply financial services in another country of the region directly or indirectly when it is already established in one country, and provided the bank has been in operation for a minimum of two years and it is rated as "strong" in COBAC's SYSCO system (rating 1 or 2). COBAC has to decide on a request for an *agrément unique* within three months following the transmittal of the application by the national monetary authority (that is, the ministry of finance).

Box 10.3. CEMAC: Financial Infrastructure Elements

A rudimentary payment system in the CEMAC zone remains a serious obstacle to the development and integration of the financial sector. The regional payment system reform project comprises several components, including a Real-Time Gross Settlement System (RTGS); an Electronic Bulk Payment Clearing System (EBPCS) or Regional Inter-Bank Compensation (CIR); an interbank bank card system (Système Monétique Interbancaire or SMI); and a "Centrale des Incidents de Paiement," which is a limited credit information system.

The legal framework for creditor rights in CEMAC member states has been developed at two levels: regionally and domestically. All CEMAC countries are members of the Organisation pour l'Harmonisation en Afrique du Droit des Affaires (OHADA), and many of the legal issues relating to the credit environment are governed by regional uniform legislation. However, although substantial matters are, to a large extent, governed by uniform OHADA legislation, judicial (for example, enforcement, court system, judicial training, and specialization), regulatory (for example, registries, insolvency trustees), and institutional (for example, level of implementation of uniform legislation) issues are dealt with at the national level. Although the legal framework is broadly appropriate, knowledge and understanding of the OHADA Acts appear to be very limited, and dissemination and training have been woefully inadequate. These issues are compounded by dysfunctional judicial systems, which seriously undermine creditor rights and represent an obstacle to the sound development of the financial sector throughout the region.

The statutory framework for private sector accounting and auditing in CEMAC is strongly influenced by regional agreements. Basic legal accounting, reporting, and external audit requirements are established by the OHADA Acts, which require all joint stock companies (*sociétés anonymes*) to appoint a statutory auditor (*commissaire aux comptes*) to audit their annual financial statements and perform other independent functions. The OHADA Accounting System (Système Comptable de l'OHADA or SYSCOHADA) adopted in 2002 is based on the French Plan Comptable with some amendments mirroring certain principles set out in the International Financial Reporting Standards (IFRS).

of excess liquidity or limited to banks within the same group. The fact that foreign banks may have available financing and undertake liquidity management through their parents may partly explain the absence of an active interbank market, at least in foreign currency, and the lack of cross-border transactions. Moreover, the shortcomings in transparency

and disclosure make it difficult for banks in one country to assess the creditworthiness of banks in neighboring countries, and the absence of a reliable payment system or government securities market renders collateralized lending difficult. In addition, excess liquidity and regulation of interest rates (Figure 10.5) limit bank competition to mobilize savings: banks have no incentive to increase the number of depositors when their remunerated resources are costly in the context of regulated interest rates, and when liquidity is high in the economy. Hence, at best, banks guide depositors toward sight deposits, which are more volatile. Furthermore, although the BEAC has designed a framework for government securities issuance at the regional level, no country has yet made use of the framework.

The payment system in CEMAC countries is rudimentary, and capital markets are in their infancy. The current payment system is slow, unreliable, burdensome, and costly for the participants. Thus, it represents a constraint on regional integration, on the implementation of monetary policy, and on the management of commercial bank liquidity. A significant risk of duplication has arisen between the recently established regional stock exchange (BVMAC) and the already existing (yet inactive) stock exchange in Cameroon (DSX), as well as a potential conflicting regulatory and supervisory overlap between the (regional) Commission de Surveillance du Marché Financier de l'Afrique Centrale and the (Cameroonian) Commission des Marchés Financiers. These parallel structures risk hampering further the chances of successfully developing CEMAC's securities markets.

Reputation effects and consumer preferences add to the lack of banking integration. These so-called "natural" barriers emerge in the form of national-based market differences, which relate to language, cultural preferences, considerations of geographical proximity, and information availability. Banks suffer from a lack of information on borrowers or other banks. Local and regional credit registries and rating agencies are absent, exacerbating an already weak credit culture. The limited availability of information on banks prevents interbank market development. For instance, banks have so far failed to agree on the dissemination of SYSCO ratings that would help improve transparency.[10] Apart from a few exceptions (that is, border of Chad and Cameroon) bank flows are negligible and point to low trade integration.

[10]SYSCO ratings are prepared by the regional banking commission COBAC, and are based on the CAMEL bank rating system.

Effects on Competition and Efficiency

This section seeks to assess the degree of bank competition in CEMAC. A widely used technique to empirically measure the degree of bank competition is the Panzar-Rosse (PR) model. This model examines the relationship between a change in factor input prices and the revenue earned by a bank, assuming that banks employ different pricing strategies in response to changes in input costs depending on the banking system's market structure. For instance, in a collusive environment, assuming profit maximization, an increase in input prices will increase marginal cost and reduce equilibrium output and revenues. Under perfect competition, an increase in input prices will increase marginal cost and marginal revenue by the same amount.[11]

Based on the PR model, we examine how banks' revenue correlates with factor prices (Table 10.7). Given the small size of the sample for some CEMAC countries, the analysis is conducted for the region as a whole. Because competition seems to take place primarily on a national level, the following analysis has obvious limitations. However, it can help in understanding the progress made in integration and the extent to which there is competition on a regional level. The following equation is estimated by using individual bank data from 1993 to 2004 on 32 banks, drawing on data provided by the COBAC:

$$\ln INCOME = a + b\ln(PF) + c\ln(PL) + d\ln(PK) + e\ln(SIZE) + f\ln(CAPITAL) + g\ln(LOANASSET), \qquad (10.1)$$

where: *INCOME* represents the ratio of gross revenue to total assets;[12] *PF* the unit price of funds, proxied by the ratio of interest expenses to total deposits; *PL* the unit price of labor or personnel expense to total number of employees (or assets); and *PK* the unit price of capital or other operating costs to fixed assets. The last three variables control for the characteristics of banks: *LNSIZE* (size captured by total assets), *LNCAPITAL* (capital by equity to assets); and *LNLOANASSET* (degree of intermediation by the

[11]This model was used in recent studies on Hong Kong SAR (HKMA, 2004), India (Prasad and Ghosh, 2005), Canada (IMF, 2005), CEMAC (IMF, 2006), and a large set of countries (Claessens and Laeven, 2004).

[12]This includes interest and noninterest revenue. Both measures with or without noninterest revenue are commonly used but given the role of fees and other income in an interest rate regulated environment such as CEMAC, a more comprehensive measure was preferred.

Table 10.7. Statistical Results

Dependent variable: *LNINCOME*
Method: panel least squares
Sample: 1999–2004
Cross-sections included: 30
Total panel (unbalanced) observations: 140

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
C	1.18319	0.636091	1.860095	0.0651
LNPF	0.115866	0.046311	2.501915	0.0136
LNPL	0.121488	0.053786	2.258725	0.0255
LNPK	0.031349	0.041804	0.749895	0.4546
LNSIZE	–0.010121	0.03665	–0.276147	0.7829
LNCAPITAL	0.033769	0.031302	1.078813	0.2826
LNLOANASSET	0.245437	0.072571	3.382027	0.0009
R-squared	0.257038	Mean dependent var.		2.359776
Adjusted R-squared	0.22352	S.D. dependent var.		0.333156
S.E. of regression	0.293571	Akaike info. criterion		0.435313
Sum squared residual	11.46247	Schwarz criterion		0.582395
Log likelihood	–23.47189	*F*-statistic		7.668846
Durbin-Watson statistic	1.164012	Prob(*F*-statistic)		0

Source: IMF staff calculations.

ratio of loans to total assets).[13] The sum of estimated coefficients of factor prices (that is, $b+c+d$) is the H statistic and indicates the degree of competition. A value of H between 0 and 1 indicates monopolistic competition (input prices increase is associated with a less than proportional increase in revenue, as the demand curve for banks is inelastic). An H equal to 1 indicates perfect competition. An H lower than 0 indicates a monopoly or a perfectly collusive oligopoly.

The estimated H statistic places CEMAC, as a region, among the least competitive environments (Table 10.8). The results: (1) confirm monopolistic competition—as is the case for most banking systems—and show an H value of 0.3; (2) do not show an increase in competition in later years with tests performed for shorter periods; and (3) suggest a lower degree of competition than for most African countries although comparisons are difficult. These results should not come as a surprise, given that the tests were performed at the regional level and there is limited regional integration. Tests performed on individual countries—which are made difficult by the small size of the samples—would probably show a higher degree of

[13]Estimates performed with fixed and random effects (not reported) provide similar results. Fixed effects are the most appropriate to capture idiosyncrasies in individual data, with data on institutions operating in the same field of business and in the same country.

Table 10.8. *H* Statistic Country Comparisons

	Sample Period	*H* Statistic	Number of Banks	Number of Observations
Ghana	1998–2003	0.56	13	65
Kenya	1994–2001	0.58	34	106
Nigeria	1994–2001	0.67	42	186
South Africa	1994–2001	0.85	45	186
Uganda	1999:Q1–2002:Q3	0.30	15	196
Uganda	2002:Q4–2004:Q2	0.49	15	97
CEMAC	1993–2004	0.27	32	140

Sources: IMF staff calculations, Claessens and Laeven (2004), Buchs and Mathiesen (2005), and Hauner and Peiris (2005).

competition, for example, in Cameroon in the later years. Moreover, to be fair the results should be compared with similar results—which are unfortunately lacking—for monetary unions with a common banking supervision and regulatory framework (not the case of the EU, for instance). Finally, the results are subject to a number of statistical caveats: (1) the *R*-squared is rather low; and (2) some variables are not significant (the unit price of capital, control variables, size, and capital).

Issues Going Forward

More than half a century into the creation of a single currency, the picture that emerges is one of fragmented retail banking markets. This is consistent with market segmentation not only in the financial sector but also in the movement of goods and labor (World Bank, 2003). Although most of the regional institutional frameworks are in place, regional markets have still to emerge, and implementation of existing regulations is weak. Moreover, greater banking integration always has to be balanced with the need to maintain banking soundness.

Nevertheless, some measures could and should be taken to address the various obstacles to regional integration:

- Legal and regulatory framework: (1) remove the various administrative and political obstacles to the implementation of the *agrément unique* (which would mean a change in the current general procedure for the *agrément*) and in particular diminish the role of the ministries of finance and allow banks already established to open branches following an easier procedure; (2) liberalize lending and deposit rates so that they are no longer a constraint on the incentives for financial

intermediation; (3) have uniform reserve requirements across the region; and (4) work on greater harmonization of tax regimes (notably on provisions) for banks.

- Infrastructure, markets, reputation, and consumer preferences: (1) develop and implement a coherent strategy to develop regional interbank and debt markets consistent with efforts aimed at improving systemic liquidity management;[14] (2) strengthen transparency by ensuring greater dissemination of bank data (SYSCO ratings); and (3) establish an efficient procedure for the sharing of credit bureau information.

Looking forward, more research could be undertaken on the roots of the identified shortcomings in integration and competition in CEMAC. On bank competition, a lack of data and small samples has prevented us from doing a thorough analysis at the national level, which, given the lack of integration within CEMAC, is likely to be the most relevant level of analysis. Although data limitations are likely to persist, more needs to be done to fine-tune the assessment of the degree of bank competition in individual countries, and to quantify the main factors behind noncompetitive features at the national or regional level, such as interest rate regulations. Nominal convergence dynamics also need to be better understood, in particular the effects of high liquidity on interest rate spreads and on the dispersion of lending rates. Finally, we need to grasp better the effects of both limited economic integration and diversification on the development and integration of banking systems, with a view to adjusting the appropriate sequencing in the design of policy measures.

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11

Growth and Convergence in the CFA Franc Zone

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Strongly linked to external price and exchange rate developments, growth performance during the post-devaluation period has varied within the CFA franc zone. Relative to sub-Saharan Africa averages, real per capita growth has been overall relatively strong, although uneven within WAEMU and CEMAC. Since 1994, real GDP growth in the CEMAC region averaged about 5 percent—with a pronounced drop in 1999 owing to unfavorable oil prices. In the WAEMU region, growth has been lower (averaging about 4 percent) and more volatile, with dips in 2000, 2002, and 2004.

Given this varied growth experience, this chapter investigates growth and convergence in the CFA franc zone vis-à-vis sub-Saharan Africa. This is of particular interest for two reasons. First, convergence of growth rates would be expected to occur in WAEMU and CEMAC, given efforts at policy convergence and regional integration. The economic and monetary unions—through common stable monetary and exchange rate policies, increased trade, fostering credibility and discipline over macroeconomic policies, and larger regional financially integrated markets for investment—would be expected to help the poorer countries catch up, and contribute to greater convergence in growth rates. To the extent that many of these factors operate throughout the entire CFA franc zone, convergence within this wider group of fourteen countries would be expected. Greater convergence in WAEMU relative to CEMAC might also be hypothesized, given

WAEMU's full economic and customs union, Growth and Stability Pact, and stronger regional institutions. On the other hand, however, the more similar economic structures in CEMAC—five of the six countries are oil producers—is another factor supporting convergence in this subregion.

Second, greater convergence of growth rates and economic cycles in WAEMU and CEMAC would facilitate and maximize the benefits of implementing a common exchange rate and monetary policy in each of the two subzones. A common monetary policy stance is likely to be more easily formulated and benefit union members more equally when they have similar economic cycles and growth trends.[1] Similarly, the benefits of the CFA-wide common exchange rate policy would be more likely if the business cycles and growth rates in countries of the zone were aligned.

This chapter investigates the growth and convergence experience in the CFA franc zone. Our analysis uses: (1) a quantitative measure of dispersion, (2) concepts from neoclassical and endogenous growth theories, and (3) comparisons of WAEMU and CEMAC with other subgroups within sub-Saharan Africa based on recent growth robustness exercises. The rest of the chapter is organized as follows. It first presents background on broad economic developments in the region and then discusses the methodology used in our analysis including the two measures of convergence and the robust growth regressions. Next, it presents the empirical results from the disparity index analysis, growth convergence regressions, and a comparison of WAEMU and CEMAC with other groups within sub-Saharan Africa.

Background

Economic Developments

Until the mid-1980s, growth in the CFA franc zone countries generally outpaced the sub-Saharan Africa average.[2] The period beginning in the 1990s brought many changes. Three subperiods can be identified and char-

[1]To fully address this issue it would be desirable to analyze synchronization of business cycles in WAEMU and CEMAC. A first-stage, simple approach is included in this chapter, but this is an area for further research.

[2]The treaty creating the WAEMU was signed in 1994. Previously, the seven members had been linked since 1960 through the West African Monetary Union (WAMU). Mali joined WAMU in 1984 and Guinea-Bissau joined WAEMU in 1997. The CEMAC treaty, adopted in 1994, went into effect in 1998, replacing the former customs union. The Union Douanière des Etats de l'Afrique Centrale (UDEAC) had preferential tariffs for intrazone trade, but was rather restricted in scope. Equatorial Guinea joined CEMAC in 1985.

acterized by different macroeconomic environments (van den Boogaerde and Tsangarides, 2005). In the first subperiod (1990–93), the WAEMU and CEMAC economies were facing adverse terms of trade movements, a significantly overvalued exchange rate, fiscal imbalances, insufficient efforts at internal adjustment, and a rapid accumulation of external debt. In the second subperiod (1994–98), the devaluation of the common currency was accompanied by ambitious stabilization and structural adjustment programs. As a result, the newly competitive economies experienced strong economic expansion, a more balanced macroeconomic performance, and some progress in transforming the structure of their economies.

For WAEMU, in the third subperiod (1999–2006), the strong economic momentum brought about by the CFA franc devaluation gradually dissipated, with weaker output growth and improvements in fiscal and external deficits reversed in several countries. The unfavorable economic environment and the crisis in Côte d'Ivoire resulted in a softening in certain member governments' political commitment to integration. Political problems in Guinea-Bissau and Togo and drought in Niger also contributed to lower growth in these countries. Clearly, political instability and exogenous shocks in some countries (particularly in the third subperiod) have strongly influenced economic growth and convergence in the region. After the 1994 devaluation, CEMAC overall experienced a resumption of growth facilitated by the improved competitiveness. However, the performance was highly differentiated, with very rapid oil-induced growth in Equatorial Guinea, and bouts of negative growth in the Central African Republic and in the Republic of Congo owing to political instability. Reflecting the fact that the CEMAC economies have been dominated by developments in the oil market, variations in world oil prices and country-specific positions in the life cycle of oil production have been the main drivers of growth.[3]

Regional Integration Frameworks

A number of initiatives were introduced to promote fiscal integration in both WAEMU and CEMAC. On the WAEMU side, a regional Convergence, Stability, Growth, and Solidarity Pact was adopted in December 1999 to strengthen convergence, notably through the use of

[3]Of the six member countries, only the Central African Republic does not produce oil. Petroleum constitutes the bulk of the export receipts and more than half of the budgetary revenue in the five oil exporters in CEMAC.

a peer review process. The pact defines a set of convergence criteria[4] that were to be met originally by a deadline of end-2002, which was subsequently moved forward to end-2005, and again to end-2010. Second, WAEMU member countries introduced a full-fledged customs union that liberalized intraregional trade, and a common external tariff (CET), which reduced the WAEMU unweighted average tariff from 19 percent in 1997 to about 12 percent in 2004. The value-added tax (VAT), excise taxes, the taxation of petroleum products, and withholding taxes aimed at strengthening the taxation of the informal sector were harmonized. Five directives were adopted to harmonize fiscal policy, and harmonized legislation pertaining to commercial activity, accounting, and disclosure was adopted.

In CEMAC, efforts at strengthening fiscal convergence are more recent and rest on a more limited institutional framework. The CEMAC treaty, adopted in 1994, went into effect in 1998, replacing the former customs union. A CET with four rates (5, 10, 20, and 30 percent) was adopted, together with the immediate removal of all intrazone tariff and nontariff trade barriers for locally produced primary products and over a three-year period for eligible industrial products. However, implementation of the relevant policies has remained slow. Supportive changes in domestic tax regimes were also envisaged, notably through application of a single VAT/sales tax rate, harmonization of other indirect and direct taxes, and progressive reduction in exemptions. In 2001, CEMAC replaced its traditional annual regional surveillance exercise by a more stringent framework that included the monitoring, country by country, of four primary convergence criteria.[5] Further nonbinding indicators are monitored as well, aimed at raising government revenues by a fraction of GDP, stimulating investment, and limiting the government's wage bill.

[4]The pact calls for the observance of four primary criteria: a basic fiscal balance in surplus or zero, a ratio of public debt to GDP of close to 60 percent, the nonaccumulation of payment arrears, and an inflation rate of 3 percent or lower. The secondary criteria are a wage bill not to exceed 35 percent of tax revenue, a level of domestically financed investment that is at least 20 percent of tax revenue, an external current account deficit not to exceed 5 percent of GDP, and a minimum ratio of tax revenue to GDP of 17 percent.

[5]A nonnegative basic fiscal balance (the basic fiscal balance excludes grants and externally financed investment expenditures); consumer price inflation of no more than 3 percent; a level of external and domestic public debt of no more than 70 percent of GDP; and the nonaccumulation of external or domestic payments arrears.

Methodology and Data

Our investigation of growth and convergence in the CFA franc region includes two measures of convergence and comparisons of WAEMU, CEMAC, and other subgroups within sub-Saharan Africa based on recent growth robustness exercises. This section describes the methodology used in each part of our analysis.

Measures of Convergence

The degree to which incomes have converged across countries over time has been the subject of extensive research in the growth literature. The dominant approach in the early literature involves estimating income growth rates as a function of initial income to examine whether poor countries grow faster than rich countries; the seminal papers are those of Barro and Sala-i-Martin (1992) and Mankiw, Romer, and Weil (1992). However, as argued by several authors such as Quah (1993) and Friedman (1992), this approach does not address the question of whether income dispersion across countries has fallen, and hence, whether the distribution of income across economies is becoming more equitable.

Sala-i-Martin (1996) distinguishes between two different types of convergence: β-convergence and σ-convergence. Evidence of β-convergence is found when the correlation between growth in income and initial income level is negative, capturing situations in which "poor economies tend to grow faster than rich ones." Alternatively, when the dispersion of real per capita income across a group of countries tends to decrease over time (for example, if the cross-sectional standard deviation of real GDP per capita for a group of countries is falling over time), there is evidence of σ-convergence.[6] While β-convergence is a necessary but not sufficient condition for the existence of σ-convergence, the opposite does not necessarily hold. This implies that we could find β-convergence without finding σ-convergence: it is possible to observe poor countries growing faster than rich countries and yet for incomes to diverge.

[6]Although Friedman (1992) has argued that the real test of convergence should focus on the consistent diminution of variance among countries (σ-convergence), Sala-i-Martin (1996) argues that both concepts of convergence are interesting and should be analyzed empirically.

A Measure of Dispersion (σ-Convergence)

To construct a measure of σ-convergence, we follow the approach of van den Boogaerde and Tsangarides (2005) and estimate a measure of dispersion called "average disparity." It is calculated as the weighted standard deviation of a variable observed for each country vis-à-vis the WAEMU (CEMAC) average for that year, namely,

$$AverageDisparity = \left\{\sum_{i=1}^{7} P_{it}(X_{it} - \bar{X}_t)^2\right\}^{1/2} \text{ where } P_{it} = \frac{GDP_{it}}{\sum_{i=1}^{7} GDP_{it}}.$$

P_{it} is the weight of WAEMU (CEMAC) member country i in year t for the observed variable X; X_{it} is the observed value of a variable X for country i in year t; and $\bar{X}$ is the weighted average of the observation of variable X in year t, calculated for each country as

$$\bar{X}_t = \sum_{i=1}^{7} P_{it} X_{it}.$$

An estimated low (high) disparity through time indicates a tendency for convergence (divergence).

We begin by examining whether the economic union has led to stronger economic convergence between WAEMU and CEMAC member countries; in particular, real GDP growth and fiscal convergence are examined. In addition, the symmetry and the degree of synchronization of business cycles between countries in the region is measured by examining the detrended component of real GDP growth and correlations of terms of trade among countries in the region.[7] The period of analysis is 1990–2006. Given the particular interest in analyzing the convergence experience immediately before and after the devaluation, this period is divided into three subperiods characterized by different macroeconomic environments: 1990–93, 1994–98, and 1999–2006. Annual data from the IMF's World Economic Outlook database are used.

Solow β-Convergence

The convergence property is an important feature of the neoclassical model: output levels of countries with similar technologies converge

[7]To estimate the synchronization of output shocks between the WAEMU countries, the Hodrick-Prescott filter is used to detrend the annual real GDP growth rates of all WAEMU countries. Next, cross-correlations of the cyclical components of the individual GDP series are estimated, as well as the disparity index.

to a given level in the steady state. Three competing hypotheses have been at the center of much of the controversy surrounding convergence.[8] First, the absolute convergence hypothesis implies that per capita incomes of countries will converge to one another in the long run, independent of the countries' initial conditions. Second, the conditional convergence hypothesis suggests that because economies differ in various respects, such as propensities to save, growth rates of the population, and access to technology, per capita incomes of countries with identical structural characteristics converge to the same levels in the long run, independent of their initial conditions. Finally, the club convergence hypothesis implies that per capita incomes of countries that are identical in their structural characteristics converge to one another in the long run provided they have the same initial conditions. In the end, all other things being equal, the Solow framework predicts that the lagging poor countries will tend to catch up with the rich.[9] The majority of the literature seems to have reached a consensus: Poor countries do catch up with the rich.[10]

Following Mankiw, Romer, and Weil (1992) and consistent with the empirical literature on cross-country comparisons of economic growth, we begin by assuming a Solow model with a Cobb-Douglas production function and labor-augmenting technological progress.[11] Technology and population growth rates, as well as the saving rate, are constant and exogenous. An approximation of the behavior of a country's growth rate around the steady state is

[8]The work of Baumol (1986) and De Long (1988) initiated the empirical work on convergence.

[9]Barro (1991); Mankiw, Romer, and Weil (1992); and Barro and Sala-i-Martin (1995) support the conditional convergence hypothesis; Quah (1993) supports the club convergence hypothesis; Baumol (1986) does not provide support for the absolute convergence hypothesis, but rather for the conditional and club convergence hypotheses, as shown by De Long (1988).

[10]Barro (1991); Mankiw, Romer, and Weil (1992); Barro and Sala-i-Martin (1992); and Sala-i-Martin (1994) are papers that estimate the rate of convergence at 2 percent. Using panel data methods, Islam (1995); Caselli, Esquivel, and Lefort (1996); Lee, Pesaran, and Smith (1997); and Tsangarides (2001) find some rates of convergence that exceed 10 percent; however, Bond, Hoeffler, and Temple (2001) and Hoeffler (2002) estimate rates of convergence in the 2 to 3 percent range. Rates of convergence of 2, 3, or 10 percent imply that a country spends 35, 23, or 7 years, respectively, to cover half of the distance between its initial position and its steady state.

[11]The derivation and the discussion in this section follows Tsangarides (2001).

$$\ln y - \ln y_0 = (1 - e^{\lambda t}) \left\{ \begin{array}{l} -\left(\frac{\alpha+\beta}{1-\alpha-\beta}\right) \ln(n+g+\delta) + \left(\frac{\alpha}{1-\alpha-\beta}\right) \ln(s) \\ \\ +\left(\frac{\beta}{1-\alpha-\beta}\right) \ln(h) + \ln A_0 + gt - \ln y_0 \end{array} \right\}. \quad (11.1)$$

The textbook and augmented Solow models are nested in equation (11.1). The elasticities for the textbook and augmented Solow models may be obtained from equation (11.2). An empirical counterpart of equation (11.1) for the *i*th country in the *t*th period is the dynamic equation with the lagged dependent variable as a regressor, written as

$$\begin{aligned} \ln y_{i,t} = {} & \eta_0 \ln y_{i,t-\tau} + \eta_1 \ln(n_{i,t} + g + \delta) + \eta_2 \ln s_{i,t} + \eta_3 \ln h_{i,t} \\ & + \zeta_j Z_{i,t-\tau} + u_i + \nu_t + \varepsilon_{i,t}, \end{aligned} \quad (11.2)$$

where $y_{i,t}$ is per capita GDP in country *i*, period *t*; $n_{i,t}$ is the population growth rate; g is the rate of labor augmenting technological change; δ is the rate of depreciation; $s_{i,t}$ and $h_{i,t}$ are measures of physical and human capital accumulation, respectively; $Z_{i,t}$ are other determinants of economic growth; u_i is a country-specific effect; ν_t is a time constant; and $\varepsilon_{i,t}$ is an overall error term. To facilitate the discussion, let $\gamma_0 = \beta_0 + 1$ and rewrite equation (11.2) as

$$\ln y_{i,t} = \gamma_0 \ln y_{i,t-\tau} + \gamma_1 Z_{i,t-\tau} + u_i + \nu_t + \varepsilon_{i,t}. \quad (11.3)$$

Finally, the speed of convergence is obtained by $\lambda = \frac{\ln(1 + \gamma_0)}{t}$ and can be recovered from the estimated coefficients.

Empirical work on growth can potentially suffer from two sources of inconsistency: omitted variable bias and endogeneity bias. Omitted variable bias can arise when country-specific effects proxying differences in tastes or technology are wrongly assumed to be uncorrelated with the other regressors. (This assumption is violated in panel growth analyses because of the dynamic structure of the model.) Endogeneity bias arises given a strong theoretical basis for a number of the explanatory variables to be endogenous. Failing to control for this will lead to inconsistent estimation.

To simultaneously address both omitted variable bias and endogeneity issues, we use a generalized method of moments (GMM) estimator first proposed by Hansen (1982).[12] The systems GMM estimator is constructed

[12]Bond, Hoeffler, and Temple (2001) and Hoeffler (2002) present applications of the systems GMM estimator in the context of growth. Bond, Hoeffler, and Temple present a detailed explanation on the construction of both the system and differenced GMM estimators.

in two steps: first, consider first differences of the levels equation (11.3), which eliminates the individual effect u_i:

$$\ln y_{i,t} - \ln y_{i,t-\tau} = \gamma_0(\ln y_{i,t-\tau} - \ln y_{i,t-2\tau}) + \gamma_1(Z_{i,t-\tau} - Z_{i,t-2\tau}) + (\nu_t - \nu_{t-\tau}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\tau}). \quad (11.4)$$

Then, for each equation, potentially endogenous right-hand-side variables are instrumented using appropriate lagged values and differences. The levels equation (11.3) and the difference equation (11.4) are estimated as a system, forcing the estimated coefficients to be the same across equations. The first step deals with the omitted variable bias, eliminating the need to make any probabilistic assumptions on the country effect. The second step eliminates the inconsistency arising from potential endogeneity of the regressors. The GMM estimator addresses both estimation problems under the assumption that the lagged values of the regressors are valid instruments.[13]

Robust Growth Regressions

The study of socioeconomic phenomena is typically plagued by inconsistent empirical estimates (omitted variable and endogeneity bias) and model uncertainty. Model uncertainty arises because the combination of a complex web of relationships and the lack of clear theoretical guidance on the choice of regressors results in a wide set of specifications and, often, contradictory conclusions.

To assess the robustness of the various potential growth determinants, recent papers use formal Bayesian robustness analyses, which account for model uncertainty by considering all possible models given the specific set of regressors. Standard Bayesian Model Averaging techniques have been used to investigate growth determinants by Brock and Durlauf (2000); Fernández, Ley, and Steel (2001); and Sala-i-Martin, Doppelhofer, and Miller (2004) in their Bayesian Averaging of Classical Estimates (BACE) approach. Tsangarides (2005) extends the BACE methodology to address potential endogeneity of the explanatory variables. In this fashion, the methodology simultaneously addresses (1) the biases that may arise owing to endogeneity and omitted variables by incorporating a panel-data-systems GMM estimator, using first differencing, and appropriate lags as

[13]Blundell and Bond (1998) provide evidence that the systems GMM estimator that exploits additional moment restrictions has better finite sample properties than the difference GMM estimator.

instruments; and (2) uncertainty about which regressors belong in the model, by considering *all* possible combinations of models when making inferences about the degree of importance (or robustness) of each determinant.[14]

The database constructed for the β-convergence and robustness analysis section of the paper consists of annual data from the Summers and Heston data set (made available by the Penn World Tables, version 6.1) and data from other sources. For the panel estimation the sample is divided into shorter time spans. Following earlier studies in the literature, five-year time intervals are created to obtain a total of eight panels: 1965, 1970, 1975, 1980, 1985, 1990, 1995, and 2000. The variables used for the convergence regressions and the comparison of WAEMU with other sub-Saharan Africa groups are drawn from recent robustness analyses of growth determinants.[15]

Empirical Findings

Disparity Index: Growth and Fiscal Developments

As emphasized throughout this volume, the CFA franc zone is made up of two very different subzones. Given the different institutional frameworks, policies, economic structures, and economic developments in the two subzones, we are mainly interested in investigating—using the alternative convergence measures—convergence within the two subzones.

For WAEMU, given the Growth and Stability Pact's convergence criteria, we would expect to see a reduction over time in a simple measure of dispersion across member countries for key macroeconomic policy variables.[16] This would contribute, together with other features of the economic and monetary union, to reducing the dispersion of growth rates across the countries. Similarly, because CEMAC in 2001 replaced its traditional annual regional surveillance exercise by a more stringent framework that includes the monitoring, country by country, of four primary convergence criteria and further nonbinding indicators, we would expect to see stronger economic convergence between CEMAC member countries, as indicated by the same measure of dispersion.

[14]In the case of K possible regressors/growth determinants, 2^K possible models are estimated. See Tsangarides (2005) for more details on this methodology.

[15]See Tsangarides (2005) for details on the variables and their sources.

[16]In the absence of a "composite" indicator of convergence that would combine several macroeconomic variables and characteristics of member countries, the analysis focuses on a few key aspects of convergence, namely, real GDP growth, business cycles, and fiscal variables.

In summary, for WAEMU the results show that (1) contrary to expectations, while the disparity of real GDP growth narrowed in the immediate post-devaluation period (1994–98), consistent with a widespread growth recovery, this was reversed in the 1999–2006 period when the disparity indicator widened; (2) as indicated by the declining disparity indicator, there is some evidence of post-devaluation synchronization of business cycles fluctuations within the countries of the region; and (3) examining several variables related to the WAEMU convergence criteria suggests that although the homogeneity of countries' tax revenues and some expenditures has improved over time, overall fiscal convergence has been limited (Table 11.1).

For CEMAC, progress at convergence has remained deceptive. With the economic structures dominated by the oil market, variations in world oil prices and country-specific positions in the life cycle of oil production have been the main drivers of growth. Economic links among member countries have remained feeble, with few spillover effects from the CEMAC region as a whole. As a result, disparity indicators of real GDP growth, business cycle fluctuations, and prices have tended to widen over time. Finally, despite the institutional effort, fiscal convergence has been limited (Table 11.2).

Growth and Price Developments

For WAEMU, trends in real GDP growth (Figure 11.1) indicate that although adverse terms of trade developments combined with the significantly overvalued real exchange rate affected all member countries in 1990–93, their growth performances were highly uneven. After the 1994 devaluation, all WAEMU economies experienced a resumption of growth with the devaluation in itself having a substantial symmetrical impact on the CFA franc zone. Recovery was also facilitated by restrictive demand policies and a range of structural and institutional reforms and helped by an improvement in the terms of trade. The disparity index declined from 5 to 2.7 in the period 1994–98 (reaching a minimum of 1.3 in 1997), suggesting convergence of growth rates. However, this trend was reversed in the period 1999–2006, with the disparity indicator widening to an average of 2.7, as a result of the adverse spillover effects of Côte d'Ivoire's sociopolitical crisis (which varied across the region), adverse terms of trade shocks, and country-specific circumstances.[17]

[17]This result is consistent with Wane (2004) who found an absence of δ-convergence, suggesting that the wealth gap or inequality of per capita income between member countries has not narrowed over time.

Table 11.1. Overall WAEMU Disparity Index

	Period Averages				
	1990–2006	1994–2006	1990–93	1994–98	1999–2006
Variables					
Real GDP growth (in percent)	1.5	1.0	3.0	1.6	2.2
Consumer price inflation (percent change)*	0.8	0.7	1.3	1.2	0.6
Share of gross domestic savings in GDP	5.4	6.3	2.8	5.9	6.7
Share of gross investment in GDP	4.5	4.3	5.6	4.7	4.7
Overall fiscal deficit (commitment basis, in percent of GDP)	2.1	2.6	3.5	2.3	2.9
Primary fiscal balance (in percent of GDP)	3.4	3.6	3.2	3.7	3.6
Tax revenue (in percent of GDP)*	2.5	2.3	3.4	2.8	2.1
Total expenditure (in percent of GDP)*	1.8	1.3	5.4	2.3	1.7
Current expenditure (in percent of GDP)*	1.7	1.3	3.1	1.5	1.3
Investment expenditure (in percent of GDP)	2.3	2.6	1.7	2.0	3.2
Civil service wage expenditures (as a share of current expenditure)*	5.4	4.7	8.1	5.8	4.7
Civil service wage expenditures (in percent of GDP)*	1.2	0.9	2.4	1.0	0.9

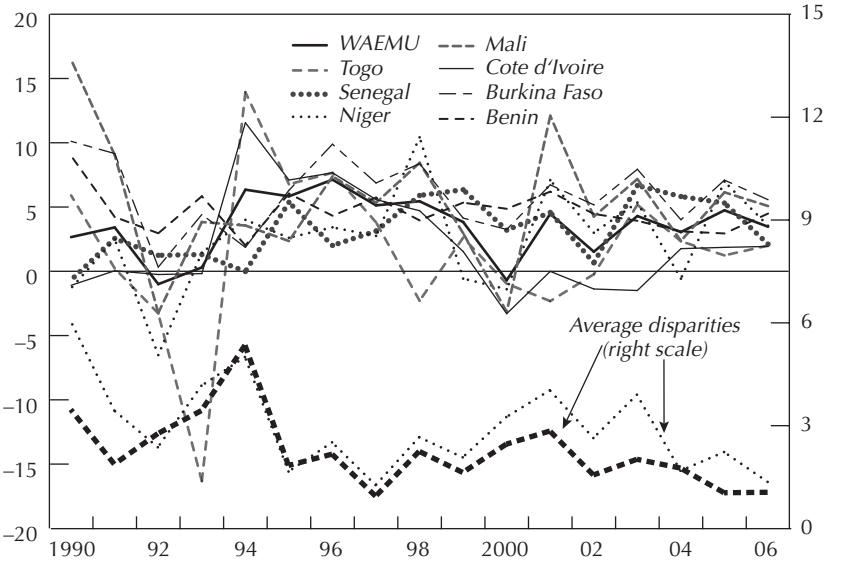
Source: Authors' calculations.
Note: * indicates a reduction in the disparity index across periods.

Table 11.2. Overall CEMAC Disparity Index

	Period Averages				
	1990–2006	1994–2006	1990–93	1994–98	1999–2006
Variables					
Real GDP growth (in percent)	6.4	7.8	3.4	5.3	6.4
Consumer price inflation (percent change)	1.0	1.2	0.8	1.5	1.6
Share of gross domestic savings in GDP	16.7	19.0	13.1	14.8	23.0
Share of gross investment in GDP	11.5	13.2	4.9	11.0	10.5
Overall fiscal deficit (commitment basis, in percent of GDP)	3.6	4.2	3.6	3.6	5.5
Primary fiscal balance (in percent of GDP)	5.1	5.7	3.7	4.7	6.8
Tax revenue (in percent of GDP)	7.9	8.6	5.8	9.0	8.6
Total expenditure (in percent of GDP)	6.4	6.2	6.0	8.7	4.7
Current expenditure (in percent of GDP)*	3.4	3.2	4.6	4.5	2.8
Investment expenditure (in percent of GDP)	3.0	2.5	2.9	3.2	2.8
Civil service wage expenditures (as a share of current expenditure)	7.4	8.0	4.5	5.2	8.7
Civil service wage expenditures (in percent of GDP)*	1.5	1.3	2.5	1.9	1.3

Source: Authors' calculations.
Note: * indicates a reduction in the disparity index across periods.

Figure 11.1. WAEMU: Real GDP Growth
(In percent)



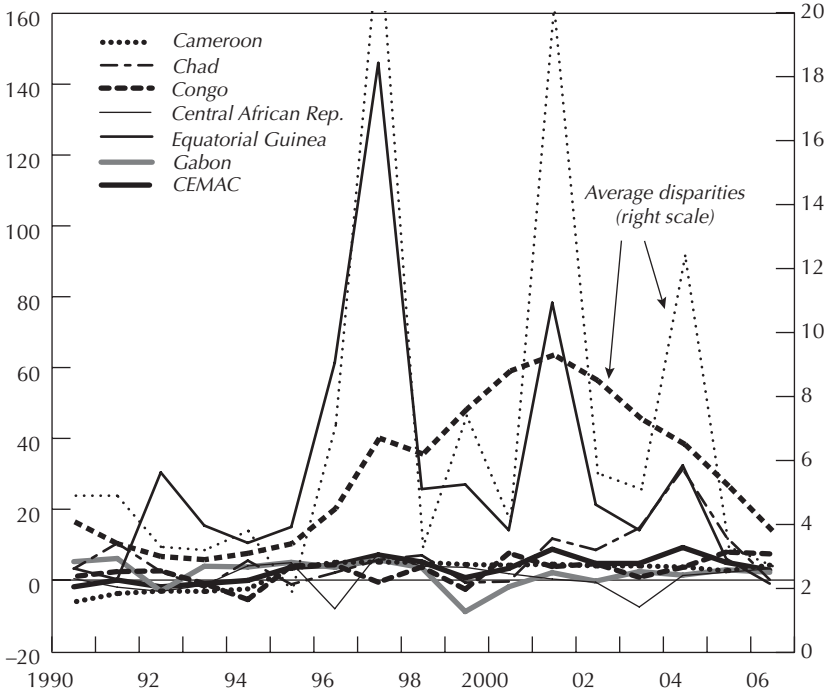
Sources: IMF, World Economic Outlook database; and authors' calculations.

The argument that common monetary policy formulation is better facilitated by convergence of union members more closely relates to the concept of convergence of economic cycles. The disparity index of the detrended growth rates can provide some indications of the synchronization of business cycles in the region.[18] Since the 1994 devaluation, the average disparity index of the business cycles' fluctuations (the bolder disparity line in Figure 11.1) has decreased, suggesting a trend toward more business cycle synchronization in the WAEMU vis-à-vis the pre-devaluation period.

Reflecting differences among member countries in the degree of reliance on oil and in their positions in the life cycle of oil production, the disparity indicator for CEMAC countries has remained at a persistently high level and tended to widen over time (Figure 11.2). Although the adverse terms of trade combined with a significantly overvalued exchange rate affected all member countries in 1990–93, their growth performances were highly uneven. Whereas CEMAC's real GDP growth was on average negative

[18]This is a clearly approximate and simple indicator of business cycle synchronization. Cashin (2004) is an example of more rigorous methods.

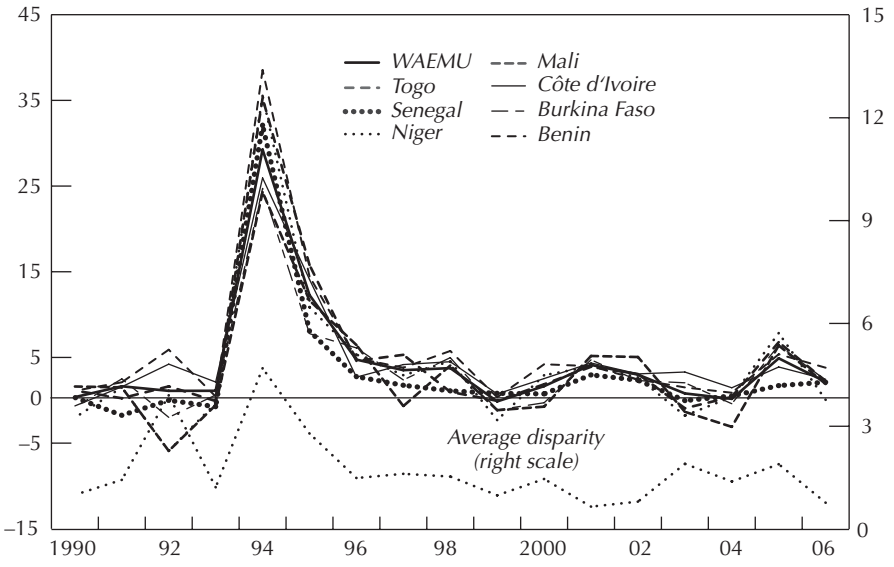
Figure 11.2. CEMAC: Real GDP Growth
(In percent)



Sources: IMF, World Economic Outlook database; and authors' calculations.

during these four years, certain member countries enjoyed relatively rapid growth rates induced by the coming on stream of oil production. Following the 1994 devaluation, countries' performance was highly differentiated, with oil-induced growth very rapid in Equatorial Guinea, and bouts of negative growth in the Central African Republic and in the Republic of Congo due to political instability. As a result, the disparity index widened from 3.4 in 1990–93 to 5.3 on average in 1994–98 (though reaching a minimum of 1.9 just after the devaluation in 1995). Since 1999, while growth continued to improve on average, heterogeneity in growth patterns became even more pronounced. Equatorial Guinea, and to a lesser extent Chad, experienced relatively robust growth rates owing to the coming on stream of oil production, whereas growth in some others (notably Gabon) was affected by declining oil output or by political crises. Thus, the disparity indicator widened to an average of 6.4 in 1999–2006. The disparity index of the detrended growth

Figure 11.3. WAEMU: Consumer Price Inflation
(Percent change)

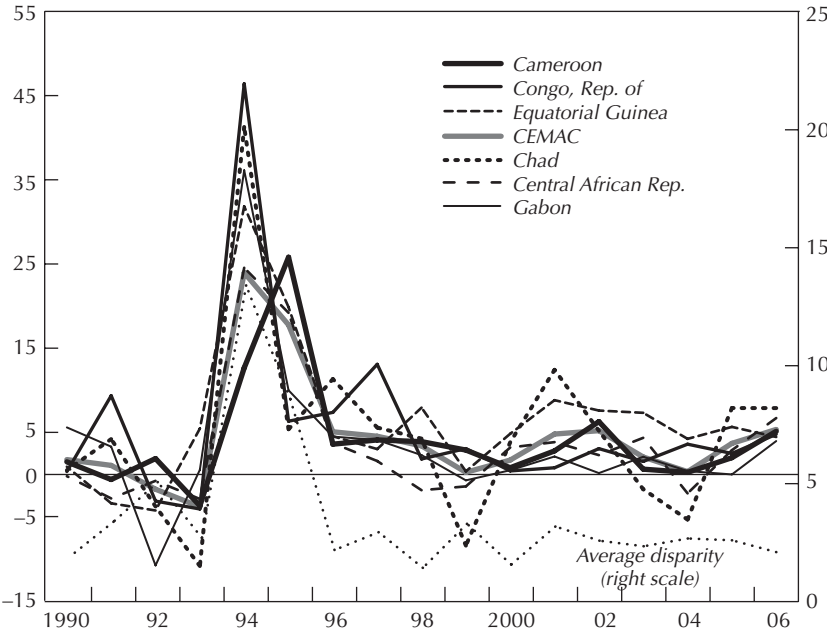


Sources: IMF, World Economic Outlook database; and authors' calculations.

rates (the bolder disparity dotted line in Figure 11.2) displays a continuously rising pattern, notably in the 1999–2006 period, suggesting a trend away from business cycle synchronization in CEMAC.

While the fixed currency peg has contributed to price stability within the franc CFA zone, price developments at the country level within WAEMU and CEMAC were less homogeneous than might have been expected (Figures 11.3 and 11.4, respectively). With stagnant or declining domestic demand and an appreciating currency, inflation was on average about zero for WAEMU and negative for CEMAC during 1990–93 in a relatively uniform way among member countries, resulting in a low level of the disparity indicator. Inflation shot up in 1994–95 as the devaluation worked its way into domestic prices. From 1996 onward, as post-devaluation adjustment programs and a prudent monetary policy took hold, price stability was restored. However, although the disparity index shows an overall decline in the period 1995–2006 in the WAEMU area, it was approximately twice as high than before the devaluation in the CEMAC area owing to the impact of oil price movements and procyclical fiscal policies followed by certain countries.

Figure 11.4. CEMAC: Consumer Price Inflation
(Percent change)



Sources: IMF, World Economic Outlook database; and authors' calculations.

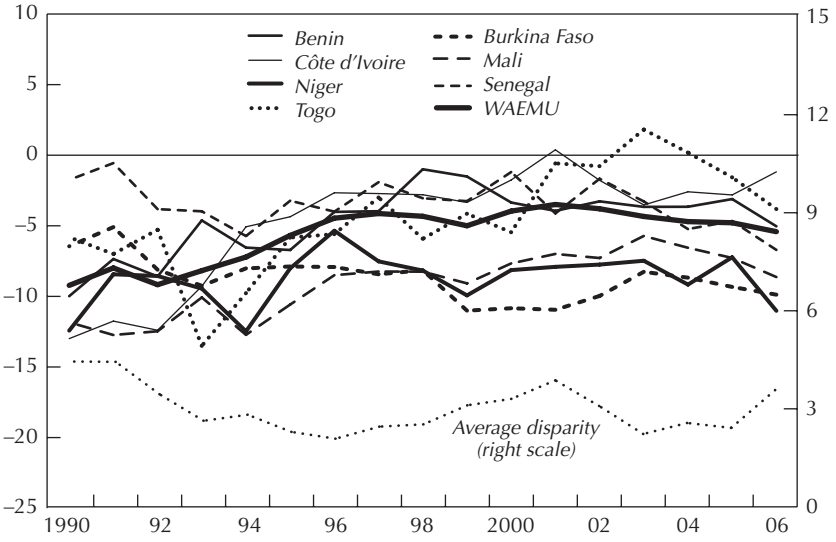
Fiscal Developments

Fiscal convergence has been the cornerstone of efforts to promote economic integration in WAEMU. Large fiscal imbalances plagued the WAEMU countries during 1990–93, and underlined the need for prudent fiscal policies to maintain the credibility and stability of the fixed exchange rate monetary union. Fiscal convergence efforts required a harmonization and coordination of fiscal policies, while allowing some flexibility at the national level to offset the impact of exogenous shocks. As described above, a number of initiatives were introduced to promote fiscal integration and ensure a consistent incentive structure.

Fiscal Deficit

Despite the political commitment at the regional level, progress toward fiscal convergence has generally remained limited in both WAEMU and CEMAC. For WAEMU, the 1994 devaluation and the ensuing implementation of domestic adjustment programs, together with debt relief, resulted,

Figure 11.5. WAEMU: Overall Fiscal Deficit
(Commitment basis, in percent of GDP)



Sources: IMF, World Economic Outlook database; and authors' calculations.

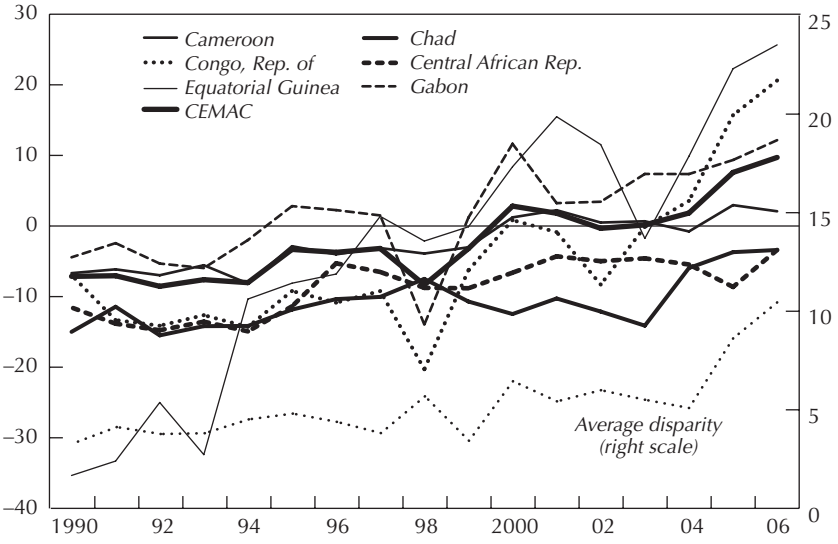
on average, in a marked improvement in the countries' public finance situations. The overall deficit-to-GDP ratio dropped from 8.6 percent, on average, in 1990–93, to 4.7 percent, on average, in 1994–2006 (Figure 11.5). The coincident improvement in the disparity index up to 1996 was reversed to a certain extent after 1997, suggesting lack of convergence after that point. Along the same lines, while primary fiscal deficits improved, heterogeneity increased, leading to a worsening of the disparity indicators.

For CEMAC, oil windfalls, and to a lesser extent debt relief in recent years, resulted, on average, in a marked improvement in the countries' public finance situations. The overall deficit-to-GDP ratio moved from average deficits of 7.6 and 5.3 percent in 1990–93 and 1994–98, respectively, to a surplus averaging 2.5 percent of GDP in 1999–2006 (Figure 11.6). However, the level of the disparity index, which had remained unchanged at 3.6 during 1990–93 and 1994–98, widened to 5.5 in 1999–2006 as heterogeneity among countries' performance increased.

Tax Revenue

Homogeneity of tax revenue has improved in WAEMU, where the structure of taxes is relatively similar. Indirect taxes (including a VAT

Figure 11.6. CEMAC: Overall Fiscal Deficit
(Commitment basis, in percent of GDP)

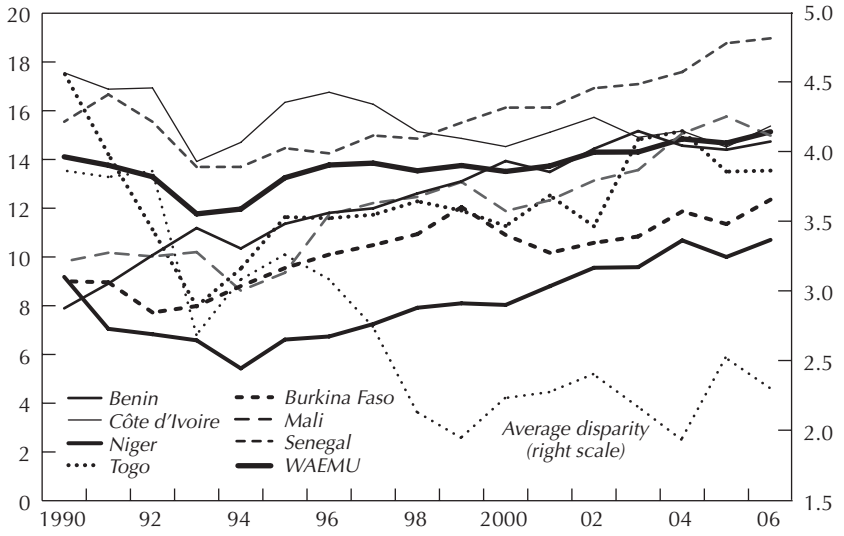


Sources: IMF, World Economic Outlook database; and authors' calculations.

on imports and specific taxes on petroleum products) represent, on average, about 40 percent of total tax revenue, custom duties about one-third, and direct taxes about one-fourth. The landlocked Sahelian countries rely somewhat more on customs duties and correspondingly less on indirect taxes. Tax revenue improved gradually from about 11.8 of GDP in 1993 to 13.9 percent of GDP in 1999–2006. Partly because of the harmonization efforts undertaken by WAEMU, homogeneity has improved steadily, with the average disparity indicators declining from 3.4 in 1990–93 to 2.8 in 1994–98 and to 2.1 in 1999–2006 (Figure 11.7).

Unlike in WAEMU, tax revenue became less homogeneous in CEMAC. With the coming on stream of oil production, the share of oil receipts in fiscal revenue rose over time, averaging less than half in the 1990s to close to two-thirds in most recent years. Accordingly, tax revenue in CEMAC countries improved gradually from 15.6 percent of GDP on average between 1990 and 1993, to 16.6 percent of GDP in 1994–98, and further to 21.6 percent of GDP in 1999–2006 (Figure 11.8). However, the more homogeneous performance in 1990–93, when all member countries were buffeted by adverse economic developments, has given way to a

Figure 11.7. WAEMU: Tax Revenue
(In percent of GDP)



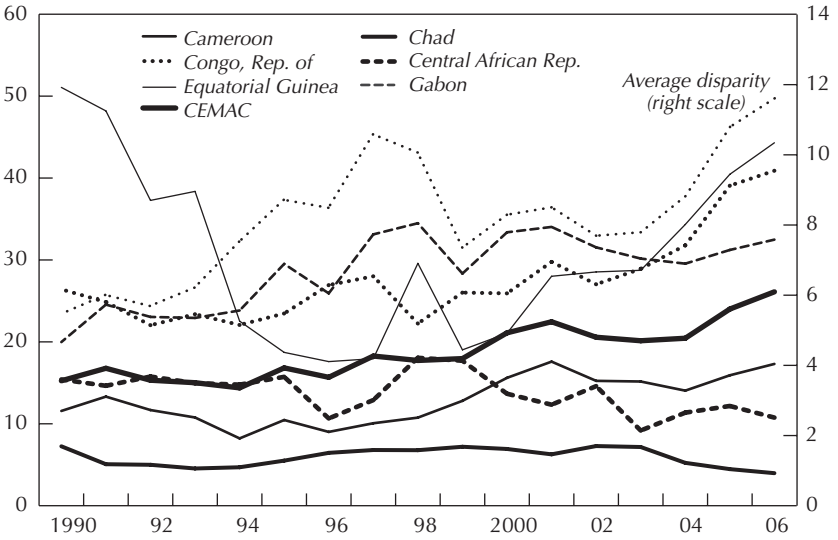
Sources: IMF, World Economic Outlook database; and authors' calculations.

significantly differentiated performance among countries in line with oil production and price cycles and individual countries' efforts at improving non-oil revenue collection. This differentiation was exacerbated by a lack of coordination of fiscal policies between member countries. As a result, the average disparity indicators nearly doubled, from 5.8 in 1990–93, to 9 in 1994–98 and 8.6 in 1999–2006.

Expenditure

Expenditure shares in GDP have become significantly more homogenous across WAEMU countries. Adjustment programs undertaken after the devaluation reduced overall expenditure from 24.4 percent of GDP in 1990–93 to an average of 20.4 percent of GDP in 1994–2006 (Figure 11.9a), with the disparity index dropping from 5.4 on average in 1990–93 to 1.7 in 1999–2006. Moreover, expenditure compression was proportionally larger in the highest spenders, in particular in Côte d'Ivoire. The same conclusion holds for current outlays (Figure 11.9b), but is reversed for investment spending. A large part of the expenditure adjustment after the devaluation has been to contain the government wage bill. WAEMU countries display a wide disparity in nominal

Figure 11.8. CEMAC: Tax Revenue
(In percent of GDP)

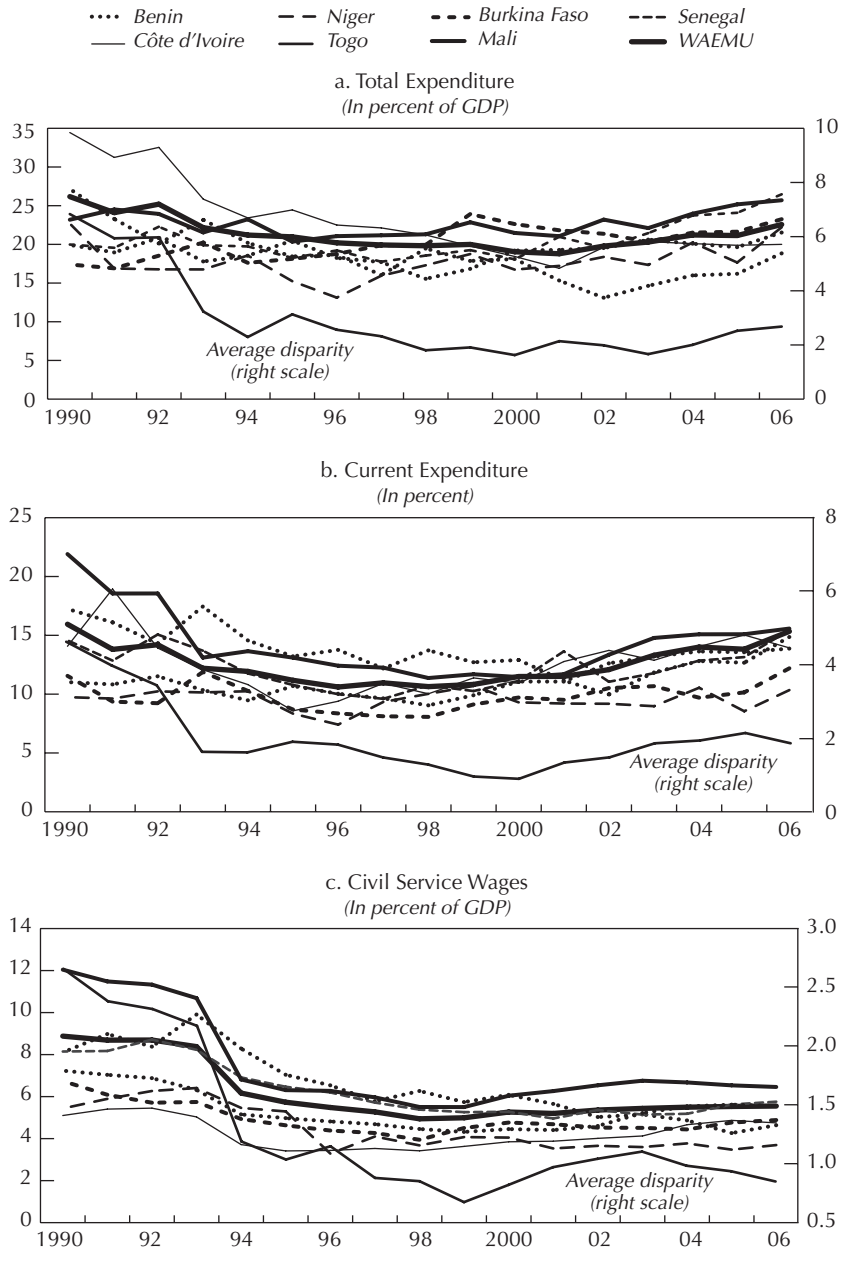


Sources: IMF, World Economic Outlook database; and authors' calculations.

average per capita salary levels, with the average civil service wages in Côte d'Ivoire more than three times those in Niger in 1990–2006. Adjustment policies following the devaluation steadily reduced the government wage bill as a percentage of current outlays and as a percentage of GDP (Figure 11.9c), and as a result, decreased wage inequality within the WAEMU and the disparity indicators.

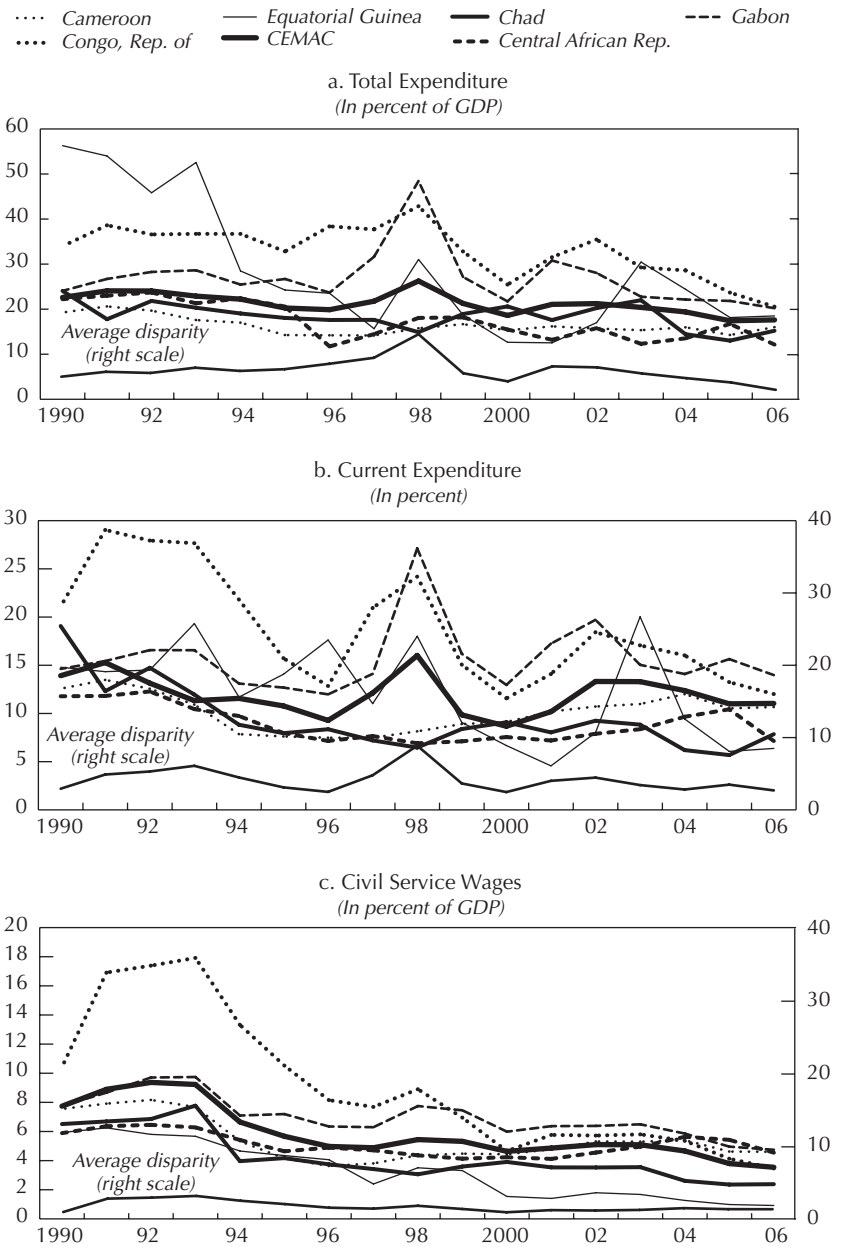
Across CEMAC, expenditure shares in GDP have become somewhat more homogenous. Growing GDPs, together with adjustment programs undertaken over time since 1994, reduced overall expenditure on average from 23.4 percent of GDP in 1990–93, to 22.1 percent in 1994–98 and 19.6 percent in 1999–2006 (Figure 11.10a). Moreover, since 1999, expenditure compression was generally consistent across countries. As a result, the disparity indicator, which had risen from 6 in 1990–93 to 8.7 in 1994–98, was nearly halved to 4.7 in 1999–2006. Current outlays as a share of GDP, in particular, experienced a continuous decline on average in a relatively harmonized fashion, resulting in a steady reduction in the average disparity indicators (Figure 11.10b). Investment spending, on the other hand, declined on average for CEMAC in the post-devaluation period, 1994–98, while rising strongly in Chad, the

Figure 11.9. WAEMU: Expenditures—Total, Current, and Civil Service Wages



Sources: IMF, World Economic Outlook database; and authors' calculations.

Figure 11.10. CEMAC: Expenditures—Total, Current, and Civil Service Wages



Sources: IMF, World Economic Outlook database; and authors' calculations.

Republic of Congo, and Gabon because of oil-related investments, resulting in an increase in the average disparity indicator. This was reversed in the 1999–2006 subperiod as nearly all CEMAC member countries experienced a solid investment growth in a relatively homogeneous fashion (the exceptions being Central African Republic and Gabon). In terms of the wage bill, CEMAC countries display a wide disparity in nominal average per capita salary levels, reflecting the wide discrepancy in per capita national income levels. Adjustment policies following the 1994 devaluation steadily reduced the government wage bill as a percentage of both current outlays and GDP (Figure 11.10c). These synchronous declines somewhat decreased wage inequality in CEMAC and the disparity indicators.[19] Also, the ratio of the government wage bill to GDP in CEMAC now compares favorably with the average for sub-Saharan Africa.[20]

In summary, although the homogeneity of countries' tax revenues and expenditures has improved, overall fiscal convergence has been limited in WAEMU. This is essentially explained by a highly divergent evolution in the level of investment outlays and in debt service costs. The former were influenced by country-specific policies and the latter by the divergent schedules for achieving debt relief under the enhanced Heavily Indebted Poor Countries (HIPC) Initiative. In the case of CEMAC, although the homogeneity of countries' expenditures improved somewhat, overall fiscal convergence has been very limited. As is typical of resource-based economies, fiscal policies of member countries have tended to be procyclical, with difficulties in containing spending in countries with falling oil output, and strong spending increases in countries with growing oil production. This has been further exacerbated under the current system of automatic government access to central bank credits. Measured improvements in convergence were driven more by oil windfalls than by targeted national policies.

Convergence Regressions

Next, we investigate conditional convergence in a regression model of the determinants of growth. Growth theory predicts conditional

[19]The average disparity of civil service wage expenditures as a share of current expenditure displays an increase in the 1999–2006 subperiod, caused by heavy up and down fluctuations in the ratios for certain countries (notably Central African Republic, Equatorial Guinea, and Gabon); however, this is believed to be due to statistical deficiencies and wage arrears buildups in certain years that were paid off in subsequent years.

[20]For 1994–98, the average for CEMAC is 5.5 percent compared with 7.9 percent for sub-Saharan Africa, and for 1999–2006, 4.6 percent compared with 8.2 percent.

Table 11.3. Conditional Convergence in the Solow Model Systems GMM Estimation
(Dependent variable lny_t–lny_0)

Sample:	Africa	OECD
Constant	0.69	0.86*
	(0.44)	(0.52)
$\ln(y_0)$	–0.06**	–0.13***
	(0.03)	(0.04)
$\ln(s)$	0.12***	0.37***
	(0.03)	(0.09)
$\ln(n + g + \delta)$	–0.22	–0.39**
	(0.22)	(0.18)
Implied I	0.82**	1.74***
WAEMU λ different from Africa?	No	
p-value	0.92	
CEMAC λ different from Africa?	No	
p-value	0.34	
CFAF franc zone λ different from Africa?	No	
p-value	0.42	
SYS-GMM specification tests		
Sargan test	40.13	17.79
p-value	0.38	0.12
p-value AR(1)	0.00	0.00
p-value AR(2)	0.28	0.05

Source: Authors' calculations.
Note: Standard errors in parentheses. Sargan test *p*-values reported for the null hypothesis of valid specification. ***, **, *, indicate significance at the 1, 5, and 10 percent levels, respectively. Data are for five-year intervals between 1960 and 2000.

convergence, that is, that per capita incomes of countries will converge to one another in the long run, conditional on the countries having similar structural characteristics. The mechanism works through the law of diminishing returns, which suggests that returns will be lower in technologically advanced countries than in a less developed country with a lower level of capital and technology. Higher returns allow poorer countries to increase investment and raise efficiency, thus initially growing faster.

To compare rates of convergence and the impact of policies in WAEMU and CEMAC, and the CFA franc zone taken as a whole vis-à-vis the sub-Saharan Africa, a standard growth model is estimated and then extended to models with roles for policy, institutional, political, and other variables. A priori, relatively faster convergence would be expected in WAEMU and CEMAC compared to other large groups, such as sub-Saharan Africa. For each variable, we test whether effects on growth differ for WAEMU, CEMAC, and the CFA franc zone as a whole vis-à-vis sub-Saharan Africa,

and whether inclusion contributes to a significant difference in convergence rates for the two groups.

Starting with the basic Solow model, the regression analysis indicates evidence of conditional convergence for sub-Saharan Africa (Table 11.3), suggesting that members with initially lower per capita GDP grow faster, catching up to the others in the group. However, despite efforts aimed at macroeconomic policy convergence and deepening regional integration, per capita growth rates in WAEMU, CEMAC, and the CFA franc zone overall are not converging faster than for sub-Saharan Africa as a whole. It should also be noted that at 0.8 percent, sub-Saharan Africa's rate of convergence is more than two times slower than that of the OECD, another homogeneous group. Our estimated rates of convergence compare favorably with those reported in the literature. In particular, the estimated rate of convergence of 1.8 percent for the OECD sample is close to the estimate of 2 percent established by various studies.[21]

Next, the analysis is extended to reflect insights from endogenous growth theories. We allow for exogenous, policy, and political variables to enter sequentially in the estimation, and we test for a significant difference between the WAEMU, CEMAC, and CFA franc zone vis-à-vis sub-Saharan Africa (Table 11.4).[22] First, several variables are found to have a significant impact as growth determinants for sub-Saharan Africa. These are initial income, investment, inflation, government balance, political change, openness, debt service to GDP, and terms of trade. However, only the impact of inflation is significantly different in WAEMU, CEMAC, and the CFA franc zone as a whole compared to sub-Saharan Africa. Lower inflation levels have a positive impact on growth, and this effect is stronger in WAEMU, CEMAC, and the CFA franc zone than for sub-Saharan Africa. This result underlines the importance of the monetary discipline encouraged by the fixed exchange rate system in the CFA franc zone.

Comparison of WAEMU and CEMAC with Other Subgroups Within Sub-Saharan Africa

In addition to the catch-up of slower growers within WAEMU to achieve convergence, policy makers are concerned with achieving faster overall growth in WAEMU. The catch-up of the relatively slower and

[21]See, for example, Barro and Sala-i-Martin (1992) and Sala-i-Martin (1996).

[22]The choice of variables was based on the set of robust variables identified in the recent growth literature.

Table 11.4. Endogenous Growth: Africa Systems GMM Estimation

(Dependent variable lny_t–lny_0)

Sample:	Solow	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.69	–0.02	0.76	0.82	1.03*	–0.70	0.36
	(0.44)	(0.72)	(0.66)	(0.35)	(0.56)	(0.60)	(0.50)
$\ln(y_0)$	–0.06**	–0.05	–0.04	–0.03	–0.04	0.05	–0.05
	(0.03)	(0.04)	(0.04)	(0.04)	(0.06)	(0.04)	(0.06)
$\ln(s)$	0.12***	0.08**	0.12***	0.15***	0.10**	0.11***	0.12***
	(0.03)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.03)
$\ln(n + g + \delta)$	–0.22	0.22	–0.33	–0.44	–0.47**	0.12	–0.12
	(0.22)	(0.29)	(0.27)	(0.15)	(0.19)	(0.24)	(0.22)
Inflation		–0.17**					
		(0.06)					
Government balance to GDP			0.01*				
			(0.00)				
Political change				–0.05**			
				(0.02)			
Openness					0.00*		
					(0.00)		
Debt service to GDP						–0.01**	
						(0.01)	
Terms of trade							0.00**
							(0.00)
Tests							
WAEMU different from Africa?	No	Yes	No	No	No	No	No
p-value	0.92	0.03	0.24	0.38	0.76	0.57	0.90
CEMAC different from Africa?	No	Yes	No	No	No	No	No
p-value	0.34	0.01	0.93	0.84	0.24	0.33	0.53
CFAF franc zone different from Africa?	No	Yes	No	No	No	No	No
p-value	0.42	0.08	0.34	0.42	0.30	0.45	0.33
SYS-GMM specification tests							
Sargan test	40.13	38.43	35.08	25.25	32.57	28.08	40.51
p-value	0.38	0.41	0.11	0.56	0.21	0.30	0.36
p-value AR(1)	0.00	0.00	0.00	0.00	0.00	0.01	0.00
p-value AR(2)	0.28	0.21	0.51	0.57	0.96	0.07	0.10

Source: Authors' calculations.

Note: Standard errors in parentheses. Sargan test p-values reported for the null hypothesis of valid specification. ***, **, *, indicate significance at the 1, 5, and 10 percent levels, respectively. Data are for five-year intervals between 1960 and 2000.

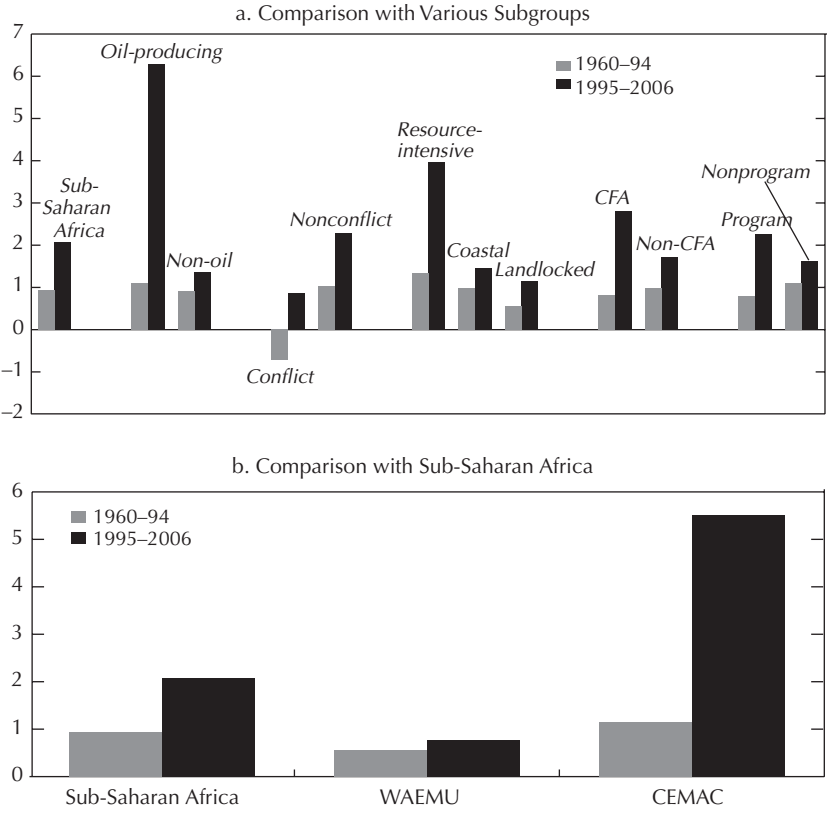
more uneven growers within CEMAC is also an issue, as is the question of the sustainability of recent growth improvements and the extent to which improvements are mainly driven by high oil prices. Sub-Saharan Africa as a whole has experienced a strong improvement in growth beginning in the mid-1990s. Sub-Saharan Africa's average real GDP per capita growth increased to 1.5 percent in 1995–99 and 2.7 percent in 2000–06, from –2.4 percent in 1990–94. The extent of the growth recovery was varied across subgroups (oil, non-oil, conflict, nonconflict, resource-intensive, coastal, landlocked, CFA, non-CFA, IMF program countries, nonprogram countries) but was not driven solely by higher growth in oil producers because of higher oil prices (Figure 11.11a). The post-1995 growth improvement in WAEMU was somewhat smaller compared to sub-Saharan Africa overall, whereas the improvement in CEMAC was larger (Figure 11.11b). What can cross-country growth models tell us about the contributions of various factors to WAEMU's slower growth, and to higher growth in CEMAC? Note that given data availability for the cross-country regressions, this exercise compares growth outcomes in the second half of the 1990s to those in the first half of the 1980s.

Previous sections showed that except for the impact of inflation, growth determinants operate similarly in both CFA subzones and sub-Saharan Africa as a whole. This implies that WAEMU and CEMAC's growth differentials with sub-Saharan Africa are not driven by a different set of growth-determining variables, but rather by different evolution of the key variables significant in a sub-Saharan Africa economic growth model. Similarly, the literature has generally converged on the view that sub-Saharan Africa does not grow differently from other regions.[23]

Thus, we can draw on recent robustness analyses of cross-country growth regressions (using the same data as above) to make some comparisons of WAEMU and CEMAC and other subgroups within sub-Saharan Africa. Robust growth regressions suggest which variables are robustly associated with growth in a world sample. An extension of Tsangarides (2005) finds that, in addition to initial conditions, the following variables were robustly correlated with growth: factor accumulation (investment

[23]Extensions of the standard growth model have largely eliminated the "Africa dummy" in cross-country growth regressions. See Sachs and Warner (1997), Easterly and Levine (1997), and Hoeffler (2002). Some papers do find that the marginal effect of selected variables is different for Africa (Block, 2001). Tsangarides (2005) concludes that Africa's growth process largely follows that of the rest of the world, although political and institutional variables are particularly important in explaining African growth.

Figure 11.11. Real GDP Per Capita Growth in WAEMU and CEMAC
(In percent)



Source: IMF, World Economic Outlook/Economic Trends in Africa database, 2006.

and education); policy variables (inflation, fiscal balance, government consumption, black market premium); and fixed geographical and exogenous factors (percentage of land in the tropics, arable land, and terms of trade growth).

For various subgroups in sub-Saharan Africa—such as the fastest growers of the 1990s, countries with on-track IMF-supported programs, or WAEMU and CEMAC—we can examine (in Table 11.5) the contribution of identified robust variables to the general improvement in sub-Saharan Africa growth beginning in the second half of the 1990s relative to earlier periods (see Pattillo, Gupta, and Carey, 2005). This table shows

Table 11.5. Relative Impact of Robust Variables on Growth
(Period-to-period changes from 1980–84 to 1995–2000, in percentage points)

	All Variables	Policy Variables	Terms of Trade	Investment
Sub-Saharan Africa	2.4	4.9	0.1	–0.4
Fast growers of the 1990s	5.1	6.5	5.0	5.6
Medium growers of the 1990s	1.2	3.0	0.9	–3.1
Slow growers of the 1990s	0.3	5.4	–8.1	–4.8
Oil	2.1	–0.7	8.1	1.1
Non-oil	2.4	5.8	–1.2	–0.6
Program	2.3	6.1	–1.9	–1.9
Nonprogram	2.7	1.2	6.1	4.1
Program on track	5.6	12.4	–0.6	–1.8
Program off track	–1.4	–0.7	–3.3	–1.9
CFA franc	0.9	0.5	1.7	0.2
WAEMU	0.3	2.0	–3.5	–0.3
CEMAC	1.8	–1.9	10.1	0.9
Non-CFA franc	3.8	6.7	1.6	1.2
Coastal	2.2	7.1	–5.5	–1.5
Landlocked	2.2	3.6	0.8	1.2
Resource-intensive	3.0	2.5	9.3	–0.3

Source: IMF staff calculations.

Note: Robust variables identified using expanded specification from Tsangarides (2005). Policy variables: inflation, government consumption to GDP, fiscal balance to GDP, black market premium; other variables include terms of trade, investment to GDP, overall schooling. Fixed factors such as percent of land in tropics, arable land, and initial income are included in regression, but not in above calculation.

the changes (from the 1980–84 to the 1995–2000 period) in percentage points in the average values of the variables combined into various groups. The main interest is a comparison of WAEMU and CEMAC to the fastest-growing economies of the 1990s—that is, those whose real GDP per capita growth rates place them in the top third of the distribution (see the Appendix).[24] The findings of this analysis show:

- The fastest growers' improvement in growth reflected a combined strong positive impact of the policy variables, as well as a positive contribution from investment and a small positive contribution from the terms of trade.

[24]The top third of the distribution includes 14 countries. Of these, 1 is an oil producer, and 3 are WAEMU members: Burkina Faso, Mali, and Benin.

- For WAEMU the policy variables' contribution was much smaller, investment was relatively unchanged, and there was a small negative contribution from the terms of trade.[25]
- Thus, improvements in investment and the robust policy variables have not contributed as much to improvements in growth in WAEMU compared to the fastest-growing sub-Saharan Africa countries.[26]
- For CEMAC, the policy variables' contribution was negative; there was a large positive contribution from the terms of trade, and a very small positive contribution from investment.
- These results are sensitive to the inclusion of Equatorial Guinea, an oil producer with double-digit growth from the second half of the 1990s until 2004. When Equatorial Guinea is excluded, the contribution of policy variables and terms of trade for CEMAC is essentially unchanged, whereas investment contributes negatively.

The analysis suggests that for WAEMU, improvements in investment and the identified robust policy variables—particularly fiscal balance and government consumption[27]—would contribute toward increasing growth to levels attained in the sub-Saharan Africa countries with the highest growth rates in the recent period.

The CEMAC results confirm the role of higher oil prices through the terms of trade in accounting for improved growth performance,

[25]Inflation is included in the policy variables. However, the bigger contribution of policy variables to growth in the fastest-growing sub-Saharan Africa countries compared to WAEMU is driven largely by the other variables (fiscal balance, government consumption, black market premium). However, the large decrease in inflation in the non-CFA fast-growing countries also does contribute (CFA countries' inflation has been consistently low). This result is consistent with findings in the section "Convergence Regressions" that inflation has had a greater positive impact on growth in WAEMU compared with sub-Saharan Africa overall.

[26]These results can be put into a broader context. Pattillo, Gupta, and Carey (2005) utilize the same model to decompose sub-Saharan Africa's "growth loss" relative to other regions over the entire sample, and various subperiods. Results suggest that sub-Saharan Africa's growth has been substantially lower on account of weak policies, but lower levels of factor accumulation, particularly investment, have implied extremely large growth losses compared with other regions. Clearly, however, lower factor accumulation in sub-Saharan Africa is also partly the consequence of weak policies.

[27]Although the black market premium is identified as a robust growth determinant, the level is extremely low in the CFA franc zone, related to the convertibility of the currency.

particularly when Equatorial Guinea is included.[28] The analysis raises questions on the sustainability of this growth, however, given the very limited role of improved policies and investment in driving growth improvements.

Conclusions

In summary, based on both disparity indices and conditional convergence measures, the analysis does not suggest that rates of convergence in WAEMU and CEMAC, or the CFA franc zone overall, are improving relative to sub-Saharan Africa or other regions. Although the institutional framework for regional integration is more developed in WAEMU, there is no evidence that convergence of growth rates is higher in WAEMU than in CEMAC. However, the regions' low inflation rates, stemming from the monetary discipline imposed by the fixed exchange rate arrangement, have had a greater positive impact on growth in WAEMU and CEMAC than for sub-Saharan Africa overall. Specifically, in an econometric growth model, inflation has an economically and statistically greater impact on growth for WAEMU and CEMAC than for sub-Saharan Africa overall.

Improvements in investment and policy variables (particularly fiscal indicators) that emerge as robust growth determinants from panel data analysis based on world samples have not contributed as much to improvements in growth in WAEMU or CEMAC compared with the fastest-growing countries in sub-Saharan Africa. These results are consistent with the convergence analysis. In particular, limited improvement and limited convergence in investment and fiscal policy variables contribute to explaining both slow convergence within WAEMU and CEMAC, and WAEMU's recent growth shortfall relative to the fastest-growing sub-Saharan Africa countries.

Several policy implications emerge. First, it may be that implementation of common monetary and exchange rate policies that benefit members more equally is more difficult given widely varying growth rates and economic cycles. However, apthough the simple method implemented here suggests that synchronization of WAEMU business cycles has improved in the post-devaluation period, whereas the opposite holds for CEMAC, this is an area that would benefit from further

[28]This effect would likely be even stronger were the most recent period of high oil prices included.

research. Second, the findings point to the need to further deepen regional integration, and reduce constraints to investment and growth, in order to maximize the benefits of the union.[29] Strengthened macroeconomic policies, particularly fiscal policies, are important for improving growth and convergence. The literature suggests that other regional integration objectives—policies to increase intraregional and external trade, and greater financial integration—are particularly important for investment (Vamvakidis, 1998). Closer links of the economies through improved regional infrastructure is also likely to aid in stimulating investment. Clearly, however, in addition to deepened regional integration and strengthened regional institutions, stronger efforts at the national level are necessary for improving growth and convergence in the region.

[29]Recent papers have found that growth opportunities may be quite different in resource-abundant countries, coastal countries without natural resources, and landlocked countries without natural resources (Collier and O'Connell, 2005). These findings heighten the importance of well-functioning regional integration schemes. Landlocked countries can benefit from spillovers when external trade and growth accelerates in the coastal countries.

Appendix 11.1. Real GDP Per Capita Growth Performance Classification

(In percent)

	1961–2006		1990–94		1995–99		1990–99		2000–06	
1	Equatorial Guinea	12.8	Mauritius	5.5	Equatorial Guinea	43.1	Equatorial Guinea	24.1	Equatorial Guinea	18.2
2	Botswana	7.2	Equatorial Guinea	5.1	Rwanda	8.9	Mauritius	4.7	Sierra Leone	8.7
3	Mauritius	4.0	Seychelles	3.0	Cape Verde	6.2	Seychelles	4.1	Chad	7.3
4	Cape Verde	2.4	Mali	2.8	Mozambique	5.8	Botswana	3.7	Angola	6.9
5	Swaziland	2.2	Burkina Faso	2.7	Botswana	5.7	Burkina Faso	3.7	Botswana	5.7
6	Seychelles	2.1	Ghana	2.0	Angola	5.5	Cape Verde	3.6	Mozambique	5.5
7	Burkina Faso	2.1	Benin	1.7	Seychelles	5.1	Mozambique	3.1	Tanzania	3.8
8	Mali	1.8	Uganda	1.7	Malawi	4.7	Uganda	3.0	Cape Verde	3.5
9	Chad	1.7	Botswana	1.6	Burkina Faso	4.6	Mali	2.7	Mauritius	3.0
10	Mozambique	1.6	Lesotho	1.5	Uganda	4.3	Malawi	2.1	Namibia	2.9
11	The Gambia	1.6	Chad	1.4	Mauritius	4.0	Benin	2.0	Nigeria	2.8
12	Lesotho	1.4	Swaziland	1.4	Côte d'Ivoire	2.5	Ghana	1.9	South Africa	2.7
13	Congo, Rep. of	1.3	Guinea-Bissau	1.1	Mali	2.5	Lesotho	1.8	Burkina Faso	2.7
14	Gabon	1.3	Cape Verde	1.1	Benin	2.2	Swaziland	1.1	Zambia	2.5
15	Cameroon	1.3	Gabon	0.5	Guinea	2.1	Guinea	0.9	Mali	2.5
16	South Africa	1.2	Mozambique	0.3	Lesotho	2.0	Rwanda	0.5	Ghana	2.4
17	Kenya	1.2	The Gambia	0.1	Ethiopia	2.0	Tanzania	0.4	Ethiopia	2.3
18	Tanzania	1.2	Namibia	0.0	Senegal	1.9	Chad	0.4	Congo, Rep. of	2.1
19	Angola	1.0	Nigeria	–0.1	Ghana	1.8	The Gambia	0.3	Uganda	2.0
20	Nigeria	0.9	Guinea	–0.4	Cameroon	1.7	Namibia	0.3	São Tomé and Príncipe	2.0
21	Malawi	0.9	Comoros	–0.4	Tanzania	1.3	Senegal	0.0	Senegal	1.8
22	Comoros	0.9	Tanzania	–0.4	Swaziland	0.9	Zimbabwe	0.0	The Gambia	1.6
23	Guinea	0.8	Malawi	–0.5	South Africa	0.8	Côte d'Ivoire	–0.1	Rwanda	1.5
24	Burundi	0.8	Zimbabwe	–0.5	Namibia	0.7	Nigeria	–0.1	Kenya	1.3
25	Ethiopia	0.8	Kenya	–1.5	Kenya	0.6	Gabon	–0.1	Benin	1.0
26	São Tomé and Príncipe	0.7	Senegal	–1.8	The Gambia	0.5	Comoros	–0.1	Swaziland	1.0
27	Namibia	0.7	South Africa	–1.9	Zimbabwe	0.5	Ethiopia	–0.3	Cameroon	0.9
28	Togo	0.6	Burundi	–2.0	Central African Rep.	0.4	Kenya	–0.5	Lesotho	0.5

Appendix 11.1 *(concluded)*

(In percent)

	1961–2006		1990–94		1995–99		1990–99		2000–06	
29	Benin	0.5	São Tomé and Príncipe	–2.2	Niger	0.3	South Africa	–0.6	Niger	0.3
30	Guinea-Bissau	0.5	Ethiopia	–2.5	Comoros	0.1	São Tomé and Príncipe	–1.3	Madagascar	0.3
31	Rwanda	0.5	Côte d'Ivoire	–2.7	Togo	0.0	Niger	–1.5	Comoros	0.2
32	Uganda	0.4	Congo, Rep. of	–3.1	Madagascar	0.0	Togo	–1.6	Malawi	0.2
33	Ghana	0.4	Togo	–3.1	Nigeria	–0.1	Madagascar	–1.6	Guinea	0.1
34	Côte d' Ivoire	0.3	Madagascar	–3.1	São Tomé and Príncipe	–0.5	Angola	–1.6	Dem. Rep. of Congo	–0.4
35	Sierra Leone	0.1	Niger	–3.2	Congo, Rep. of	–0.5	Central African Rep.	–1.7	Burundi	–0.5
36	Niger	0.0	Central African Rep.	–3.9	Chad	–0.6	Congo, Rep. of	–1.8	Togo	–0.9
37	Zambia	0.0	Sierra Leone	–4.8	Gabon	–0.7	Guinea-Bissau	–2.0	Gabon	–1.2
38	Zimbabwe	–0.2	Zambia	–5.4	Zambia	–1.5	Cameroon	–2.4	Guinea-Bissau	–1.5
39	Senegal	–0.6	Cameroon	–6.6	Burundi	–3.7	Burundi	–2.9	Côte d'Ivoire	–1.8
40	Central African Rep.	–0.7	Rwanda	–7.9	Dem. Rep. of Congo	–4.8	Zambia	–3.4	Central African Rep.	–1.8
41	Madagascar	–1.0	Angola	–8.7	Guinea-Bissau	–5.2	Dem. Rep. of Congo	–8.1	Seychelles	–2.6
42	Dem. Rep. of Congo	–2.3	Dem. Rep. of Congo	–11.5	Sierra Leone	–13.5	Sierra Leone	–9.1	Zimbabwe	–5.7

Sources: World Bank, World Development Indicators database, 2004; IMF, World Economic Outlook database, 2004; and IMF staff estimates.
Note: Data not available for Eritrea and Liberia.

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12

Trade in CEMAC: Developments and Reform Opportunities

JAN KEES MARTIJN AND CHARALAMBOS TSANGARIDES

The creation of the CEMAC customs union in 1994, was a major step in the regional integration process in central Africa. The reform was part of a wider initiative to boost regional integration and policy effectiveness in conjunction with the devaluation of the common exchange rate relative to the French franc. CEMAC replaced the UDEAC (Union Douanière des Etats d'Afrique Centrale), which was created in 1964 but had remained largely ineffective. The 1994 reforms introduced (1) a common external tariff (CET), (2) the gradual removal of tariffs on intra-regional trade (completed in 1998), (3) the harmonization of indirect taxation (with the introduction of a value-added tax (VAT) in 1999), and (4) the replacement of quantitative import barriers by temporary import surcharges (to be phased out by 2000—see below).

The implementation of the agreed-upon regime by the member countries, however, has remained unsatisfactory. Trade is hampered and distorted by cumbersome and costly border procedures, as well as national restrictions and exemptions in defiance of the common rules. Further problems stem from the lack of transportation infrastructure, security problems and, for trade with the rest of the world, high common external tariffs.

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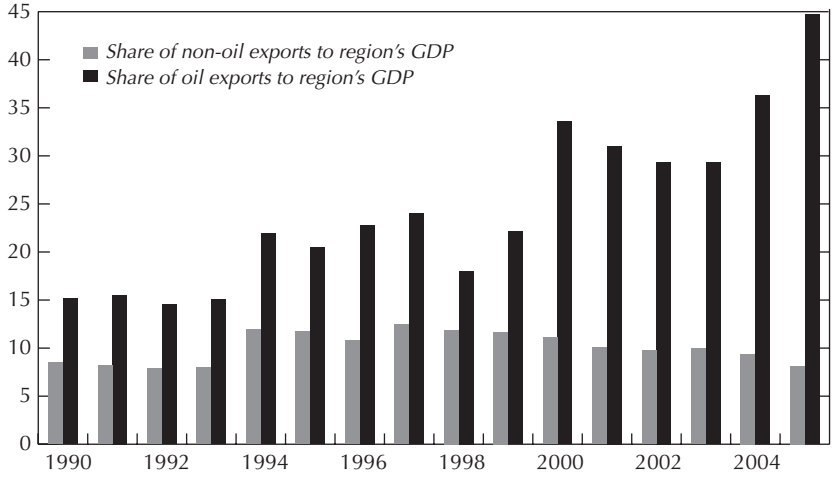
A 2002/03 initiative to improve policy implementation has largely stalled. In 2002, French experts prepared a report on customs procedures (the "Steenlandt" report; Dufy, Puons, and Steenlandt, 2002), and an October 2003 workshop in Brazzaville, Republic of Congo resulted in a proposed road map for further reform. These efforts were supported by the EU, France, and the World Bank. However, since then the initiative has lost momentum, even though some of the actions identified in the road map have still moved forward. The June 2005 summit of the CEMAC heads of state in Malabo, Equatorial Guinea, confirmed the need for improved implementation of the CEMAC trade regime.

Several recent initiatives concerning external trade provide new challenges and opportunities for welfare-enhancing reforms. First, the 2003 workshop suggested reducing the number of CET rates from four to three, while lowering the top rate from 30 percent to 20 percent, in line with the WAEMU regime. The importance of external liberalization was reaffirmed by then IMF Managing Director in a March 2006 speech (de Rato, 2006). CEMAC representatives have indicated that changes to the CET should be based on both a review of experience with the changes introduced in 1994 and a forward-looking assessment of proposed new rates. Second, an Economic Partnership Agreement (EPA) with the EU could result in far-reaching reciprocal trade liberalization between the two regions. And, finally, global trade liberalization, for example in the context of the Doha Round, would affect market access and world market prices, in particular for agricultural products.

This chapter provides an update on the main elements of the reform agenda concerning the CEMAC trade regime as well as a quantitative assessment of selected potential effects on tariff revenues and trade patterns. Unfortunately, the latter analysis is hampered by severe data limitations: sufficiently detailed recent balance of payments data for most exercises in this chapter were available for Cameroon, the Central African Republic, and Gabon only.[1] The next section gives an overview of the main deficiencies of the current regime as well as the proposed remedies. The following sections discuss the scope for boosting intra-community trade and the implications of tariff reductions or an EPA. The final section provides policy recommendations.

[1]Chad, Equatorial Guinea, and the Republic of Congo reported their latest external trade statistics for 1995. More recent data are available in UN COMTRADE database, derived from mirror flows (that is, flows declared by partner countries), but these are partial data, and do not add up to total imports as estimated by the monetary authorities.

Figure 12.1. Ratio of Oil and Non-Oil Exports to GDP
(In percent)



Sources: IMF, World Economic Outlook database; and authors' calculations.

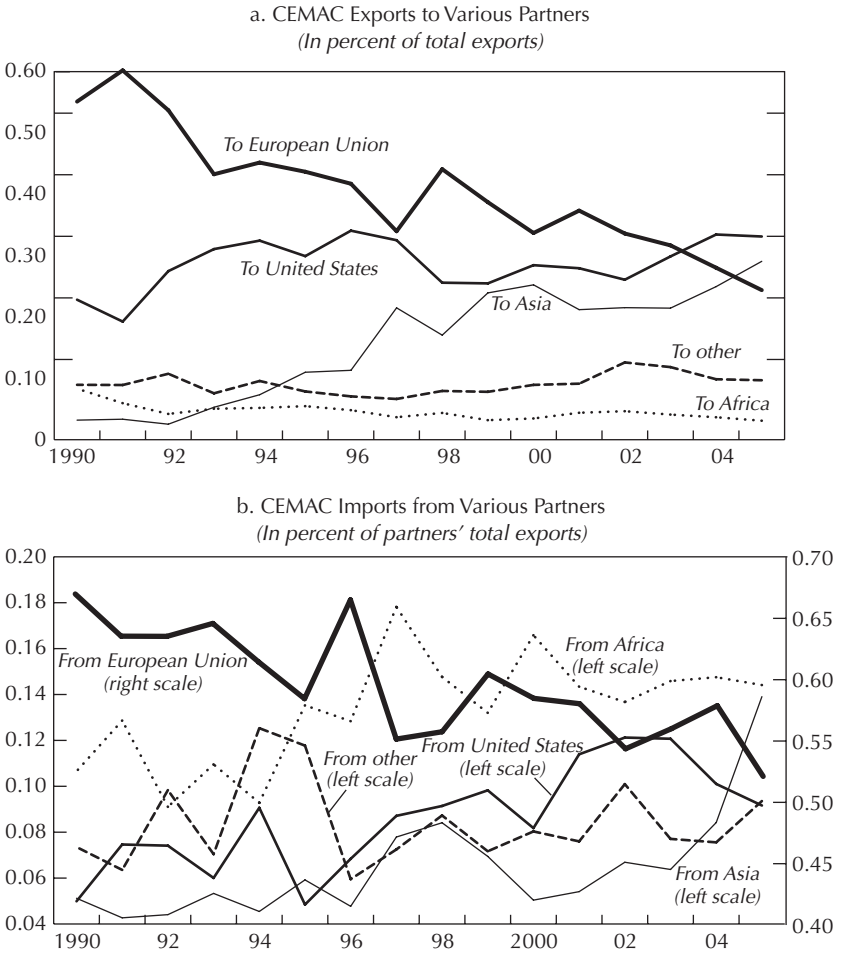
The Current Regime: Characteristics, Deficiencies, and Reforms

Trade Characteristics

Trade restrictions and an uneven application of CEMAC rules constrain external and intraregional trade. On balance, structural reforms and the region's tariff policy have had very little positive impact on trade. Although overall trade as a share of GDP increased slightly during the period 1994–2005, this increase is broadly reflective of developments in the oil sector, which is insulated from the tariff regime.[2] In line with the increased oil output, the ratio of total goods exports to GDP increased from about 34 percent of GDP in 1994 to about 51 percent of GDP in 2005 (Figure 12.1), while non-oil exports fell only slightly from 12 percent of GDP to 8 percent over the same period. It follows that CEMAC countries' share of non-oil exports in total regional exports declined substantially from 1994 to 2005, from 35 percent to 16 percent. Figure 12.2a suggests that since about 2004,

[2]Increased trade and exports during this period can be attributed to both petroleum prices, which experienced a cumulative increase from $16 a barrel in 1994 to $70 a barrel in 2005, and production of oil, which went up by 85 percent.

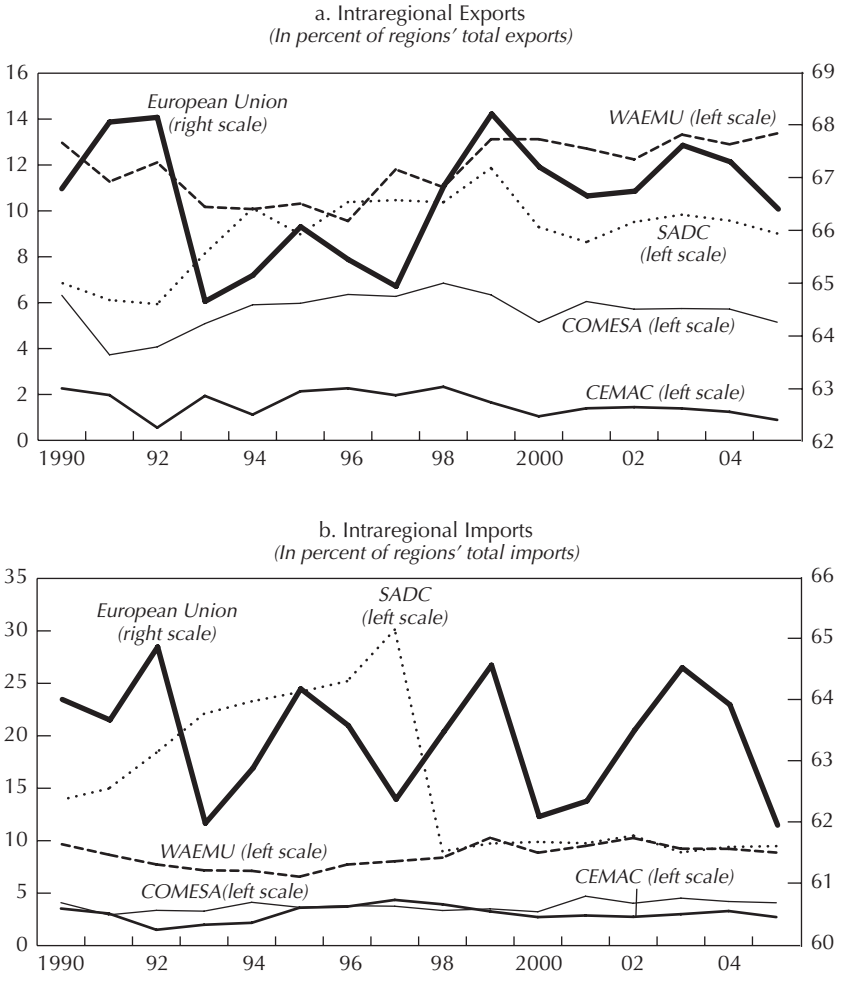
Figure 12.2. Composition of Exports and Imports



Sources: IMF, *Direction of Trade Statistics;* and authors' calculations.

EU countries are no longer the primary destination for CEMAC's exports. Exports to the United States and to Asia have been increasing in the past two years (to 33 and 29 percent in 2005, respectively). On the import side, goods trade has remained fairly constant at about 18 percent of GDP in 1994 and 2005. The diverging trends of imports and exports are reflected in the trade surplus, which improved from 5 percent of GDP to 21 percent of GDP over this period. Although EU countries accounted for about 52 percent of

Figure 12.3. Intraregional Exports and Imports: Selected Regional Groups



Sources: IMF, *Direction of Trade Statistics;* and authors' calculations.

total CEMAC imports in 2005, their share has followed a declining trend (Figure 12.2b and Table 12.1). At the same time, imports from Asian countries more than doubled in the past three years.

Intracommunity trade in CEMAC is low, at less than 2 percent of GDP and about 1.5 percent of total trade. The share of intraregional trade in total trade of the CEMAC countries has remained stagnant over the past

Table 12.1. CEMAC: Sources of Imports and Tariff Revenue by Region of Origin[1]
(In percent of total)

	Imports	Tariff revenue
CEMAC	2.1	
Rest of sub-Saharan Africa	16.0	13.2
Asian countries	12.8	18.7
EU	52.9	52.7
United States	4.9	4.2
Other countries	11.3	11.3

Source: Data provided by the authorities.
[1]Based on total imports by Cameroon (2004), Gabon (2004), and the Central African Republic (2003).

five years, and even trended down somewhat since 1997—despite the 1994 initiative for creating an effective customs union (Figures 12.3a and 12.3b). Internal trade is much lower than in other country groupings with free internal trade in Africa. Intraregional trade in WAEMU amounts to more than 10 percent of total trade. For SADC and COMESA this share is between 5 and 10 percent of total trade. Official data may underestimate the magnitude of intraregional trade owing to large unrecorded trade flows—especially between neighboring countries. However, even with an adjustment for underreporting, the magnitude of intraregional trade would still remain very low.[3]

Deficiencies and Reforms

Although the unweighted average most-favored-nation (MFN) tariff rate is close to 20 percent, most imports enter under the 10 percent rate, as shown in Table 12.2. CEMAC import tariffs are ad valorem and were revised in 2001 in order to ensure conformity with the 2002 version of the World Trade Organization's (WTO) Harmonized System. The CET contains four rates—5 percent for basic necessities, 10 percent for raw materials and capital goods, 20 percent for intermediate and other goods, and 30 percent for general consumer goods.

The 1994 reforms that created the CEMAC customs union were a major step forward, but the trade regime remains plagued by poor implementation. The customs union suffers from a range of implementation

[3]Anecdotal evidence suggests that the amount of unrecorded informal trade within the region could be about 50 to 60 percent of recorded trade.

Table 12.2. CEMAC: Sources of Imports and Tariff Revenue by Import Tariff Band[1]

(In percent of total)

Tariff Band (In percent)	Imports	Tariff Revenue
5	6.8	2.2
10	54.9	35.5
20	17.9	22.8
30	20.5	39.4

Source: Data provided by the authorities.

[1]Based on total imports by Cameroon (2004), Gabon (2004), and the Central African Republic (2003).

problems—listed below—as well as red tape, weak and inefficient customs administration involving the misclassification of imports, and corruption problems, including theft.

The Executive Secretariat, located in Bangui, Central African Republic, lacks both the authority and the resources that would be needed for effective oversight of the arrangement. Data reporting to the secretariat by the member countries has been incomplete and, as a result, the secretariat has only a very partial picture of regional trade flows and of country-specific procedures and regulations.

National trade regulations are not always in compliance with community rules.[4]

- Discrepancies between the CET and actual tariffs rates applied by member countries have been introduced to provide additional protection to national industries.[5] The 2003 road map proposed a detailed review of both the nomenclature and the tariff rates in order to restore compliance with the CET. However, even in the absence of such a comprehensive exercise, the planned gradual move to the Automated System for Customs Data (ASYCUDA) by five member countries (excluding Equatorial Guinea) should still be beneficial to proper CET implementation.

[4]The CEMAC secretariat—which has provided much of the information underlying this overview—does not have up-to-date information on the incidence of the various concerns listed below across countries. As a result, this assessment should be seen as tentative and subject to further confirmation.

[5]For example, the Central African Republic provides temporary preferential tariff treatment on imports of heavy machinery and some vehicles for investment purposes of 8 percent.

Box 12.1. Problems Implementing the Agreed Trade Regime in Chad

Experience in Chad, as revealed in the preparation of a Diagnostic Trade Integration Study, illustrates the myriad implementation problems concerning the CEMAC customs union (Integrated Framework, 2005). (However, Chad should not be seen as a representative example.)

- Although the ASYCUDA customs database has been introduced in the main customs offices, it remains to be extended to those in the provinces. Introduction is hampered by severe planning problems, lack of training, and lack of network wiring. At present, the information provided in the statements issued by the customs offices varies—except concerning oil and cattle, which are handled by separate posts—with many smaller offices not reporting the tariff line and/or the country of origin.
- A large range of exemptions from import tariffs are granted, including for imports under the Doba oil project, for the French military base, and for specific firms through *Conventions d'Etablissement*. In 2002–03 the actual import tax base was only 23 percent of total imports.
- Imports of sugar, cigarettes, and beverages from nonmember countries are still subject to a "temporary" 25 percent surcharge, which was scheduled to be removed by 2000. In addition, imports from all countries—including other CEMAC members—are subject to a range of charges, including a statistical fee (2 percent) and a storage fee (depending on number of days in customs storage).
- Chad agreed in 2002 to apply transaction values as the basis for import valuation, but minimum values are still used for imports from non-CEMAC bordering countries.
- There are no taxes on export products, except for cattle (CFAF 1,500 a head) and other livestock, and some plants. However, the 2 percent statistical fee also applies to exports. Exports are free from quantitative restrictions, apart from some restrictions for reproductive cows.

- Temporary tariff surcharges of up to 30 percent were introduced in 1994 for a period of six years or less, to help cushion the impact of abolishing quantitative restrictions. However, not all surcharges have been abolished as scheduled. Reportedly, the surcharges have been removed in the Central African Republic, Cameroon, the Republic of Congo, and Gabon. However, Equatorial Guinea and Chad still maintain surcharges on selected products (see Box 12.1).

- Several, but not all, CEMAC members have phased out the granting of firm-level tariff exemptions in the oil, mining, and tourism sectors through bilateral *Conventions d'Etablissement*. In addition to renegotiating remaining existing exemptions, a lasting solution should involve aligning the national investment codes with the CEMAC Investment Charter, which strictly limits tariff exemptions.
- A range of taxes and charges on top of the CET severely complicate the tariff regime (see Oliva, 2008). Some of these charges have been initiated at the community level, such as the community integration tax (1 percent) introduced in 2002 to finance the community institutions, and a statistical fee (up to 2 percent). Additional fees have been introduced at the national level, and their legal status under the common regime seems unclear. These include levies related to other international organizations, in particular the Economic Community of Central African States (ECCAS) and the Organization for Business Harmonization in Africa (OHADA).[6] Box 12.2 illustrates these various duties for the Republic of Congo.

Goods produced in member countries are, in principle, eligible for a zero-rate preferential tariff, but qualification has been subject to problems. A study commissioned by the CEMAC secretariat in 2006 seeks to address problems concerning the application of the 1993 rules of origin. The existing regime confers community origin on raw (mining and agricultural) products originating from CEMAC, and also on goods manufactured in CEMAC—with a local context of at least 40 percent, or where at least 50 percent of the raw materials (in value terms) used in the production stem from CEMAC. Certificates of origin are to be issued by the customs office closest to a producer. However, problems have arisen; not all customs offices have the required expertise, resulting in improper certification, which, in turn, is frequently rejected by other member countries (recent examples concern powdered milk and wine). Also, a precertification procedure for frequent exporters is hardly used. To address these problems, in 2006 the CEMAC secretariat initiated a study on simplifying the rules and improving compliance.[7]

[6]The CEMAC member states are also members of the ECCAS and OHADA.

[7]Including consideration of a suggestion in the Steenlandt report for moving to a criterion of "sufficient transformation" as evidenced by a change of product classification based on the SH nomenclature. In addition, proposals should be compatible with the requirements of an EPA (see below).

Box 12.2. Implementation of the Trade Regime in the Republic of Congo

The various problems in implementing the agreed-upon CEMAC trade regime are illustrated by experience in the Republic of Congo, which has recently been discussed in Oliva (2008) and WTO (2006).

- Imports are subject to a large number of additional duties and fees, raising the de facto import tariff from 19 percent to about 22 percent, and hampering transparency. These additional charges are an automation fee (2 percent), the Community Integration Tax (1 percent), a statistical tax (0.2 percent), an OHADA levy (0.05 percent), an (ECCA) Community Integration levy (0.04 percent), and inspection fees for qualifying transactions. There is also a 15 percent tax on imports of wood products. The customs also collect a 5 percent levy as an advance payment on income taxes or the flat-rate tax.
- For certain goods, including cement, customs valuation is still based on reference prices.
- Widespread structural and ad hoc exemptions greatly undermine customs duty collection. Exemptions include flour imports, and imports for public investments.
- Nontariff barriers include price controls and domestic monopolies for sugar and wheat flour. These barriers maintain high domestic prices, while imports are constrained by quotas and import licensing procedures.
- The export regime includes the automation fee (2 percent), a supplementary exit duty (2 percent), diamond royalties (2 percent), and various fixed and variable levies on wood.

Three of the six CEMAC member countries (Cameroon, the Central African Republic, and the Republic of Congo), in principle, apply transaction-based import valuation—as was the case already in 2003. This valuation basis has been mandatory since 2000, under the WTO agreement on customs valuation. In Chad, the move from standardized reference prices to transaction-based valuation has been hampered by training problems. Gabon, which has finished the training and has updated its regulations, has pointed to revenue concerns as a reason for delaying the adjustment. Moreover, even in those countries that in principle apply transaction-based import valuation, implementation has been incomplete.

Problems concerning overly costly and cumbersome transit procedures and double taxation are, reportedly, being resolved. The existing transit regime includes a costly guarantee system. The system requires importers of goods to acquire a bond at the point of entry into the union, which aims to guarantee to the—generally, coastal—transit country that the required duties are paid and that the goods are indeed reexported to the—generally, landlocked—country of destination. However, the bonds can be very costly and reimbursement may be subject to long delays. To resolve these problems, a Central African Republic customs official was recently stationed in Douala to collect import duties at the point of entry into the region—in line with a suggestion in the 2003 Roadmap. A similar procedure is under consideration for clearing imports through the Douala port destined for Chad. A more efficient transit regime would help reduce the incidence of double taxation of customs duties (as well as excises and value-added tax) on goods imported from a third country and then reexported within CEMAC.

Trade is also affected by a relatively burdensome overall regulatory environment for doing business. The World Bank's Doing Business 2006 database provides comparable measures of business regulations and their enforcement across 175 economies, including the WAEMU and CEMAC member countries. Following Oliva (2008), we summarize some of these measures for CEMAC and compare with other groups and regions. Regarding trade-related impediments, the number of documents required for importing or exporting in CEMAC countries is comparable with that in WAEMU and in sub-Saharan Africa (Table 12.3).[8] However, trade is also hampered by regulations that are not directly trade related but that work as barriers to trade by increasing the cost of doing business and hampering entrepreneurship. These obstacles are summarized in Table 12.4. Comparing WAEMU and CEMAC averages with sub-Saharan Africa and other regions, structural impediments to developing a competitive private sector are relatively high for both the WAEMU and CEMAC countries. Out of the 175 countries, CEMAC and WAEMU's overall rank is in the bottom tier (153 for WAEMU and 157 for CEMAC), worse than sub-Saharan Africa and other regions.

Generally, quantitative restrictions do not appear to provide a main barrier to trade. Most quantitative restrictions were converted into tariffs in 1994. Imports of sugar are restricted in Central African Republic and Gabon. Exports of timber and logs are subject to prohibitions and quota restrictions in several member countries, for environmental reasons.

[8]See section on "Prospects for Enhanceing Intra Community Trade" and Box 12.3 for a discussion of transportation costs.

Table 12.3. Doing Business Survey, 2006: Trading Across Borders

Indicator	WAEMU									CEMAC							Sub-Saharan Africa
	Benin	Burkina Faso	Côte d'Ivoire	Guinea-Bissau	Mali	Niger	Senegal	Togo	Average	Cameroon	Central African Rep.	Chad	Congo, Rep. of	Equatorial Guinea	Gabon	Average	Average
Documents for export (number)	8	9	9	8	10	. . .	6	7	8	10	9	7	12	6	4	8	8
Time for export (days)	35	69	21	27	66	. . .	22	32	39	38	63	87	50	26	19	47	40
Cost to export (US$ per container)	980	1,215	781	1,656	1,752	. . .	978	463	1,118	524	1,502	1,860	1,732	1,203	4,000	1,804	1,561
Documents for import (number)	11	13	19	9	16	19	10	9	13	14	19	14	15	6	10	13	12
Time for import (days)	48	66	48	26	61	89	26	41	51	51	60	111	62	50	26	60	52
Cost to import (US$ per container)	1,452	1,700	1,395	1,749	2,680	3,266	1,674	695	1,826	1,360	1,572	2,400	2,201	1,203	4,031	2,128	1,947
Rank	130	154	132	125	167	174	94	64	130	140	156	157	166	96	112	138	124

Sources: World Bank, Doing Business database 2006; and IMF staff calculations.

Table 12.4. Doing Business Survey, 2006

Indicator	WAEMU	CEMAC	Sub-Saharan Africa	Latin America	East and Central Asia	East Asia and Pacific
Starting a business	152	151	125	87	77	74
Dealing with licenses	123	110	110	69	111	74
Employing workers	147	156	118	79	86	57
Registering property	128	119	121	87	72	81
Getting credit	137	119	112	70	62	89
Protecting investors	107	78	92	78	85	76
Paying taxes	135	141	104	102	105	63
Trading across borders	130	138	124	82	97	66
Enforcing contracts	132	138	111	116	50	93
Closing a business	100	132	111	94	80	95
Overall	153	157	131	84	77	74

Sources: World Bank, Doing Business database 2006; and IMF staff calculations.

Most, but not all, export taxes have been phased out. In contrast to the joint tariffs on imports, export taxes are set at the national level. They are applied on exports to all countries, including other members. Reportedly, the taxes concerned are generally low and relate to only few products (primarily logs and timber products).[9]

Finally, it is important to note the wide range of overlapping trade agreements that shape the trade regime.[10] The CEMAC countries are also members of the ECCAS, which aims to create a free trade area by the end of 2007 (WTO, 2006).[11] The CEMAC countries benefit from several arrangements that provide preferential access to developed countries. These include the Cotonou and Everything But Arms (EBA) agreements with the European Union, preferences under the African Growth and Opportunity Act (AGOA) for exports to the U.S. market, and under the Generalized System of Preferences (GSP) for exports to several other countries.

[9]The Central African Republic maintains export taxes of 2.25 percent, 4.25 percent, 4.05 percent, and 10.5 percent on gold, diamond, processed wood, and timber respectively. Equatorial Guinea currently has export taxes that range between a 1 percent (coffee and cocoa) and 15.8 percent (logs), with intermediate rates for other goods (reexports, plywood, and sawn wood). Cameroon and the Republic of Congo maintain export taxes on timber and logs only. Chad imposes export taxes on cattle and some plants.

[10]See Yang and Gupta (2005) for an analysis of the key features of the many trade arrangements in Africa, and the related concerns of weak implementation, lack of transparency, and protectionism.

[11]The ECCAS also includes Angola, Burundi, Rwanda, São Tomé and Príncipe, and the Democratic Republic of the Congo.

Box 12.3. Transportation Delays and Costs

Administrative delays owing to transit and customs procedures, roadblocks, and poor transportation services result in delays and excessive transportation costs and thereby hinder intraregional trade. For example, a cargo journey from the port of Douala (Cameroon) to Bangui (Central African Republic) and N'djamena (Chad) takes an average of two and five weeks, respectively. In principle, in the absence of any administrative or organizational hurdles, transportation from Douala to N'djamena could be completed in one week (Integrated Framework, 2005). In addition, the average clearing and transportation costs for a 20-foot container from Douala to Bangui or N'djamena are about 4,000—about four times the cost of maritime transport from Europe to Douala (World Bank, 2004a). Port expenses account for about 25 percent of that amount (which is almost equivalent to the cost of maritime transport from Europe to Douala), and the remaining 75 percent is spend on road transportation.

The 2005 Diagnostic Trade Integration Study for Chad suggests that these costs and delays, although high, are comparable to those in West African countries. For example, average clearance time for imported containers in the port of Douala is about 19 days, which was second only to Senegal (30 days), in a review of eight countries along the west coast of Africa (World Bank, 2004c). However, costs and delays are about 30 percent lower for landlocked countries in East Africa; for example, for Kigali (Rwanda), which is within the same distance from its ports as N'djamena. In addition, for Uganda and Tanzania, 72 percent and 85 percent of roads, respectively, are classified as in good or fair condition compared to 30 percent in Cameroon (World Bank, 2004c).

The World Bank's Doing Business indicators also corroborate the high trasportation costs, focusing on the costs and delays related to procedural requirements for importing and exporting (see Table 12.3). On average, it costs about $1,800 to export and almost $2,100 to import a 20-foot container load—which exceeds the costs in WAEMU by about 60 percent and 20 percent, respectively, largely as a result of the high costs of trade in Gabon. Reflecting very lengthy procedures in Chad, the time required to export and import is, on average, about 20 percent more for CEMAC countries than in WAEMU.

Prospects for Enhancing Intracommunity Trade

The lack of functional transportation corridors across the CEMAC countries is likely the main impediment to intraregional trade, although several helpful initiatives are under way. Several of the weaknesses of the trade regime discussed in the section "The Current Regime: Deficiencies,

and Reforms" hamper trade within the CEMAC—in particular, the problems concerning the rules of origin and double taxation. However, these concerns are probably overshadowed by the severe deficiencies of transportation infrastructure in the region. The resulting high costs and long delays in the transportation of goods are discussed in Box 12.3. In line with an action plan adopted at a June 2004 workshop in Douala, several projects for improving cross-country road infrastructure are currently being implemented—supported by the European Union, the African Development Fund, and the World Bank. These projects aim to connect, for instance, Douala (Cameroon) with Bangui (Central African Republic) and with N'djamena (Chad). A still unpaved section in the Central African Republic of the Douala-Bangui corridor poses a serious bottleneck during the rainy season. However, part of the project has been delayed as a result of the Central African Republic's suspension from EU funding. The projects also include a trade facilitation component, with the construction of border posts and checkpoints on both sides of the border for administrative services, including customs, police, and forestry services. Transportation is also hampered by serious security problems involving highway robbers, armed cross-border rebels, and internal rebel groups.

A structural determinant of the low level of intracommunity trade may be the lack of complementarities in the production structures of the member countries. There is substantial similarity in the natural comparative advantages of the CEMAC countries, and, as a result, in their production and trade patterns (Table 12.5), which limits the scope for internal trade. In particular, oil is the main source of exports for all countries except the Central African Republic. Other exports relate to wood products and cotton. But there is very little diversification, especially in manufacturing. Of the six members, only Cameroon has a significant industrial base.

The existence of only limited product complementarities is confirmed by a more formal analysis. Trade complementarity between a pair of countries is traditionally measured by the Trade Complementarity Index (TCI). The index is a measure of similarities between the export basket of one country and the import basket of another; therefore, it can provide useful information on prospects both for intraregional and external trade. We define the bilateral product complementarity index between country *i* exports and country *j* imports based on Michaely (1996), as follows:

$$TCI_{ij} = 100 - \sum_{k} \frac{|M_{jk} - X_{ik}|}{2},$$

Table 12.5. CEMAC: Sources of Imports and Tariff Revenue by Product Type[1]
(In percent of total)

	Imports	Tariff Revenue
Agricultural products	20	25
Industrial products	80	75
Oil products	14	9

Source: Data provided by the authorities.
[1]Based on total imports by Cameroon (2004), Gabon (2004), and the Central African Republic (2003).

where X_{ik} is country *i*'s total exports of product *k*, and M_{jk} is country *j*'s total imports of product *k*. The higher the index between two countries, the greater the product complementarity. The index is zero when no product exported by one country is imported by the other; the index is 100 when the export-import shares match exactly.

We calculate and compare bilateral product complementarity indices for CEMAC and WAEMU member countries using UN COMTRADE data at the two-digit classification level (Tables 12.6 and 12.7). Following Tsikata (1999) and Khandelwal (2004), we consider TCIs above 25 as indicative of strong complementarity. Our estimates suggest a much higher degree of average complementarity within WAEMU, compared to CEMAC (30.4 compared to 16.9). In addition, the highest average complementarity in CEMAC (Central African Republic imports to rest of CEMAC exports) is lower than the smallest average complementarity in the WAEMU (Senegal imports to rest of WAEMU exports). These findings help explain the higher volume of intraregional trade within WAEMU compared to CEMAC.

Within CEMAC, the more developed and diversified economies of Cameroon and Gabon appear to be in a much better position to market their exports in the region than the smaller and less developed Central African Republic. Exports from Cameroon to the Central African Republic exhibit the highest degree of complementarity (28.6), and exports from the Central African Republic to Gabon the lowest (7.8).[12]

[12]We also calculated TCIs at the one-digit level because it allows us to increase the sample of CEMAC countries (results available upon request). Although TCIs at the one-digit level are higher by construction, the conclusions still remain unchanged: complementarities within CEMAC are low, especially for exports by the Central African Republic and Equatorial Guinea. Exports from Cameroon to Equatorial Guinea exhibit the highest degree of complementarity.

Table 12.6. Trade Complementarity Index in CEMAC
(Two-digit)

		Exporter		
		Cameroon	Central African Republic	Gabon
Importer	Cameroon	. . .	9.8	23.0
	Central African Republic	28.6	. . .	21.0
	Gabon	11.4	7.8	. . .

Sources: UN COMTRADE database; and authors' calculations.

A similar pattern emerges for WAEMU. With an average TCI of 51.3, Senegal and to a lesser extent Côte d'Ivoire—the largest and most developed member countries—are in the best position to market their exports to the region.[13] There is also evidence of asymmetric complementarities for the smaller economies, in particular for Benin and Niger: product complementarities between Niger and Benin exports with the region's imports are the lowest, while at the same time these countries' imports have the highest complementarity with the region's exports.

Nonetheless, a closer look at the product composition of internal and external trade suggests significant potential for an expansion of trade within the union. The above exercise gives an impression of the (limited) scope for diverting existing trade flows toward the regional partners. However, this exercise assumes unchanged production patterns. The key question may be whether intraregional trade also could be boosted by stimulating the production in CEMAC of those goods—especially in the manufacturing sector—for which an effective market in other member countries could be opened up as a result of a substantial reduction in transport-related and administrative barriers within the region. To help answer this question, we calculated for three CEMAC members, for what part of imports (at the six-digit level) from non-CEMAC countries, any other CEMAC country already had significant exports to any country—indicating that there is, at least, a potential for production within the union that could satisfy the demand for imports.[14] This exercise

[13]However, product complementarity between Senegal and Côte d'Ivoire is high.

[14]The (2003 or 2004) import data relate to Cameroon, the Central African Republic, and Gabon and the export data include all six member countries, using older (1995) data for Chad, the Republic of Congo, and Equatorial Guinea. After all, the existence of exports a decade ago still provides evidence of a potential for production. Exports were included only if they exceeded $1 million.

Table 12.7. Trade Complementarity Index in WAEMU
(Two-digit)

		Exporter							
		Benin	Burkina Faso	Côte d' Ivoire	Guinea-Bissau	Mali	Niger	Senegal	Togo
Importer	Benin	. . .	27.1	43.1	. . .	31.0	27.0	48.9	43.0
	Burkina Faso	17.4	. . .	35.7	. . .	24.8	15.9	50.3	33.6
	Côte d'Ivoire	18.1	19.0	. . .	. . .	25.6	15.9	56.9	33.1
	Guinea-Bissau	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	Mali	14.0	17.1	37.2	. . .	. . .	13.8	49.5	36.4
	Niger	24.5	26.2	41.8	. . .	28.7	. . .	50.2	37.4
	Senegal	19.9	21.7	38.9	. . .	26.3	15.9	. . .	36.3
	Togo	19.3	21.9	38.5	. . .	23.9	20.4	51.6	. . .

Sources: UN COMTRADE database and authors' calculations.

indicates that for 21 percent of total CEMAC imports, there may be potential for the development of internal sources.

Recent Trade Initiatives

Reducing the CET

With tariff rates up to 30 percent, and an unweighted average of about 19 percent, the CEMAC CET rates are high in comparison with other countries and country groups, including in Africa (Table 12.8). In particular, with an average rate of about 13 percent, WAEMU tariffs are substantially lower. As shown in Table 12.9, average CEMAC tariffs exceed WAEMU tariffs for all sectors. The highest rates apply to footwear, wood products, and agriculture—with average rates of 23 percent or more—which are also produced domestically. This pattern is suggestive of a protectionist bias. Evidence of tariff escalation is mixed, although for most industries, tariffs are higher on finished than on semifinished products (WTO, 2006). Finally, with its large variation in tariff rates, CEMAC tariffs are also more dispersed than those of WAEMU—which complicates customs administration and entails price distortions across imported goods.

Revenues from external tariffs have provided a significant source of fiscal revenues—although declining in relative terms (Table 12.10). From 2000 to 2005, import duty receipts remained stagnant in nominal terms, declining in proportion to total fiscal revenues and GDP. Tariff revenue amounted to 1.5 percent of GDP in 2004, and 1.3 percent in 2005, while declining from 9 percent of total revenues to 7 percent, as higher oil prices boosted GDP and fiscal receipts. Actual tariff revenues have remained well below the level that would result from combining the schedule-based rates to imports, reflecting the eroding effect of exemptions on the import tax base.[15]

Nonetheless, there are strong arguments for tariff reduction. Extensive empirical evidence supports the positive impact of trade liberalization on economic growth and, thereby, on poverty alleviation (Berg and Krueger, 2003). For the CEMAC countries, trade liberalization could help boost the development of a more diversified non-oil export base, which is of vital importance for long-term growth and external sustainability because oil resources are expected to be largely depleted over the coming decade

[15]The higher level of actual tariff receipts compared with the computed level for Gabon likely reflects misclassification in the fiscal data.

Table 12.8. Simple Average MFN Tariffs, 2005
(In percent)

Africa	15.0
CEMAC	19.1
COMESA	14.7
ECOWAS	14.2
WAEMU	12.1
SADC	11.9
Other developing countries	10.8
Asia-Pacific	10.5
Europe	7.4
Middle East and Central Asia	11.2
Western Hemisphere	11.5
Industrial countries	6.2

Source: IMF staff calculations.

and a half. Trade liberalization could result both from lower rates and from reducing the high degree of tariff dispersion (which would result in more uniform price incentives across products and curb tariff escalation). Accordingly, a move from the current tariff schedule to WAEMU rates—which are capped at 20 percent rather than 30 percent—could serve as a useful first step.

Trade liberalization should be accompanied by measures to compensate for its impact on fiscal revenues, as needed. Table 12.11 suggests that the revenue impact of adopting WAEMU tariff rates could be as large as 40 percent—reducing the calculated receipts (disregarding exemptions) from 2.2 percent of GDP to 1.3 percent. This simulation, however, does not incorporate any positive volume response of imports to the lower domestic prices of imported goods, and therefore overestimates the actual revenue effect.[16] Reducing the many tariff exemptions that have narrowed the current tariff base provides a first option for offsetting such losses. Further revenue measures should aim to strengthen income and indirect tax policies and administration. In principle, shifting from trade taxes to taxes on domestic consumption would help offset the revenue loss, while preserving the efficiency gains from the tariff cuts, because domestic producers would now face world market prices.

[16]However, a positive volume response is unlikely to be large enough to maintain the original revenue level, given that CEMAC tariff rates are already below levels considered revenue maximizing (IMF, 2005).

Table 12.9. CEMAC and WAEMU: MFN Import Tariff Rates by Sector

HS Classification	CEMAC		WAEMU	
	Average MFN rate (In percent)	Standard deviation	Average MFN rate (In percent)	Standard deviation
Animals and animal products	22.7	6.4	15.1	6.1
Vegetable products	23.4	9.8	14.3	6.8
Foodstuffs	25.3	9.1	16.5	5.6
Mineral products	10.1	2.2	6.1	3.4
Chemicals and allied products	11.3	6.6	7.1	5.0
Plastics/rubbers	16.5	9.4	10.7	6.2
Raw hides, skins, leather, and fur	19.5	10.0	12.0	5.7
Wood and wood products	26.3	8.1	10.6	6.3
Textiles	22.1	8.6	17.1	5.0
Footwear/headgear	29.3	2.6	17.7	4.2
Stone/glass	24.9	9.3	15.3	6.0
Metals	16.7	7.9	12.7	6.8
Machinery	14.2	7.1	8.8	5.8
Transportation	16.5	9.4	10.3	6.2
Miscellaneous	21.3	9.4	14.4	6.6
Unweighted average	19.1	9.6	12.1	6.8

Source: Oliva (2008).

Table 12.10. CEMAC: Tariff Receipts[1]

(In percent of GDP)

	Actual, in Percent of		Based on Tariff Schedule
	Revenue excluding grants	GDP	
Cameroon	10.1	1.4	2.2
Gabon	8.4	2.3	2.1
Central African Republic	16.9	1.1	1.8
Chad	25.7	1.3	. . .
Republic of Congo	6.6	2.1	. . .
Equatorial Guinea	12.8	0.3	. . .
CEMAC	9.4	1.5	2.2

Sources: IMF, World Economic Outlook database; IMF staff estimates; and data provided by the authorities.

[1]Based on data for 2004, except for the Central African Republic (2003 data).

Economic Partnership Agreement

Discussions with the EU on an EPA started in 2003 and an agreement could be enacted as of January 1, 2008. São Tomé and Príncipe and the Democratic Republic of the Congo have joined CEMAC in preparing for an EPA (which would not involve their membership in CEMAC as such).

Table 12.11. CEMAC: Scenarios for Tariff Receipts[1]
(In percent of GDP)

	Based on Tariff Schedule	WAEMU Tariff Rates	EPA	EPA and WAEMU Tariff Rates
Cameroon	2.2	1.3	1.2	0.6
Gabon	2.1	1.5	0.7	0.5
Central African Rep.	1.8	0.9	1.0	0.5
Chad	. . .	. . .	. . .	. . .
Congo, Rep. of	. . .	. . .	. . .	. . .
Equatorial Guinea	. . .	. . .	. . .	. . .
CEMAC	2.2	1.3	1.0	0.6

Sources: IMF, World Economic Outlook database; IMF staff estimates; and data provided by the authorities.

[1]Based on data for 2004, except for the Central African Republic (2003 data).

The first phase of the negotiations was completed in December 2005.[17] The second phase involves drafting the specific agreements. Specific issues at this stage concern product exemptions, rules of origin, and the pace of liberalization. On rules of origin, discussions have focused on a 50 percent local content requirement, in the context of wider talks of all Asian, Caribbean, and Pacific (ACP) countries with the EU.[18]

An EPA could be instrumental in addressing the serious institutional weaknesses of the CEMAC trade regime. The proper functioning of an EPA would require the uniform application of trade rules by all CEMAC countries, in particular concerning rules of origin. More generally, an EPA could provide both the areawide political momentum and the technical assistance needed for empowering the regional authorities, harmonizing the rules and procedures and strengthening their implementation, and reforming the investment climate.

The effect of an EPA on the CEMAC manufacturing sector will likely hinge on liberal rules of origin. Available evidence refutes earlier notions that restrictive rules of origin could support industrialization by promoting the development of local supply chains that would provide inputs for domestic industries serving the European markets (so-called backward integration).

[17]The Schedule and principles for these discussions are presented in a joint 2004 document (Feuille de route des négociations des Accords de Partenariat Economique Entre l'Afrique Centrale et l'Union Européenne).

[18]As discussed above, the current local content requirement within CEMAC is 40 percent. CEMAC representatives noted that this internal requirement would need to be harmonized with the one under an EPA.

Instead, a simple and low-value-added criterion is more likely to be beneficial, attracting foreign investors into new export industries that would use third-country inputs and benefit from inexpensive local labor and tariff preferences. The potential for the success of such an approach is evidenced by the United States' AGOA initiative. Under AGOA, eligible African countries are granted tariff free access to the U.S. market, with relatively liberal rules of origin.[19] Several African countries, including Lesotho and Swaziland, have seen large increases in manufacturing production triggered by AGOA aimed at the U.S. market, often using cheap inputs from outside the region.

In the context of an EPA, Hinkle and Schiff (2004) argue that sub-Saharan Africa's gains from liberalization of trade in the service sector are likely to come from the import side, because of the less developed nature of the export service sector in sub-Saharan Africa and the constraints on expanding the employment of temporary workers in the EU.[20] This argument also extends to the case of CEMAC, where exports are dominated by the oil sector. Further, Hinkle and Schiff (2004) suggest that imports of services should be liberalized on both an MFN and an intra-sub-Saharan Africa regional bloc basis at the same time as they are liberalized vis-à-vis the EU in order to attract investment by the most efficient service providers and benefit from economies of scale. At the same time, the timing of the liberalization in various service sectors depends on the capacity of the sub-Saharan African countries to implement the required accompanying regulatory reforms in these sectors.

An overall evaluation of the costs and benefits of an EPA should also incorporate the likely incidence of trade diversion and revenue losses.

- An EPA would entail serious risks of large-scale trade diversion. The relatively high CET would entail a clear incentive in case of selective trade liberalization for both trade creation and trade diversion. A second indicator for the risks of trade diversion is provided in Table 12.12, which shows the degree to which goods (at the six-digit classification level) currently imported from non-European sources are also already imported from the EU. It appears that this is the case for almost all such imports—although imports from non-European sources accounted for 47 percent of total imports, those concerning goods that were *not* also imported

[19]The regular requirement is that domestic content must equal at least 35 percent of a product's value. Moreover, further exemptions apply (until September 2007) for apparel made in low-income countries using outside fabric.

[20]Possible priority sectors for liberalization are transportation, telecommunications, and finance.

Table 12.12. CEMAC: Indications of the Scope for Trade Diversion[1]
(In percent of total imports)

	Imports from Non-EU Countries	
	Total	"Not overlapping" with imports from EU
CEMAC	47	1
Cameroon	53	3
Gabon	32	1
Central African Republic	58	12

Sources: Data provided by the authorities and IMF staff calculations.
[1]Based on total imports by Cameroon (2004), Gabon (2004), and the Central African Republic (2003) and exports by Cameroon (2004), Gabon (2004), the Central African Republic (2003), Chad (1995), Equatorial Guinea (1995), and the Republic of Congo (1995).

from the EU amounted to only 1 percent of total imports.[21] This finding is suggestive of a large scope for CEMAC countries to turn to the EU for products that are now, at least in part, sourced from other, cheaper suppliers.

- The eventual revenue impact of an EPA would be substantial, because more than 50 percent of CEMAC imports originate in the EU. An EPA would involve an implementation period that may well extend to 2020, at the end of which EU goods could enter CEMAC free of import tariffs or quotas—albeit with exemptions for a limited range of products. As a benchmark, the EPA column in Table 12.11 provides a tentative approximation of the possible revenue impact in case of full import liberalization for imports from the EU. The lower revenue levels in comparison with those in the first column indicate that revenue could decline by more than half, which reflects the current tariff revenue relating to imports from the EU. The actual eventual tariff loss may be overestimated in this simple exercise by ignoring product exemptions, or underestimated by ignoring the further tariff loss that would result with trade diversion. A noteworthy result is also that the tariff loss would be largest by far for Gabon, reflecting the high EU share in its imports, which amounts to about 65 percent of the total. This is well above the average for CEMAC as a whole, at 53 percent.

[21]The part of imports from non-EU countries concerning goods not also imported from EU sources is smaller for CEMAC as a whole than for individual countries because the calculation for CEMAC as a whole considers EU exports to any CEMAC country.

The risks of trade diversion call for parallel tariff cuts on an MFN basis, accompanied by a timely further strengthening of domestic revenue mobilization. The revenue loss would, however, be compounded if an EPA were combined with tariff reductions on an MFN basis, thereby limiting trade diversion. A scenario for the tariff loss in case with parallel tariff cuts to the WAEMU tariff rates is shown in the final column of Table 12.11, which suggests that revenues from import tariffs could drop by about three-fourths.

Global Trade Liberalization

The significance of global trade liberalization for the CEMAC member countries can be illustrated by the effects of a successful conclusion of the Doha Round. Several studies found that under a possible Doha Round scenario, increased market access for agricultural and nonagricultural merchandise exports to industrial countries alone would not bring substantial benefits to many countries in Africa (Anderson, Martin, and Mensbrugghe, 2005; and Boüet and others, 2005). This is in part because existing preferences for Africa (such as those under the Everything But Arms Initiative in the EU) would be eroded (see Box 12.4). This argument, however, has little immediate relevance for CEMAC, as its members have so far largely failed to take advantage of the existing preferences for developing a significant non-oil export sector. In addition, rising world agricultural prices would lead to worsening terms of trade for Africa's net food importers—including CEMAC. However, over time, higher world prices may turn some net food importers in Africa into net exporters.

A beneficial result from the Doha Round for the CEMAC countries would crucially depend on the extent to which these countries themselves would also liberalize their own imports.[22] Anderson, Martin, and Mensbrugghe (2005) find that sub-Saharan Africa would gain provided that the countries engage fully in the Doha reform process. This result mirrors the earlier discussion of the gains from trade liberalization, with relatively high initial tariff levels. This would imply reconsidering the opportunity for developing countries to liberalize less than middle-

[22]The study finds that for sub-Saharan Africa (excluding South Africa), the net effect could be a net decline in real income by 0.1 percent. However, the net result would switch to a 0.3 percentage point improvement if developing countries undertook the same reductions in bound (but not necessarily applied) tariffs as the high-income countries.

Box 12.4. The Doha Round and Africa's Preference Erosion[1]

African countries have emphasized the potential losses from preference erosion. The estimated impact of preference erosion is, however, often overstated, because of the failure to take account of the underutilization of preferences and export increases in sectors not affected by preference erosion. Moreover, preference erosion usually represents a permanent shock occurring over a long period of time, which can be anticipated.

Yang (2005) notes that what is overlooked is that, over the past two and a half decades, African countries have become increasingly dependent on other developing countries for trade, despite the ever-expanding trade preferences they have received in industrial countries. Further, if recent trends continue, it is likely that by the time any Doha Round liberalization is implemented (say, by 2015), developing countries may account for an even larger share of Africa's exports. Liberalization in developing countries will lead to little preference erosion because no major preferences for Africa are in place in these countries. Moreover, trade barriers against African exports (especially those against manufactures) remain significantly higher in developing countries than in industrial countries, and hence the potential market access gains are larger.

[1]Based on IMF (2005, Box 2.4) and Yang (2005).

and high-income countries. These results are largely confirmed by a simulation of the poverty impact of the Doha Round for Cameroon (Emini, Cockburn, and Decaluwé, 2005), which finds a small adverse welfare impact of a Doha Round scenario. However, positive results emerge in case of full liberalization by Cameroon, although the size of these gains crucially depends on a possible reduction in Cameroon's export prices, with increased export volumes of cash crops, wood processing, and forestry.

Concluding Remarks and Policy Recommendations

The manifold weaknesses in the implementation by the member countries of the agreed-to customs union regime highlight a need for a renewed political commitment to regional integration. Although recent political declarations on strengthening integration policies are welcome, policy measures at the national level have progressed

only slowly. The incipient momentum in 2003 for coordinated action appears to have lost steam.

Progress also requires effective central oversight. The CEMAC secretariat, which is responsible for overseeing compliance with the agreed-to trade regime, lacks the means and the authority to carry out this role in an effective manner. In this context, recent proposals for converting the secretariat into a commission, with adequate means and authority, present an important step. A first requirement for an effective central organization concerns data collection, both on trade flows and on country-specific regulations and practices.

Key measures for improving compliance with the requirements for a customs union should be adopted without delay at both the regional and—most importantly—the national level. The deficiencies of existing regulations and of implementation by member countries have already been identified in the context of the 2003 road map for reform. Key actions include limiting tariff exemptions, phasing out remaining surcharges, strengthening (and maybe simplifying) the determination of products' origin, and enhancing customs administration in general, including through ASYCUDA. A further key requirement is the need to improve transportation infrastructure and organization.

The ongoing preparations for an EPA should be buttressed by comprehensive analyses of its likely effects. An EPA would reduce fiscal revenues from international trade—possibly by about half, and even more in the case of Gabon. It would also entail serious risks for trade diversion, given the wide range of goods imported from the EU at present. Preparations for an EPA should also include poverty and social impact analyses, taking into account the differential impact on import and export prices of goods produced and consumed by urban and rural households. The main benefits from an EPA may well be those that stem from the opportunities for improving the consistent application of trade regulations and from possible EU assistance in upgrading and marketing CEMAC exports.

There is a strong case for tariff reduction, with or without an EPA. CEMAC tariffs are relatively high, especially the top rate of 30 percent for consumer goods. Trade liberalization would help boost economic growth and poverty alleviation and limit risks of trade diversion with an EPA. The returns to trade liberalization will be larger if they take place in tandem with other structural reforms (for example, labor market reform) to enhance market functioning.

Finally, tariff reform should be complemented by improvements in domestic revenue mobilization. Both the introduction of an EPA and tariff reductions on an MFN basis would likely result in a significant loss of fiscal

revenues that could amount to 1 percent of GDP or even more. Moreover, the gradual loss of fiscal revenues during the implementation period of an EPA would broadly coincide with the loss of oil-based revenues, because most oil resources are expected to be depleted over the coming decade or so. The introduction of VAT systems in the 1990s has provided a helpful foundation for shifting from trade-based to domestic taxation.

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13

Trade in WAEMU: Developments and Reform Opportunities

MANUELA GORETTI AND HANS WEISFELD

The creation, between 1996 and 2000, of the West African Economic and Monetary Union (WAEMU) customs union was an important step toward greater regional integration in western Africa. It was part of an initiative to boost regional integration and policy effectiveness after the CFA franc was devalued relative to the French franc in 1994. The WAEMU customs union entails free movement of goods between member countries and application of a common external tariff (CET) on imports from other countries.

Although creation of the customs union streamlined the region's trade regime, both structural constraints and competitiveness concerns have impeded its implementation. There are still costly border procedures; lack of compliance with community rules, especially rules of origin; weak governance; and inadequate transport infrastructure.

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Recent trade initiatives bring both opportunities and challenges. First, an ECOWAS-wide customs union could boost trade between WAEMU and its West African neighbors.[1] Second, an Economic Partnership Agreement (EPA) with the European Union (EU) could bring far-reaching reciprocal trade liberalization between WAEMU and the EU. Finally, global trade liberalization, for example through a revived Doha Round, could further enhance market access and affect world market prices for some of the region's main agricultural products.

This chapter reviews the main elements of the reform agenda and provides a quantitative assessment of some potential effects on trade patterns and tariff revenue. The next section describes the main characteristics of WAEMU's trade. The following section presents the current trade regime and its challenges. We then look at the scope for boosting intraregional trade, and discuss prospects for enhancing trade with other countries.

WAEMU Trade Characteristics

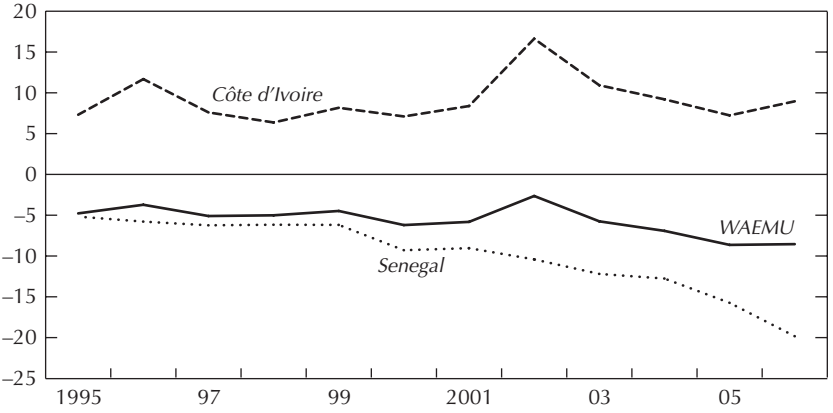
In recent years, trade in WAEMU has suffered from significant shocks, both foreign and domestic. Among them are an appreciation of the CFA franc against the U.S. dollar resulting from the CFA's fixed parity with the euro and the depreciation of the dollar, a strong increase in oil prices, and a reduction in the profitability of major export commodities. As a result, the region's trade deficit has slowly but continuously grown from 3 percent of GDP in 2002 to 8 percent in 2006 (Figure 13.1). Senegal has particular problems; its trade deficit is almost 20 percent of GDP, owing in part to difficulties in the phosphate and fishing industries. As WAEMU's only oil exporter, Côte d'Ivoire has been the only member to benefit from the recent increase in oil prices. The oil-importing member countries have suffered under rising oil bills (Figure 13.2).

Some of the region's main export sectors are not profitable. Figure 13.3 summarizes export performance in WAEMU by product.[2] World prices and

[1]ECOWAS consists of the WAEMU countries and Cape Verde, The Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone. In 2006, ECOWAS GDP was 4.7 times WAEMU GDP.

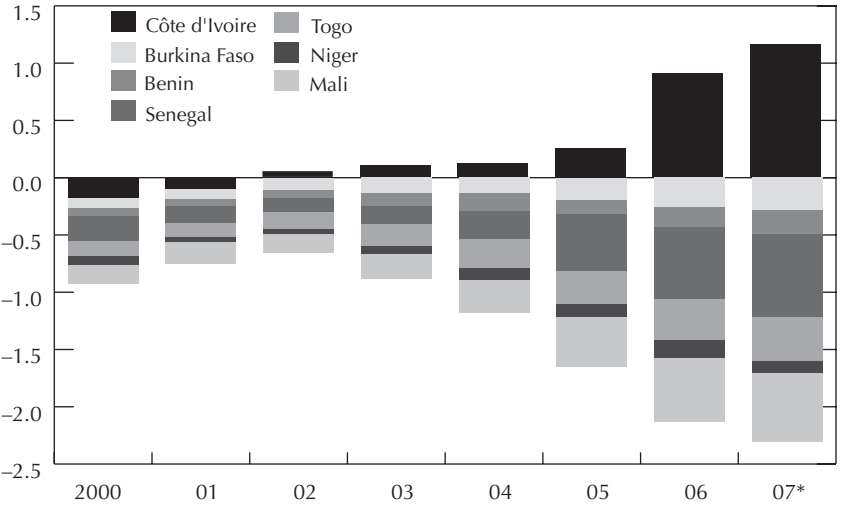
[2]The figure shows price increases and growth in world exports for the main WAEMU exports; bubbles reflect the relative size of each sector and are based on the ratio of WAEMU's total exports to GDP.

Figure 13.1. Trade Balances
(In percent of GDP)



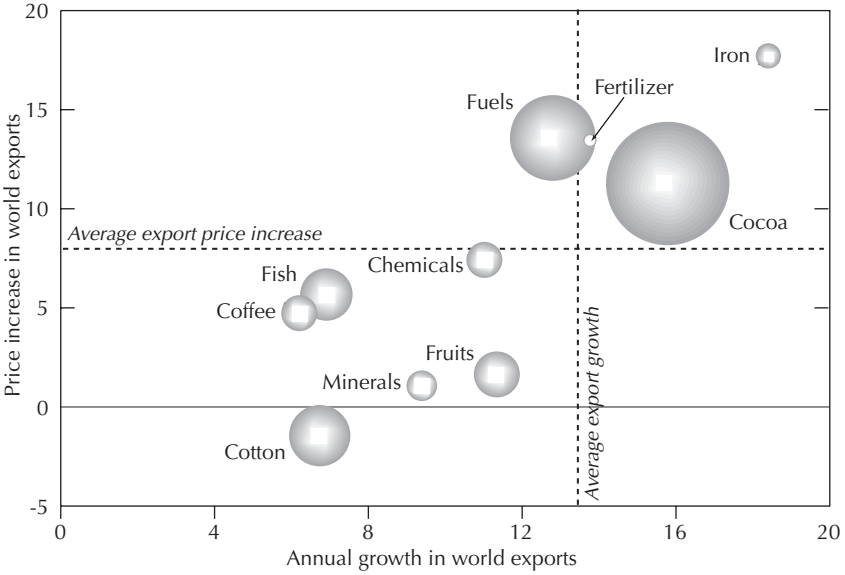
Sources: IMF, World Economic Outlook database; and author's calculations.

Figure 13.2. Oil Trade Balances of WAEMU Countries
(In billions of U.S. dollars)



Sources: IMF, World Economic Outlook database; and author's calculations.
Note: Countries are listed in the legend in the order that their oil trade balance appears in the bars.

Figure 13.3. WAEMU: Export Performance by Product, 2000–05
(Percent, bubbles reflect relative size of exports)

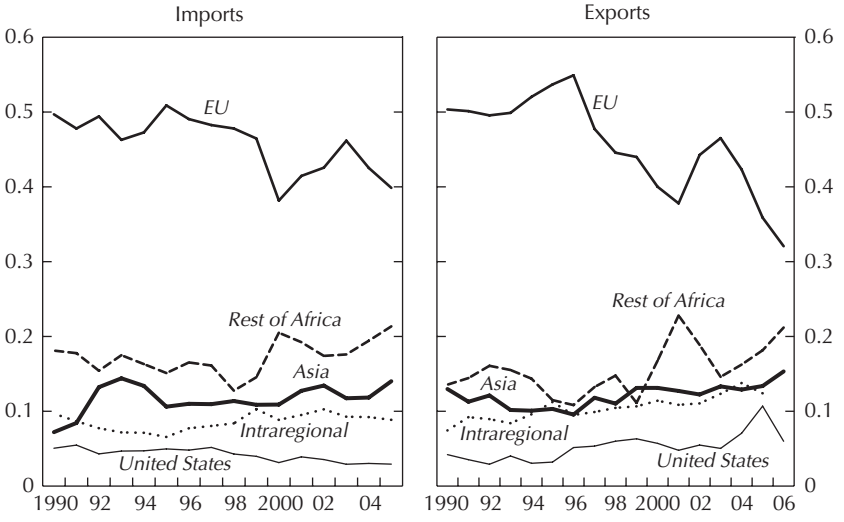


Sources: UN COMTRADE and authors' calculations.

demand have been declining for cotton—one of the main exports of Benin, Burkina Faso, Mali, and Togo—in the past five years. Cotton exports have also suffered from developed country subsidies for their cotton production, as well as from increased competition from Brazil and China. In contrast, cocoa and oil products—both exported by Côte d'Ivoire—have seen robust increases in both prices and demand. In general, WAEMU exports are not diversified, so the region's trade performance is exposed to substantial terms of trade and other shocks.

Oil products, cereals, vehicles, machinery, and mechanical appliances are among WAEMU's main imports. Whereas exports are usually denominated in U.S. dollars, imports tend to reflect trading partner currencies, notably the euro. The appreciation of the euro has thus affected exports and imports asymmetrically: it has penalized most exports, but on the import side it has helped lessen little more than the impact of higher U.S. dollar oil prices. Although the EU is still WAEMU's main trading partner, its weight has fallen over the years. Asian and other African countries are

Figure 13.4. Composition of WAEMU Trade with Various Partners
(In percent of total)



Sources: IMF, *Direction of Trade Statistics;* and authors' calculations.

increasingly important; Asia now accounts for 13 percent, Africa for 20 percent, and the EU for 38 percent of WAEMU trade (Figure 13.4).

Intraregional trade in WAEMU has increased only marginally since the free trade area was created in 1996. It was relatively stable at about 11 percent of total trade from 2000 through 2006 (Figure 13.5). Nevertheless, WAEMU still has more intraregional trade than any other region in Africa.[3]

The Current Trade Regime

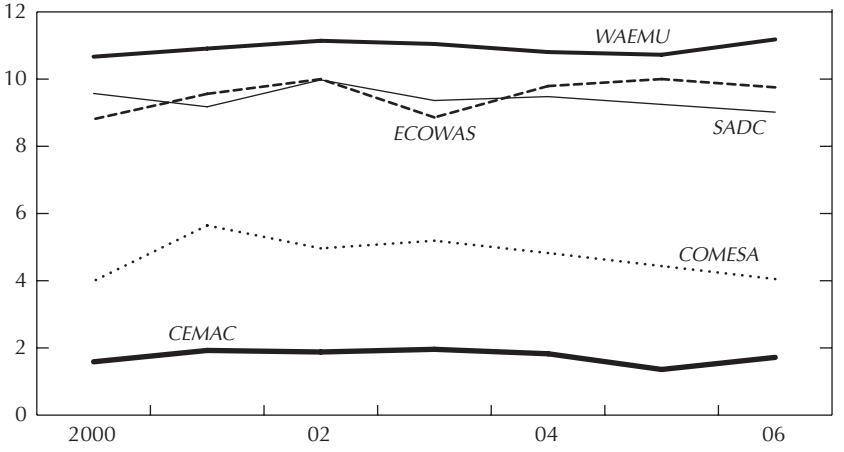
Characteristics and Deficiencies

The adoption of the free trade agreement in 1996 and of the CET in 2000 reduced tariff rates and streamlined the tariff structure.[4] Although no tariff or quantitative restriction is applied to intraregional trade in

[3]Official statistics do not capture WAEMU's informal trade, which is considerable, especially in fresh products.

[4]The WAEMU customs union was put into place in two steps: in 1996 member countries removed tariffs and quantitative restrictions on intraregional trade (tariffs on trade in

Figure 13.5. Intraregional Trade: WAEMU and Other Selected Regional Groups
(In percent of total trade)



Sources: IMF, *Direction of Trade Statistics;* and authors' calculations.

domestic products, levies on imports from third countries are based on four tariff bands, ranging from 0 percent for "social" goods (for example, medicines), "cultural" goods (for example, books), and capital goods to 20 percent for finished consumer goods.[5] The simple average most favored nation (MFN) tariff rate is 14.2 percent,[6] with almost 40 percent of imports classified under the 10 percent tariff band (Table 13.1) and a little less than 50 percent of imports being manufactured products (Table 13.2).

Tariff receipts fall substantially short of estimates based on the CET schedule, which suggests that CET implementation is generally weak

industrial products were phased out over four years); and in 2000 they adopted a common external tariff, which reduced tariff rates and tariff dispersion substantially.

[5]Details on the tariff bands applied to each tariff line are shown in WAEMU Regulation 23/2002/CM/UEMOA.

[6]This tariff rate does not include other charges and duties applied on consumption goods: a statistical fee of 1 percent; the 1 percent WAEMU Community solidarity levy (PCS), applied to goods of non-WAEMU origin; a 0.5 percent ECOWAS levy applied to goods of non-ECOWAS origin; and in some cases, a charge for the inspection and verification of imported goods of 0.75–1 percent.

Table 13.1. WAEMU: Sources of Imports and Tariff Revenue by Import Tariff Band, 2005
(In percent of total)

Tariff Band	Imports	Tariff Revenue
5%	32.0	14.1
10%	38.9	34.4
20%	29.1	51.4

Sources: Data provided by the authorities and IMF staff estimates.

(Table 13.3). Shortfalls are particularly pronounced in Côte d'Ivoire, Guinea-Bissau, and Mali.[7]

Substantial differences in factor costs between WAEMU countries have led to the introduction of nontariff barriers. Although some differences can be explained by the geographical characteristics of the countries (for example, landlocked versus coastal) and transport costs, many distortions in prices are caused by differences in taxes, notably on oil products. Togo has the lowest factor costs in the region and Burkina Faso the highest (Table 13.4). Box 13.1 presents an analysis of Benin's inefficient transport system and high costs.

Most nontariff barriers arise from national trade regulations that conflict with WAEMU rules. Quantitative restrictions are still present in the form of minimum levels of imports and exports; Burkina Faso, Côte d'Ivoire, and Senegal still use reference values in their customs valuation of certain products; a "statistical fee" is often applied to products in transit through the trade corridors of the union; three countries impose a charge for verifying imported goods to remunerate inspection companies; there are still some disputes on CET tariff lines, although the number has been substantially reduced in recent years; double taxation on transit goods still applies to some imports; and temporary tariff surcharges introduced with the CET in 2000 and scheduled to expire in 2006 are still in place in some countries.[8]

[7]Curiously, in Benin actual receipts exceed what could be expected based on the CET schedule. This points to data inaccuracies.

[8]The *Taxe Dégressive de Protection* (TDP) was established to compensate for the decline in protection related to installation of the CET. Until December 2006, the TDP entailed a 5 percent levy on specific products, such as vegetable oils, cigarettes and tobacco substitutes, matches, and textile bags. Senegal and Côte d'Ivoire still apply the *Taxe Conjoncturelle à l'Importation* on some products (flour, sugar, tomato concentrate, and so forth). Its purpose is to mitigate the effect on community production of sharp fluctuations in international prices. The authorities wish to replace the *Taxe Conjoncturelle à l'Importation* with a regional safeguard arrangement.

Table 13.2. WAEMU: Sources of Imports and Tariff Revenue by Product Type, 2005
(In percent of total)

Tariff Band	Imports	Tariff Revenue
Agricultural products	20.1	22.5
Manufacturing products	47.2	45.1
Oil products	27.3	16.2

Source: Data provided by the authorities and IMF staff estimates.

Some countries do not fully implement the WAEMU rules of origin. These rules are used to certify products as being of WAEMU origin and therefore as free of import tariffs. A recent simplification of the rules and their management has reduced the time needed to obtain certification from 6 months to an average of 15 days.[9] Nevertheless, Mali and Côte d'Ivoire have generalized disputes on certificates issued by other countries and often apply the CET to imports from other WAEMU members (Box 13.2 details Mali's implementation of the trade regime).

Cumbersome and inefficient administrative practices hamper the functioning of the customs union. The World Bank's *Doing Business Survey 2006* suggests that the business environment is poor in all WAEMU member states.[10] With reference to trading across borders, the WAEMU ranks below most other countries and the sub-Saharan African average. Mali and Niger have particularly burdensome procedures; import processing is lengthy and the number of documents to be presented for both imports and exports is unreasonable (Table 13.5).

Among the physical barriers to trade are numerous ineffective police and customs checkpoints along trade corridors. A double control system at the borders considerably lengthens clearance times without reducing illegal practices.

Finally, sociopolitical developments in the region and poor road security have further impeded free movement of goods across borders. In particular, the crisis in Côte d'Ivoire has forced some countries, notably the landlocked ones, to channel part of their trade through ports outside of Côte d'Ivoire. Regional programs to facilitate transport and improve security have not been very effective so far.

[9]The use of a common nomenclature has also facilitated customs procedures. Most WAEMU members are adopting the 2002 version of the Harmonized System (HS) and use the Automated System for Customs Data (ASYCUDA). Guinea-Bissau still does not follow the HS, and Senegal uses another customs data system.

[10]The survey covers 175 economies.

Table 13.3. Actual and Expected WAEMU Tariff Receipts

	Actual, Based on Official Data on Customs Duties		Based on CET Tariff Schedule					
	In percent of total revenue[1]	In percent of GDP	In percent of total revenue[1]			In percent of GDP		
	2003	2003	2003	2004	2005	2003	2004	2005
Benin	15.0	2.5	14.0	20.7	20.0	2.4	3.4	3.3
Burkina Faso	12.0	1.5	18.4	19.1	22.3	2.2	2.4	2.8
Côte d'Ivoire	8.2	1.4	20.3	25.2	22.7	3.4	4.4	3.9
Guinea-Bissau	11.8	1.8	34.5	16.9	26.6	5.2	2.9	4.7
Mali	10.4	1.7	20.8	16.5	6.5	3.4	2.9	1.2
Niger	12.0	1.2	26.8	39.4	40.1	2.6	4.4	3.9
Senegal	12.7	2.3	18.6	32.3	28.5	3.4	6.0	5.5
Togo	14.6	2.5	18.3	17.4	53.5	3.1	2.9	8.4
WAEMU	10.9	1.7	19.5	24.9	23.8	3.1	4.1	3.9

Sources: Data provided by the authorities; and IMF, *World Economic Outlook* and staff estimates.
[1]Excluding grants.

Table 13.4. Factor Costs in WAEMU, 2006

Factors	Benin	Burkina Faso	Côte d'Ivoire	Guinea-Bissau	Mali	Niger	Senegal	Togo	WAEMU Average	WAEMU Standard deviation (In percent of average)
Labor										
National minimum wage[1] (CFA/mo.)	27,000	28,723	36,607	. . .	28,460	18,899	36,174	13,757	27,089	31
Employer's social contribution rate[1] (%)	16	22	14	. . .	17	15	8	14	15	26
Land										
Urban area (unbuilt)[1] (CFA/m^2)	2,975	8,667	8,175	. . .	1,673	6,000	106,042	. . .	22,255	185
Capital										
Average lending rate (end-year) (%)	10.1	10.1	7.3	12.3	9.9	11.2	6.1	10.1	9.6	21
Tax rates on business profit[1] (%)	38	35	35	. . .	35	35	33	40	36	7
Tax rates on securities (avg)[1, 2] (%)	14	25	11	. . .	18	16	11	10	15	35
Energy and water										
Premium gasoline (CFA/liter)	425	607	615	710	635	661	600	525	597	15
Diesel (CFA/liter)	415	587	545	520	525	586	568	515	533	10
Kerosene (CFA/liter)	385	490	395	430	440	456	454	375	428	9
Electricity (low tension) (CFA/Kwh)	93.3	86.0	61.2	175.0	59.4	96.4	83.8	65.8	90.1	41
Electricity (medium tension) (CFA/Kwh)	63.3	121.0	51.9	115.0	88.0	79.9	78.5	63.3	82.6	30
Water[1] (CFA/m^3)	307	1,040	684	. . .	321	403	576	379	530	50
Transports										
Freight (food)[1] (CFA/TK)	53	. . .	18	. . .	29	24	. . .	. . .	31	49
Freight (nonfood products)[1] (CFA/TK)	51	. . .	31	. . .	30	24	. . .	. . .	34	35
Telecommunications										
Local telephone call[1] (CFA/min.)	23	30	59	. . .	15	25	21	20	28	53
Monthly Internet subscription[1] (CFA/mo.)	9,505	15,000	15,000	. . .	30,000	4,950	10,000	9,000	13,351	61

Source: BCEAO.

[1]2005 data.

[2]Tax rates on returns from equities, bonds (short-term and long-term issuances), and other dividends.

Box 13.1. Deficiencies in the Transport and Transit System: The Case of Benin

Poor transportation services, roadblocks, and administrative delays owing to transit and customs procedures are major obstacles to trade in WAEMU. Although landlocked countries tend to have the highest costs to trade and the longest delays, coastal countries also suffer from lengthy procedures and excessive transportation costs. Let us use Benin as an example.

Benin has some of the highest transport costs in the region (see Table 13.4). For example, to ship a ton of rice from Benin to Niger costs about CFAF 71 a kilometer but from Togo only CFAF 47 a kilometer, for a total cost of CFAF 75,000 versus CFAF 70,000, even though the distances are shorter and Benin borders Niger.

- The Cotonou port, the main entry point for imports to Benin, accounts for about 40 percent of the country's tax revenue. Despite its gateway role for landlocked countries and its strategic position next to Nigeria, the port's traffic is below potential owing to both deficiencies in infrastructure and organizational and procedural problems. Port users are subject to several unofficial fees. The high costs and long delays affect the port's competitiveness. To address these issues and speed reform, the authorities have recently handed over management of the port to the U.S.-funded Millennium Challenge Account Benin unit.
- The majority of transit declarations from Cotonou port, accounting for 68 percent of the total value of transit, are not documented (World Bank, 2006). A number of goods, especially used cars, tend to be declared as being in transit to landlocked countries in order to suspend tax payments, but are instead smuggled to Nigeria.
- The planned adoption of the CET at the ECOWAS level (as described in the section on expanding intraregional trade) and the respect of the *Transit Routier inter-Etat* program should help avoid double taxation and multiple controls on goods in transit and thus reduce the incentive to replace formal trade relations with smuggling.

Conclusions and Policy Recommendations

Member country implementation of the customs union is uneven and hampered by nontariff and other barriers. Both WAEMU and ECOWAS are putting in place regionwide programs to address cumbersome customs procedures and uneven application of the rules. The institution of national committees to monitor the implementation of rules of origin is an important step. Nevertheless, national governments will have to

Box 13.2. Implementation of the Trade Regime: The Case of Mali

Mali's average tariff rate has fallen from 22.1 to 15.0 percent since the CET was introduced. This includes supplementary duties equal to 2.5 percent (some imports are also subject to a contribution to the Import Inspection Program). Despite the reduction and the significant unification of customs duties, the country still faces several challenges in implementing the WAEMU trade regime. Continuing exemptions and limited compliance with community rules substantially raise the country's de facto level of protection:

- Mali still classifies 10 tariff lines differently from the regional CET. Because it has general disputes on products of origin, it tends to levy the CET rate on imports from WAEMU members. Mali's authorities say these actions are taken because coastal countries, notably Côte d'Ivoire, do not respect the rules concerning products in transit.
- The country continues to apply a special import tax (*Taxe Conjoncturelle à l'Importation*) of 55 percent on imports of sugar from non-WAEMU countries and restricts imports of cigarettes, tobacco, beef, and live cattle. These and other measures have created incentives for smuggling through neighboring countries.
- Mining and other companies approved under Mali's Investment Code are exempt from customs duty; and although the country has no export subsidy program, enterprises with an export content above 80 percent of production are granted tax concessions.
- The customs process is marred by lengthy and costly clearance procedures, entailing a very high number of customs documents; the cumbersome system has even hampered the ability of the WAEMU Commission to send CET compensation payments to Mali in a timely manner because of the time it takes to review the paper documentation.

Sources: WTO (2004), World Bank (2004), Malian authorities, and IMF staff estimates.

commit to implementing the regional reforms and guarantee the correct functioning of the customs union if trade is to be effectively facilitated.

Realizing the Regional Economic Program could help mitigate country differences in factor costs and help strengthen the trade regime. The projects on road transport, energy, and water distribution should reduce and harmonize factor costs, which in turn should increase incentives to comply with the customs union rules.

Table 13.5. Doing Business Survey, 2006: Trading Across Borders

Indicator	WAEMU									CEMAC	SSA
	Benin	Burkina Faso	Côte d'Ivoire	Guinea-Bissau	Mali	Niger	Senegal	Togo	Average	Average	Average
Documents for export (number)	8	9	9	8	10	. . .	6	7	8	8	8
Time for export (days)	35	69	21	27	66	. . .	22	32	39	47	40
Cost to export (U.S. dollar per container)	980	1,215	781	1,656	1,752	. . .	978	463	1,118	1,804	1,561
Documents for import (number)	11	13	19	9	16	19	10	9	13	13	12
Time for import (days)	48	66	48	26	61	89	26	41	51	60	52
Cost to import (U.S. dollar per container)	1,452	1,700	1,395	1,749	2,680	3,266	1,674	695	1,826	2,128	1,947
Rank	130	154	132	125	167	174	94	64	130	138	124

Sources: World Bank, Doing Business Database 2006; and IMF staff calculations.

Prospects for Enhancing Intraregional Trade

The WAEMU countries show significant trade complementarities, particularly between coastal and landlocked countries.[11] This can be seen with the help of Michaely's (1996) trade complementarity index (TCI). The TCI measures the similarities between the import structure of one country and the export structure of another. It is defined as

$$TCI_{ij} = 100 - \sum_{k} \frac{|M_{jk} - X_{ik}|}{2},$$

where X_{ik} is country *I*'s total exports of product *K*, and M_{ik} is country *J*'s total imports of product *k*.[12] The index ranges from zero, indicating no complementarity, to 100, indicating perfect complementarity between the export and import structures of the two countries. Estimates for WAEMU based on trade data at the HS two-digit classification level suggest considerable complementarity; the average level of the index is 30 percent, compared, for example, to only 17 percent for CEMAC.[13]

Trade complementarities vary from country to country. Côte d'Ivoire and Senegal present average export complementarity indices of 39 percent and 52 percent with the rest of WAEMU, because their economies are diversified and these two coastal countries are more likely to reexport to landlocked ones. In contrast, for Benin, Niger, and Burkina Faso the average export complementarity is less than 25 percent, suggesting that what they export only partially meets the import needs of other member countries (Table 13.6).

On this basis, there is room for more intraregional trade. An analysis based on the potential for expansion of production in certain sectors suggests that WAEMU could satisfy internally another 3 percent or so of its import demand.[14] With production patterns unchanged, the current level of intraregional trade could thus be expanded from 11 percent of total

[11]Reexports, notably between coastal and landlocked countries, are important to WAEMU (and ECOWAS) regional trade. Although customs procedures for products in transit are in place, a significant amount of imports are registered as imports and then reexported after a transformation sufficient to change their certificate of origin.

[12]Both variables are expressed as a percent of the total.

[13]As found in the literature and reported in Martijn and Tsangarides (2006), a TCI is considered as an indicator of strong complementarities once it reaches a threshold of 25 percent.

[14]We select products at the six-digit classification level for which a country's net exports exceed $125,000. We consider net exports, instead of exports, in order to control for the significant amount of reexport from third countries within the region.

Table 13.6. Trade Complementarity Index in WAEMU

		Exporter							
		Benin	Burkina Faso	Côte d'Ivoire	Guinea-Bissau	Mali	Niger	Senegal	Togo
Importer	Benin	. . .	27.1	43.1	. . .	31.0	27.0	48.9	43.0
	Burkina Faso	17.4	. . .	35.7	. . .	24.8	15.9	50.3	33.6
	Côte d'Ivoire	18.1	19.0	. . .	. . .	25.6	15.9	56.9	33.1
	Guinea-Bissau	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	Mali	14.0	17.1	37.2	. . .	. . .	13.8	49.5	36.4
	Niger	24.5	26.2	41.8	. . .	28.7	. . .	50.2	37.4
	Senegal	19.9	21.7	38.9	. . .	26.3	15.9	. . .	36.3
	Togo	19.3	21.9	38.5	. . .	23.9	20.4	51.6	. . .

Source: UN COMTRADE database.

trade to about 14 percent. A diversification of production would allow this value to increase further.

Conclusions and Policy Recommendations

Although intraregional trade has grown only marginally in recent years, policy efforts to promote diversification of the production base and guarantee effective application of the customs rules could promote a significant expansion of intraregional trade. Regional and national programs targeting development of the secondary sector could further enhance trade complementarities between WAEMU countries. In addition, the recent adoption of the *Transit Routier Inter-Etat* program to correct the functioning of the trade corridors and introduce a joint control system should help expedite customs procedures and reduce informal trade within WAEMU.

Prospects for Enhancing Trade with Countries Outside the Region

Enhancing Trade Within ECOWAS

Trade integration within ECOWAS has so far been limited to WAEMU. At present, trade between WAEMU members and the other ECOWAS countries is subject to substantial tariff barriers: WAEMU countries apply the CET to imports from the other ECOWAS countries, and in turn these countries apply country-specific tariffs to imports from WAEMU (and all other countries, including other ECOWAS countries). Even though

average tariff rates of non-WAEMU ECOWAS countries do not differ markedly from the WAEMU average rate, the structures of tariff systems vary widely.[15]

For several years ECOWAS has been planning to form a customs union. In early 2006 the ECOWAS heads of state agreed to extend the CET to ECOWAS as a whole and form a free trade area among ECOWAS members, with the end of 2007 as the target date. To provide some flexibility on the CET, it was decided that countries could suggest a list of products to be temporarily or permanently moved to another tariff band. When these are negotiated, the parties should strive to ensure that the new average tariff levels and tariff dispersion are no higher, and preferably, lower than those current in the WAEMU.[16] It was also agreed to introduce measures, similar to those used in the WAEMU, to temporarily offset tariff revenue losses. Finally, it was decided to allow countries to apply safeguard measures in line with WTO rules.

The trade complementarities between ECOWAS countries are substantial, which could promote trade. The trade complementarity index for WAEMU countries as exporters and the other ECOWAS countries as importers (see Table 13.7) is 29 percent, higher than the index level of 25 percent that is thought to indicate strong potential for enhancing trade. For WAEMU countries as importers and the other ECOWAS countries as exporters, the index is 20 percent (27 percent if Guinea and Sierra Leone are excluded), which also suggests that there is potential for expanding trade. As with all reductions of preferential tariffs, an ECOWAS-wide customs union could also lead to some trade diversion; that is ECOWAS imports replacing imports from other countries. However, the limited overlap between WAEMU imports from the other ECOWAS countries and imports from the EU suggests that the scope for trade diversion is small.

Revenue losses resulting from the creation of an ECOWAS customs union are likely to be limited. Current tariff revenue from trade with ECOWAS countries averages 0.1 percent of GDP and ranges from close to zero in Mali to 0.6 percent in Burkina Faso (Table 13.8). A loss of this amount of revenue seems manageable. Actual losses are likely to be even lower, because Table 13.8 assumes that current tariff revenue is where it

[15]Average tariff rates in ECOWAS range from 12 to 16 percent (except for Cape Verde, which has lower rates).

[16]Some ECOWAS countries seem to have suggested introducing much higher bands (for example, for rice, one of WAEMU's main imports).

Table 13.7. Trade Complementarity Index in ECOWAS

		Exporter															
		WAEMU									Non-WAEMU						
		Benin	Burkina Faso	Côte d'Ivoire	Guinea-Bissau	Mali	Niger	Senegal	Togo	WAEMU	Cape Verde	The Gambia	Ghana	Guinea	Nigeria	Sierra Leone	Non-WAEMU
Importer	WAEMU																
	Benin	. . .	27.1	43.1	. . .	31.0	27.0	48.9	43.0		34.7	26.3	21.2	8.0	16.5	7.7	19.1
	Burkina Faso	17.4	. . .	35.7	. . .	24.8	15.9	50.3	33.6		38.2	19.4	17.8	8.0	24.0	8.4	19.3
	Côte d'Ivoire	18.1	19.0	. . .	. . .	25.6	15.9	56.9	33.1		40.7	23.6	24.8	10.8	23.9	8.3	22.0
	Guinea-Bissau	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		. . .	. . .	. . .	. . .	. . .	. . .	. . .
	Mali	14.0	17.1	37.2	. . .	. . .	13.8	49.5	36.4		37.6	18.7	18.7	9.9	22.3	9.4	19.5
	Niger	24.5	26.2	41.8	. . .	28.7	. . .	50.2	37.4		31.9	32.2	21.7	9.6	16.5	9.0	20.2
	Senegal	19.9	21.7	38.9	. . .	26.3	15.9	. . .	36.3		37.4	21.5	21.6	10.7	23.9	9.2	20.7
	Togo	19.3	21.9	38.5	. . .	23.9	20.4	51.6	. . .		40.9	24.9	20.7	8.4	22.9	7.5	20.9
	WAEMU									. . .	37.4	23.8	20.9	9.3	21.4	8.5	20.2
	Non-WAEMU																
	Cape Verde	21.6	20.7	34.9	. . .	26.2	16.7	35.2	40.6	28.0	. . .	24.0	23.9	9.4	10.1	10.4	
	The Gambia	21.9	25.0	38.5	. . .	25.6	23.1	43.7	37.6	30.8	27.5	. . .	22.4	11.0	14.5	10.3	
	Ghana	18.6	20.2	39.3	. . .	26.2	18.4	47.8	35.2	29.4	32.2	24.7	. . .	11.7	15.4	8.5	
	Guinea	19.5	21.9	37.2	. . .	25.6	18.4	51.2	35.9	30.0	38.5	24.2	18.1	. . .	23.8	8.6	
	Nigeria	14.4	17.1	29.9	. . .	24.4	15.0	38.9	37.9	25.4	25.5	20.8	23.1	12.3	. . .	9.5	
	Sierra Leone	24.6	25.1	37.6	. . .	27.3	17.1	47.0	37.1	30.8	53.2	20.8	18.7	7.7	41.7	. . .	
	Non-WAEMU	20.1	21.7	36.2	. . .	25.9	18.1	44.0	37.4	29.0							. . .

Source: UN COMTRADE database.

Table 13.8. Introduction of the ECOWAS CET: Scenario for Tariff Receipts in WAEMU
(In percent of GDP)

	2005 Tariff Receipts Based on WAEMU CET Tariff Schedule		Expected Level of Tariff Receipts Under ECOWAS CET
	All trading partners	ECOWAS only	Total
Benin	3.31	0.14	3.16
Burkina Faso	2.75	0.56	2.19
Côte d'Ivoire	3.87	0.03	3.84
Guinea-Bissau	4.69	0.20	4.50
Mali	1.17	0.01	1.15
Niger	3.87	0.24	3.64
Senegal	5.52	0.04	5.48
Togo	8.41	0.15	8.27
WAEMU	3.89	0.13	3.76

Sources: Data provided by the authorities; IMF, *World Economic Outlook*; and IMF staff estimates.
Note: We assume application of the current WAEMU tariff schedule to all non-ECOWAS exporters.

would be if the CET were applied flawlessly (we saw earlier that actual revenue is substantially lower than that). Some further revenue losses could occur through trade diversion.

However, progress toward the customs union has been slow, and it seems increasingly likely that the year-end target date will be missed. So far there has been no agreement on the classification of goods into the WAEMU's CET bands. Also, the details of the accompanying and safeguard measures have not yet been agreed. Because unification of the trade regime is important for further trade integration with the European Union (see below), the discussions should be accelerated.

Enhancing Trade with the EU[17]

Currently, trade between WAEMU and the EU does not conform to the World Trade Organization (WTO) principle of nondiscrimination. Until now, WAEMU's commercial relations with the EU have been framed by partnership agreements that the EU has entered into with developing countries in Africa, the Caribbean, and the Pacific (ACP countries). These agreements (the Lomé I agreement signed in 1975, Lomé IV signed in 1989, and the Cotonou Agreement signed in 2000 and covering EU-ACP cooperation

[17]Parts of this section draw on Nielsen and Zouhon-Bi (2007).

through 2020) gave ACP countries preferential access to the EU market for all industrial and most agricultural products.[18] The agreements discriminate between ACP countries and other developing or least developed countries in that they give ACP countries better access to the EU market. The agreements are also nonreciprocal: ACP countries have better access to the EU market than the EU has to ACP markets. These features are inconsistent with the EU's obligation to respect the WTO principle of nondiscrimination and the rules that govern derogations of this principle.[19]

The Cotonou Agreement, while temporarily prolonging the nonreciprocal preferences, calls for a shift to WTO-consistent trade. It specifies that WTO-consistent agreements should be finalized by the end of 2007 to ensure that the new agreements can be phased in starting in January. Consistency with WTO rules will be ensured by establishing reciprocity. Full reciprocity is to be reached no later than 2020, when EU goods can enter the WAEMU free of import tariffs or quotas—though a limited range of products may be exempted.[20] The WTO membership endorsed this approach in 2001, and the EU was granted a waiver of its WTO commitments with respect to the Cotonou Agreement through 2007.

The negotiation of WTO-consistent trade agreements as part of an EPA is being conducted in parallel with six different regional groups, ECOWAS being one of them. Mauritania has joined this group for the

[18]For overviews of trade preferences and their effects on development see, for example, Hoekman and Öezden (2005) and Panagariya (2002). These studies find that trade preferences did little to support development, in part because they lessened incentives for developing countries to open up to trade.

[19]In 1947, the General Agreement on Tarriffs and Trade (GATT) established nondiscrimination as the fundamental principle of international trade. It entails (1) the MFN principle, which obliges a country to extend to all members of the GATT/WTO the most favorable terms it offers to any of them; and (2) national treatment, requiring that imported goods, once they have cleared customs and border procedures, be treated no worse than domestically produced goods. Nondiscrimination limits the role of strategic motives for sidelining particular sources of supply, such as small countries, helping to depoliticize trade and to keep the system predictable and rules-based. The GATT/WTO rules allow derogations from the nondiscrimination principle only (1) where developed countries provide preferential market access to all developing or least developed countries, or (2) where members of reciprocal preferential trade agreements collectively discriminate against imports from other countries. The Lomé and Cotonou conventions do not satisfy condition (1) because they grant better EU market access to ACP countries than to other developing or least developed countries. The conventions do not satisfy condition (2) because they are not reciprocal.

[20]Such limited exemptions are common in past EU agreements that have not been challenged by the WTO.

purpose of negotiating the agreement. The negotiations, coordinated by the ECOWAS Secretariat, started in October 2003.

So far there has not been much progress on the EU-ECOWAS EPA negotiations. The ECOWAS therefore recently requested from the EU a three-year extension of the deadline negotiations, citing concerns about a lack of competitiveness and calling for EU aid to help build industries that could survive a removal of tariffs on imports from the EU.[21]

An EPA could help address institutional weaknesses affecting trade in the WAEMU. An EPA could provide the areawide political momentum needed for harmonizing rules and procedures and ensuring their implementation. Further, an EPA would encompass trade facilitation measures, including support for applying technical, sanitary, and phytosanitary standards and customs procedures, which could have a substantial impact on trade development.[22]

However, the prospective EPA also raises some problems. First, it is not only likely to create trade through higher imports from the EU, but it could also divert trade if imports from the EU replace cheaper imports from other countries (see Box 13.3, a case study of Togo).[23] Second, the EPA will put downward pressure on the fiscal position of WAEMU members because they will gradually lose customs revenue from EU-sourced imports as the tariffs on them are gradually removed. Customs revenue from other imports will also decline as result of trade diversion. Third, the poor business environment in WAEMU, limited access to credit, and other factors could slow the reallocation of capital and labor set free through cheaper imports from the EU.

The scope for revenue losses seems large. Table 13.9 shows the effects of a loss of all revenue currently generated by tariffs on imports from the EU, as would happen with the eventual complete removal of such tariffs

[21]The EU has publicly announced that there can be no delay relative to the end-2007 deadline. In any case, it seems likely that the WTO membership would permit a temporary prolonging of the current discriminatory arrangement only if the EU offers some WTO concessions.

[22]For an empirical analysis of the effects of trade facilitation on trade volumes, see Wilson, Mann, and Otsuki (2005).

[23]Trade creation enhances welfare because it allows goods to be sourced from the lowest-cost producer. Trade diversion, the replacement of an import that has a low pretariff price by a similar import that has a higher pretariff import price, lowers welfare because it prevents such sourcing (Viner, 1950). The net welfare effects of an EPA for the WAEMU countries could therefore be positive or negative, depending on whether the volume of trade creation multiplied by the unit value of goods it affects exceeds or falls short of the volume of trade diversion multiplied by the unit values of goods it similarly affects. The unit values not being available, this paper does not calculate the welfare effects of an EPA.

Box 13.3. Potential Impact of the EU-ECOWAS EPA on Togo

ECOWAS members will lose tariff revenue with an EU-ECOWAS EPA and experience a change in trade patterns. The welfare effect of the change in trade patterns is uncertain because it depends on both welfare-enhancing trade creation and welfare-reducing trade diversion.

This box presents some stylized facts to suggest the effects that an EPA might have on Togo:

- Assuming that production and trade patterns are unchanged, the estimates in Table 13.9 suggest that the EPA would reduce Togo's trade tax revenue by more than 4.4 percent of GDP—more than half of total trade tax revenue. Efforts to recoup this substantial loss by raising more domestic tax revenue will be essential to preserve fiscal sustainability and continue valuable spending programs.
- Togo's imports from the EU currently account for 55 percent of total imports. This share could increase considerably after the EPA is operative. Almost all Togo's imports (at the six-digit classification level) are sourced both in EU and non-EU countries; only a minimal 1.3 percent of products come only from non-EU countries. This suggests that an EPA could lead to substantial trade diversion from non-EU to EU member countries.
- For the EPA to generate welfare losses, trade diversion would have to entail replacement of low-cost products from outside the EU by more expensive imports from the EU. For five of Togo's main import products,

under an EPA.[24] As before, actual losses could be lower, because Table 13.9 assumes that current tariff revenue is where it would be if the CET were applied flawlessly (we saw earlier that actual revenue is substantially lower than that). Losses could also be higher because of trade diversion: some imports currently sourced from outside the EU will in the future be sourced from within. Table 13.10 shows projected fiscal revenue losses after taking trade diversion into account, as calculated by UNECA (2005) and Busse, Borrmann, and Grossman (2004) using the Verdoorn partial equilibrium model (Verdoorn, 1960).[25] The average projected loss ranges from 4 percent

[24]We ignore here the possibility that a small share of import goods may still bear tariffs beyond 2020.

[25]This widely used partial equilibrium model provides easy-to-calculate formulas for trade creation and diversion after preferential tariff reductions. Combining these formulas

which together account for almost 80 percent of total imports, imports from the EU are on average cheaper than from other countries (see table). Yet we cannot conclude that the welfare effects of trade diversion after the EPA is introduced will be small for Togo, because the presence of official aid from the EU on certain products and the aggregation of data may be distorting our estimates of import prices.

Togo: Average Import Prices of Selected Products

Product Description	HS Six-Digit Code	Average Import Tariff[1] (In percent)	Average Import Price (Per unit) From EU members	Average Import Price (Per unit) From other countries
Spelt, common wheat, and meslin	10.01.90	5.00	114	125
Petroleum oils (excluding crude)	27.10.00	7.88	246	260
Of which:				
Partially refined oils	27.10.11	7.86	299	249
Fuel and lubricating oil	27.10.19	7.91	192	271
Hot-rolled iron/steel bars and rods	72.13.91	5.00	133	258
Electrical apparatus for line telephony or line telegraphy	85.17.80	10.00	100,119	101,966

Sources: Data provided by the authorities; and IMF staff estimates.
[1]Average tariff rates based on CET tariff schedule. Note that oil products are subject to different CET tariff lines.

of fiscal revenue in Mali to 12.5 percent in Togo.[26] As in Table 13.9, these calculations assume flawless application of the CET, and actual losses are likely to be lower.

Clearly, it will be essential for trade liberalization to incorporate measures to compensate for its impact on fiscal revenue. Revenue measures should aim to strengthen direct and indirect tax policies and administration. In principle, shifting from trade taxes to taxes on domestic consumption could fully offset the revenue loss while pre-

with information about existing tariff rates makes it possible to calculate revenue effects.

[26]Projections vary in part because of different assumptions about the numerical values of certain behavioral variables that the Verdoorn model requires (price elasticities of import demand and the elasticity of substitution between imports from the EU and the rest of the world).

Table 13.9. Impact of the EPA with the EU: Scenario for Tariff Receipts in WAEMU
(In percent of GDP)

	2005 Tariff Receipts Based on WAEMU CET Tariff Schedule		Expected Level of Tariff Receipts Under the EPA	Expected Level of Tariff Receipts Under the EPA and the ECOWAS CET
	Total	Receipts from the EU	Total	Total
Benin	3.3	1.6	1.7	1.5
Burkina Faso	2.8	1.4	1.4	0.8
Côte D'Ivoire	3.9	2.3	1.6	1.6
Guinea-Bissau	4.7	3.8	0.9	0.7
Mali	1.2	0.3	0.8	0.8
Niger	3.9	0.9	2.9	2.7
Senegal	5.5	4.1	1.4	1.4
Togo	8.4	4.4	4.0	3.9
WAEMU	3.9	2.2	1.7	1.5

Sources: Data provided by the authorities; IMF, *World Economic Outlook;* and IMF staff estimates.
Note: We assume application of the current WAEMU tariff schedule to all non-ECOWAS exporters.

serving the efficiency gains of tariff cuts, because domestic producers would now have to compete with world market prices. However, there is little room for raising tax rates on domestic consumption because the value-added tax rate in WAEMU countries is already quite high. Thus, additional domestic revenue will have to be generated mainly by broadening the domestic tax base and strengthening tax administration. The problem will be particularly challenging for low-income countries,[27] as the WAEMU countries fully recognize. They may wish to review whether the current regional framework for harmonizing and increasing domestic tax revenue is sufficient. Additional revenue could also be generated if customs were administered better. Finally, the WAEMU countries should strive to enhance public financial management and the efficiency of spending.

To allow factors of production made redundant by trade liberalization to be quickly reallocated, an EPA should feature liberal rules of origin. The effect of an EPA on the manufacturing sector in WAEMU will likely hinge on rules of origin. The evidence refutes earlier notions that restrictive rules of origin could support industrialization by promoting local

[27]Keen and Ligthart (2001), Baunsgaard and Keen (2005), and IMF (2005) discuss the challenge of offsetting losses in trade tax revenue through domestic revenue.

Table 13.10. WAEMU: Expected Revenue Loss from an EPA
(In percent of total fiscal revenue)

	UNECA (2005)	Busse, Bormann, and Grossman (2004)	Average
Benin	6.7	8.6	7.7
Burkina Faso	6.1	5.6	5.9
Côte d'Ivoire	5.6	4.6	5.1
Guinea-Bissau	19.4	5.6	12.5
Mali	4.5	3.8	4.2
Niger	7.6	3.6	5.6
Senegal	6.0	10.7	8.4
Togo	12.5	7.4	10.0

Source: Hinkle, Hoppe, and Newfarmer (2006).

supply chains that would provide inputs for domestic industries serving European markets ("backward integration"). Instead, a simple and low-value-added criterion is more likely to attract foreign investors into new export industries that would use inputs from outside the region—benefiting from inexpensive labor and tariff preferences.[28]

The risk that trade will be diverted by an EPA could be countered by parallel tariff cuts on imports from the rest of the world. However, such cuts would likely lead to further revenue losses.[29] These losses could be mitigated by the lessening of EPA-related trade diversion and the associated tariff receipts.

The Cotonou Agreement recognizes that some countries might not be in a position to enter into an EPA. The possible alternatives present their own challenges.[30] ACP countries that decide not to participate in an EPA or to participate only later could export under the EU's non-reciprocal Generalized System of Preferences (GSP). Least developed countries also benefit from the special GSP arrangements known as

[28]The potential that such an approach could succeed is evidenced by the United States African Growth and Opportunity Act (AGOA) initiative. AGOA grants eligible African countries tariff-free access to the United States market; the rules of origin are relatively liberal. AGOA has triggered large increases in manufacturing production in several African countries, including Lesotho and Swaziland, often using cheap inputs from outside the region. It is to be hoped that AGOA can be helpful to the WAEMU countries, too. The WAEMU authorities report that the process of demonstrating AGOA eligibility can be cumbersome; only Senegal has been declared AGOA-eligible, though Benin and Mali have made progress in demonstrating eligibility.

[29]When initial tariff rates are high, tariff cuts can result in revenue increases. The WAEMU CET is, however, too low for this to happen.

[30]All WAEMU countries except Côte d'Ivoire are classified as least developed countries.

the "Everything But Arms" (EBA) initiative.[31] Thus, any WAEMU member except Côte d'Ivoire that is not ready to enter into an EPA by 2008 could export to the EU under the terms of that initiative; Côte d'Ivoire would have to export under the less favorable GSP. Although the preferences of the initiative are more generous than those of the Cotonou Agreement, both the EBA initiative and the GSP have more restrictive rules of origin that could inflict considerable damage on West African exporters. Also, the GSP and the EBA initiative are unilateral arrangements that the EU can cancel at its discretion. Further, market access under these arrangements becomes more restricted as a country gains EU market share.

Enhancing Trade Through Multilateral Trade Liberalization

Multilateral liberalization offers simple and broad market opening and holds the potential to enhance welfare by, for example, accelerating growth and reducing poverty.[32] Bilateral and regional arrangements cannot substitute for multilateral liberalization, for one reason because they lead to trade diversion and strain scarce technical capacity in Africa.

It has been questioned whether multilateral liberalization would be beneficial for sub-Saharan Africa at this time (Panagariya, 2004). Two elements could limit the benefits:

- Under multilateral liberalization, industrial countries would reduce subsidies for agricultural products, making their export to developing countries more expensive. This could benefit African food producers but would hurt African consumers.
- By liberalizing trade for all, multilateral liberalization would erode current trade preferences for Africa, such as those under the Everything But Arms initiative. This could hurt African exporters.

[31]This initiative provides duty- and quota-free access for almost all exports other than arms and munitions. The only exceptions are sugar and rice, which will be given free access only in the second half of 2009; in the meantime, duties on them will be gradually reduced and duty-free quotas increased.

[32]For recent reviews of the literature on the links between trade liberalization, economic growth, and poverty alleviation, see Winters (2002 and 2004); Berg and Krueger (2003); Winters, McCulloch, and McKay (2004); Dollar and Kraay (2004); Anderson (2004); and United Kingdom, Department of Trade and Industry (2004). Wacziarg and Welch (2003) show that for 1950 through 1998, countries that opened up (raising their trade-to-GDP ratio by an average of 5 percentage points) have experienced on average 1.5 percentage points higher GDP growth since doing so.

Recent quantitative research finds that sub-Saharan Africa would still gain from comprehensive multilateral liberalization (Anderson, Martin, and van der Mensbrugghe, 2006). It also finds that Africa's poor would gain disproportionately because of the beneficial effects of liberalization on the agricultural sector, where the poor are concentrated. This makes multilateral trade liberalization a particularly valuable tool for reducing poverty. Further, as Yang (2005) notes, African countries have become increasingly dependent for trade on other developing and emerging countries, where barriers against African exports are substantially higher than in industrial countries. Hence, the potential gains for Africa from better access to these markets are large.

The WAEMU countries should therefore seek further multilateral trade liberalization, including in the Doha Round. WTO negotiations in the Doha Round were suspended in mid-2006 but resumed in early 2007. Regrettably, Doha Round proposals related to market access for African exports such as fishery products have been limited, and a large number of "sensitive goods" of interest to least developed countries have been excluded, reducing the potential gains for Africa. Nevertheless, Anderson, Martin, and van der Mensbrugghe (2006) find that sub-Saharan Africa could still gain from a successful conclusion of the Doha Round if it substantially reduced its own import tariffs.

A successful conclusion of the Doha Round would be particularly helpful for WAEMU cotton producers. Doha negotiations target comprehensive cotton sector liberalization, covering subsidies, market access, and export competition.[33] This could benefit WAEMU's cotton producers through both higher world prices and a larger export volume.

Conclusions and Policy Recommendations

The planned ECOWAS-wide customs union could enhance trade between the WAEMU and its West African neighbors without seriously diverting trade or causing losses of tariff revenue—as long as it does not raise the average tariff rate and tariff dispersion relative to the current WAEMU regime.

[33]As mentioned above, cotton is a major WAEMU export crop and producers have been struggling with low prices for several years. In Benin, Burkina Faso, Mali, and Togo, cotton exports amount to 5–8 percent of GDP and cotton production employs as much as one-third of the population. Subsidies to cotton producers in middle- and high-income countries are substantial; world cotton prices are significantly lower as a result.

The planned EPA with the EU could provide the political momentum needed for good implementation of the current WAEMU or the planned ECOWAS trade regime, and could result in substantial trade creation through both lower tariffs and trade facilitation. However, an EPA could also result in trade diversion and substantial revenue losses. Strengthening domestic revenue will be crucial to preserving fiscal sustainability and valuable spending programs. That strengthening could be achieved mainly by broadening the tax base and firming up tax administration. Customs administration should be enhanced as well. Finally, WAEMU countries should strive to better manage public finances and make spending more efficient.

Trade diversion from preferential trade integration within the ECOWAS and between the ECOWAS and the EU could be mitigated through cuts to the WAEMU (or in future, the ECOWAS) common external tariff. WAEMU should actively pursue multilateral liberalization, not least because of the potential gains for its cotton producers. Cutting the common external tariff could bring further revenue losses, reinforcing the case for strengthening domestic revenue.

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