# 4 Characteristics and structural convergence of the WAMZ economies

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## Introduction

This chapter presents a brief synopsis of the economies of the WAMZ countries, including The Gambia, Ghana, Guinea, Nigeria and Sierra Leone. It discusses their structural economic features, indebtedness, patterns of trade, risk of asymmetric shocks, business cycle synchronization and exchange rate movements and analyses issues relating to economic distance in the WAMZ.

## Key features of the WAMZ economies

The WAMZ is heterogeneous in terms of gross domestic product (GDP) as well as population. In addition, the economies are very open, but tend to rely on very few export goods. The Zone covers a total land area of 1.49 million square kilometres. With the exception of Guinea and Sierra Leone that share national borders, the other countries are not geographically contiguous. The WAMZ has a total combined population of 192.6 million people, representing 66 per cent and 20 per cent of the population of the Economic Community of West African States (ECOWAS) and Africa respectively (World Bank, 2008a), and a combined GDP of US$340 billion (purchasing power parity), representing 73 per cent and 19 per cent of ECOWAS and Africa, respectively.

While the Zone is relatively large geographically, it is still a small open economy in global terms, accounting for less than 1 per cent of the global economy. As a result, even after full integration of the economies, the Zone will still be considered a small open economy, with a strong possibility of imported inflation with implications for the conduct of monetary policy and the choice of targets and instruments within the monetary union.

Nigeria is the dominant economy in the WAMZ, accounting for over 78 per cent of the population and 86 per cent of the Zone's GDP (World Bank, 2008b). Nigeria's economy is oil-based, with the sector contributing about 40 per cent of GDP, 80 per cent of total revenue and 90 per cent of foreign exchange earnings (see Nigeria, 2008). The next largest economy within the Zone is Ghana with 9.2 per cent of the Zone's GDP, while The Gambia is the smallest economy constituting about 0.6 per cent of the GDP.

Table 4.1 WAMZ countries key indicators (2008)

| Country | Population (millions) | Population age composition (%), ages 0–14 | Land area (1,000 km²) | Gross Domestic Product | | |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | | | US$ billion (PPP) | Average annual GDP growth 2001–2008 | Per capita US$ |
| The Gambia | 1.8 | 40 | 10.4 | 2.1 | 4.9 | 1,317 |
| Ghana | 23.9 | 39 | 235.5 | 31.3 | 5.6 | 1,425 |
| Guinea | 9.5 | 44 | 245.9 | 9.7 | 3.1 | 973 |
| Nigeria | 151.3 | 44 | 923.8 | 291.7 | 5.2 | 2,027 |
| Sierra Leone | 5.9 | 79 | 71.7 | 4.0 | 11.0 | 592 |

Sources: World Bank (2008) and (2007).
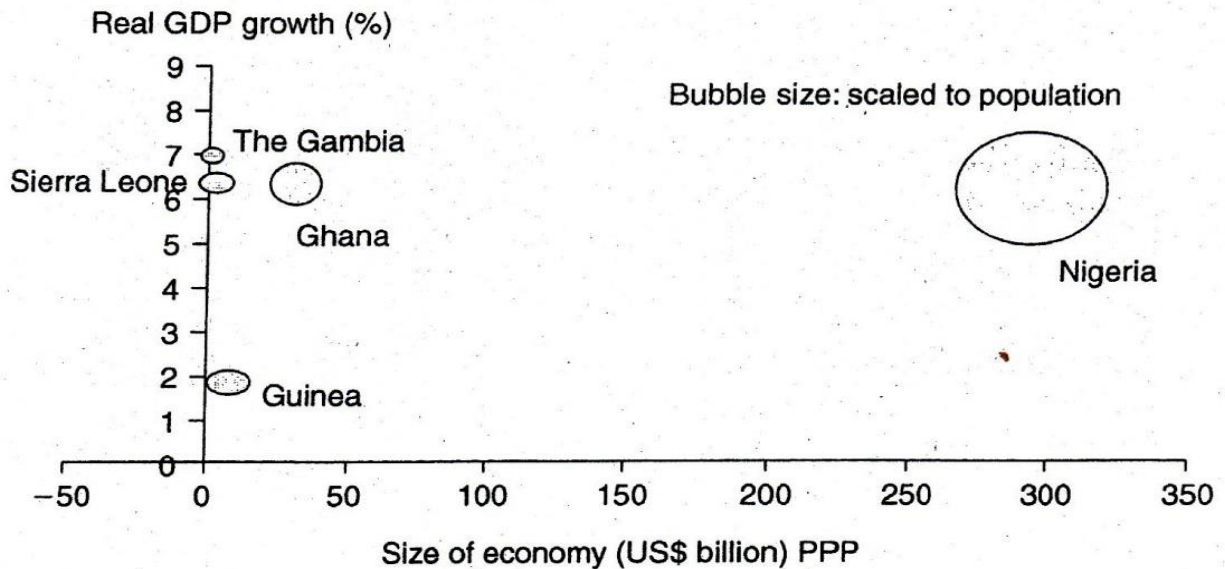
Real GDP growth (%)



*Figure 4.1* WAMZ countries: population, GDP growth and size of economies (2007) (sources: World Bank (2008) and WAMI (2007)).

A decision-making framework that allows the political weight of Nigeria to equal its economic weight may create a sense of dominance by Nigeria that would make monetary zone decisions less acceptable to the other countries. To create a sense of ownership of decisions by all countries, a delicate choice is required that permits: decentralization and a degree of local autonomy; governance by rules agreed by consensus rather than governance by discretion; and having discretionary powers given to a governing board where the members would be selected in such a way that it would be possible to have a high degree of confidence allowing member countries to think of themselves as individuals seeking the interests of the WAMZ as a whole.

## Structure of production and demand in the WAMZ

Apart from Nigeria, sectoral distribution of output in the WAMZ economies shows some similarities, with services and agriculture dominating. In The Gambia, the services sector remains the dominant sector, while in Ghana, contributions from agriculture and the services sectors are quite similar. In Guinea, the services sector was the largest contributor to GDP from 2000 through 2006; however, in 2007, the industrial sector (especially mining) had the largest share of GDP. In Nigeria, the industrial sector (petroleum) remains the largest contributor to output, while in Sierra Leone the agricultural sector continues to provide the dominant share in output growth. It is important to note that although the current production structures in the WAMZ appear divergent, diversification in production, discovery and exploitation of oil in some member countries in the future may increase structural similarities.

Across WAMZ countries, household final consumption expenditure accounts for the greatest share of aggregate demand,[1] followed by gross capital formation
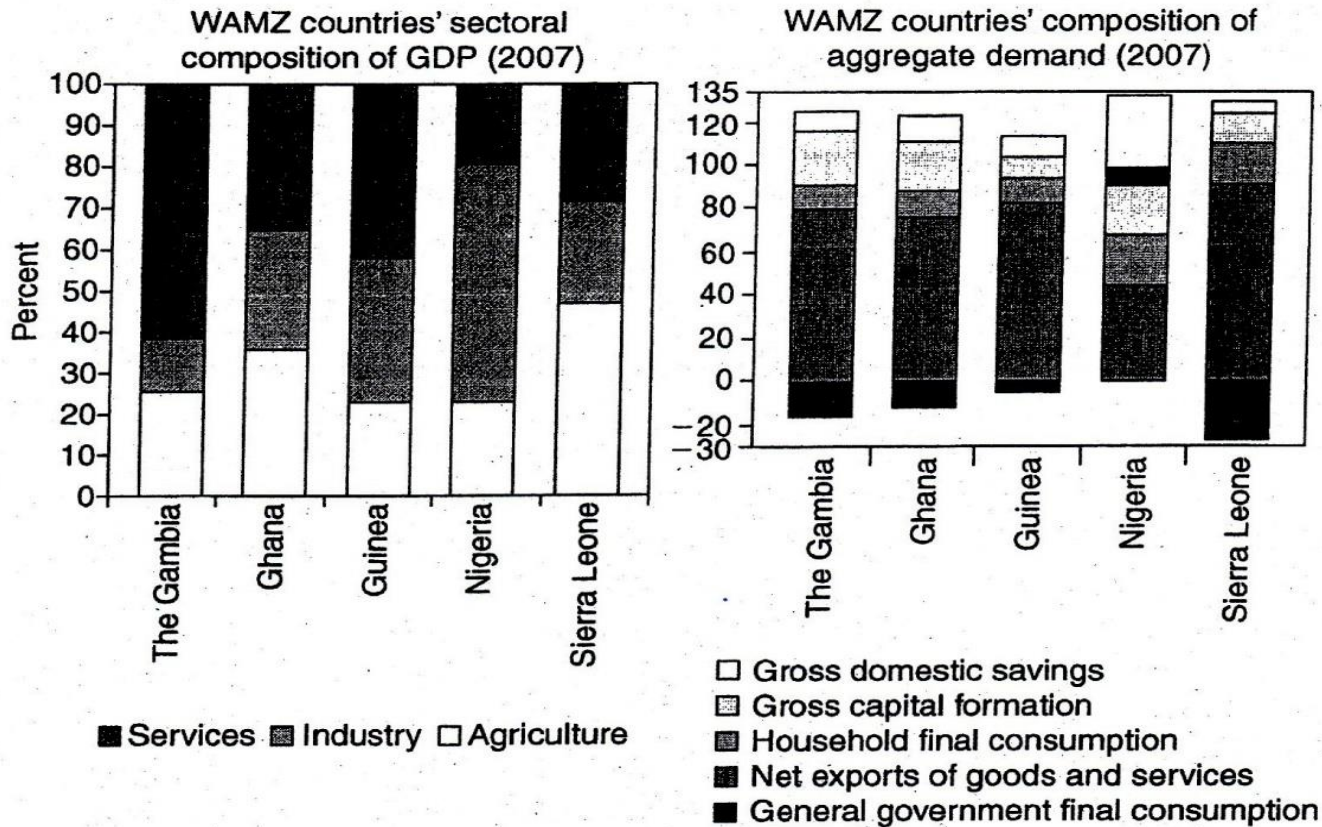
**Figure 4.2** WAMZ countries' sectoral composition of GDP and aggregate demand (sources: World Bank (2007) and WAMI (2007) database).

in the case of The Gambia, Ghana and Nigeria. In Guinea and Sierra Leone, however, general government final expenditure follows household consumption. Net exports[2] are generally negative, except in Nigeria where a positive 9 per cent of GDP was recorded. Gross domestic savings were generally low in all the countries with the exception of Nigeria.

## Business cycle synchronization[3]

Optimum Currency Area theory stresses the importance of the synchronization in cyclical economic activity for members of a monetary union. In particular, the higher the correlation of business cycles, the lower the stabilization cost of giving up an independent monetary policy. If a member economy's business cycle is very highly correlated with the union-wide cyclical output, then monetary policy conducted by the common central bank will be a very close substitute for the country's own independent monetary policy. If the economy's business cycle is weakly correlated (or, worse, negatively correlated) with the union's cyclical output, then the common monetary policy will be a poor substitute for that economy's own independent monetary policy, and may end up actually being destabilizing.

Annual data on real GDP,[4] broad money supply, nominal interest rate and real interest rate were used to evaluate business cycle synchronization as well as

identifying the channels of risk sharing that existed in the WAMZ. Table 4.2 gives the descriptive statistics of the variables including their correlation, mean and standard deviation. Although the correlation among the five countries generally appears low, Ghana and Nigeria showed relatively high correlations in most of the variables, including real and nominal interest rates as well as real GDP growth, to some extent.

## Asymmetry of shocks

The occurrence of asymmetric shocks is a potential source of conflict in a monetary union (Houssa and Leuven, 2004; Blanchard and Quah, 1989). Terms of trade shocks (see Table 4.3), natural disasters and other shocks to the real economy can affect different countries differently at any particular point in time. The dilemma for the monetary union central bank would arise when the appropriate policy response differs for the different countries. On the other hand, if the real effects of shocks tend to be symmetrical, then there is no dilemma, since a common policy would be required in addressing such a shock.

The WAMZ economies are prone to relatively large and asymmetric shocks, given the member countries' heavy reliance on exports of different primary commodities. Nigeria, Sierra Leone and Guinea each depend on a single commodity for over 50 per cent of their export earnings. The massive terms of trade shocks in the Zone's largest economy, Nigeria, stand out and are underpinned by the volatility of world oil prices.

Furthermore, these shocks have a low correlation, mainly because the prices of the different commodities exported exhibit a low correlation. Nigeria's terms of trade movements in particular had a negative correlation with the other four countries. However, Ghana is expected to join Nigeria as an oil exporter and this may improve, to some level, the degree of correlations between the two major countries of the Zone.

A dilemma for the West African Central Bank (WACB) would arise when the appropriate policy response differs for the different countries. For example, monetary and exchange rate policies can help to insulate output from terms of trade fluctuations, via flexible exchange rates and interest rate adjustment. In addition, member countries could use prudent fiscal policies to cushion the effect of such asymmetric shocks.

Deterioration in the terms of trade[5] tends to tighten money and credit markets, while improvements in the terms of trade tend to relax these markets. Deterioration in terms of trade may reduce earnings from exports, which may have dampening effect on the money supply. In addition, to avoid excessive depreciation[6] of the domestic currency arising from decline in export earnings, the monetary authorities may reduce the money supply (domestic credit). Furthermore, banks may also reduce the availability of credits to creditors. Thus, when terms of trade deteriorate, the eco is expected to depreciate in the foreign exchange markets and interest rate is also expected to decrease. The opposite should be allowed to happen when terms of trade improve: the eco should appreciate and interest rates

Table 4.2 Correlation of key economic indicators

| Real GDP growth | The Gambia | Ghana | Guinea | Nigeria | Sierra Leone | Mean | Standard deviation |
|---|---|---|---|---|---|---|---|
| The Gambia | 1.00 | | | | | 6.08 | 0.91 |
| Ghana | 0.99 | 1.00 | | | | 5.65 | 0.98 |
| Guinea | 0.37 | 0.42 | 1.00 | | | 2.95 | 0.07 |
| Nigeria | 0.98 | 0.96 | 0.17 | 1.00 | | 6.31 | 0.22 |
| Sierra Leone | -0.99 | -0.99 | -0.41 | -0.97 | 1.00 | 11.86 | 5.71 |
| *Broad money supply growth* | | | | | | | |
| The Gambia | 1.00 | | | | | 21.63 | 12.12 |
| Ghana | 0.50 | 1.00 | | | | 35.00 | 11.77 |
| Guinea | 0.34 | -0.34 | 1.00 | | | 28.35 | 17.62 |
| Nigeria | -0.42 | 0.16 | -0.38 | 1.00 | | 31.25 | 16.37 |
| Sierra Leone | 0.00 | 0.19 | -0.16 | -0.41 | 1.00 | 25.34 | 5.31 |
| *Nominal interest rates* | | | | | | | |
| The Gambia | 1.00 | | | | | 19.00 | 7.44 |
| Ghana | 0.22 | 1.00 | | | | 16.74 | 6.55 |
| Guinea | -0.55 | -0.86 | 1.00 | | | 17.44 | 4.19 |
| Nigeria | 0.41 | 0.91 | -0.79 | 1.00 | | 12.42 | 4.59 |
| Sierra Leone | 0.54 | -0.25 | -0.17 | -0.14 | 1.00 | 19.04 | 4.76 |
| *Real interest rates* | | | | | | | |
| The Gambia | 1.00 | | | | | 11.51 | 5.16 |
| Ghana | -0.13 | 1.00 | | | | 0.8 | 5.28 |
| Guinea | -0.79 | 0.25 | 1.00 | | | -0.72 | 10.33 |
| Nigeria | -0.06 | 0.80 | 0.16 | 1.00 | | 0.06 | 4.42 |
| Sierra Leone | -0.06 | 0.82 | 0.31 | 0.49 | 1.00 | 9.52 | 4.72 |

Source: WAMI (2008).

*Table 4.3* Terms of trade shocks in the WAMZ

| | Correlations of terms of trade shocks | | | | | Standard deviation of shocks |
|---|---|---|---|---|---|---|
| | The Gambia | Ghana | Guinea | Nigeria | Sierra Leone | |
| The Gambia | 1.000 | | | | | 9.9 |
| Ghana | 0.453 | 1.000 | | | | 14.3 |
| Guinea | 0.315 | 0.054 | 1.000 | | | 11.1 |
| Nigeria | −0.261 | −0.515 | −0.042 | 1.000 | | 26.0 |
| Sierra Leone | 0.156 | −0.206 | 0.202 | −0.019 | 1.000 | 14.0 |

Source: WAMI (2008).

increase. Such a strategy calls for appropriate intervention in foreign exchange and money markets by the WACB, or changes in the WACB interest rates or exchange rates. If the real effects of such external shocks remained uniform across the WAMZ, then there is no dilemma for the WACB. A dilemma would arise when the real effects of such shocks tend to differ across countries within the Zone.

The authorities, governments and the WACB could greatly mitigate the effects of an external shock to one country within the Zone through the creation of an enabling environment involving the implementation of certain measures, while providing compensatory developments in other parts of the Zone. The most important of these measures would be the integration of the financial markets. With such integration, banks could obtain liquidity anywhere in the WAMZ and competition would become vibrant in the financial markets, allowing investors to diversify their portfolio across the Zone, as well as encouraging cross-border borrowing by firms and households. To foster financial market integration, the payment systems and the legal and regulatory systems would, *inter alia*, need to be harmonized in fundamental ways. Such harmonization would greatly assist the conduct of monetary policy. Fostering integration of markets would also involve removing barriers to entry and forces that engender segmentation of the markets for particular assets (e.g. government securities or foreign exchange) across regions or across groups of firms of the same country.

## Exchange rate movements

A low synchronization in exchange rate movements would likely hinder the cooperation between members of a monetary union. Comparing the correlation of real exchange rates (RER), there is clear evidence of strong similarity in RER movement among most of the countries, especially between The Gambia and Sierra Leone (97 per cent), Ghana and Nigeria (91 per cent) and The Gambia and Guinea (82 per cent). This is a positive trend for the formation of a monetary union. Only Guinea's RER movements appeared to diverge strongly from the rest of the countries. The Gambia's real exchange rate was the most volatile with a standard deviation of 19.5, while Guinea's currency was the

most stable with a standard deviation of 2.3 during the period covered. It is envisaged that high correlation of real exchange rates among countries of the Zone prior to the formation of a monetary union would pave the way for the smooth adoption of a unified exchange rate mechanism that would be less costly. It would also enhance the effective functioning of a common monetary policy, as well as easing the effects of external shocks through the use of exchange rate policy.

## Trends in structural convergence

In terms of structural convergence, apart from Nigeria, the differences in sectoral distribution of output and GDP sizes among the countries, while significant, were not impediments to the formation of a monetary union. Interestingly, Ghana and Nigeria showed high correlations in key economic variables (business cycle synchronization indicators). It is also important to emphasize that the apparent overall structural heterogeneity of the WAMZ countries is more likely to be reduced in the future. Nigeria, the largest economy and currently the only oil producing/exporting country in the Zone, is pursuing policies to diversify its economy away from the excessive dependence on oil, while Ghana may at the same time become more correlated with Nigeria as its oil production develops.

## External and domestic debt in WAMZ

External debt acts as a burden on governments' fiscal operations and hence has major implications for monetary union convergence in WAMZ. Financing of huge external debt may cause governments to redirect expenditure to non-priority areas. In addition, it also serves as a burden on future generations, as well as a signal for future tax increases to finance the debt burden based on the Ricardian equivalence doctrine.[7]

In 2001, Nigeria's external debt remained extremely high, compared to other countries within the Zone (Figure 4.3). However, the external debt position improved significantly during 2007 and 2008. The Gambia, on the other hand, incurred the lowest external debt in 2001, but it slightly increased in 2007 and 2008, despite attaining the Heavily Indebted Poor Countries (HIPC) Initiative

*Table 4.4* Correlation of real exchange rates (2000= 100): 2002–2006

|  | *The Gambia* | *Ghana* | *Guinea* | *Nigeria* | *Sierra Leone* | *Mean* | *Standard deviation* |
|---|---|---|---|---|---|---|---|
| The Gambia | 1.000 |  |  |  |  | *61.6* | *19.5* |
| Ghana | 0.823 | 1.000 |  |  |  | *110.1* | *10.9* |
| Guinea | −0.972 | −0.680 | 1.000 |  |  | *106.2* | *2.3* |
| Nigeria | 0.536 | 0.914 | −0.358 | 1.000 |  | *120.3* | *13.2* |
| Sierra Leone | 0.967 | 0.750 | −0.935 | 0.417 | 1.000 | *78.7* | *13.5* |

Source: IMF (2008).

completion point. Guinea's external debt moderated within US$5 billion during the entire period, while Sierra Leone's external debt declined significantly in 2007 and 2008 due to debt cancellation. Ghana's debt also halved between 2001 and 2007, arising from the debt cancellation under the HIPC debt relief. However, in 2008 the level increased slightly by 5 per cent.

Fiscal discipline is crucial for the success of a monetary union. Without it, large differences in member countries' fiscal stances can create tensions, leading to political disagreements and hindering other key macroeconomic convergence requirements for the smooth functioning of the union, such as price stability. It is therefore important that countries achieve fiscal convergence prior to the introduction of the common currency. Applying one of the traditional fiscal convergence indicators, namely government domestic debt, it was observed that the WAMZ countries' debt profile followed a mixed but declining trend. The trend in domestic debt as shown in Figure 4.5 reveals that The
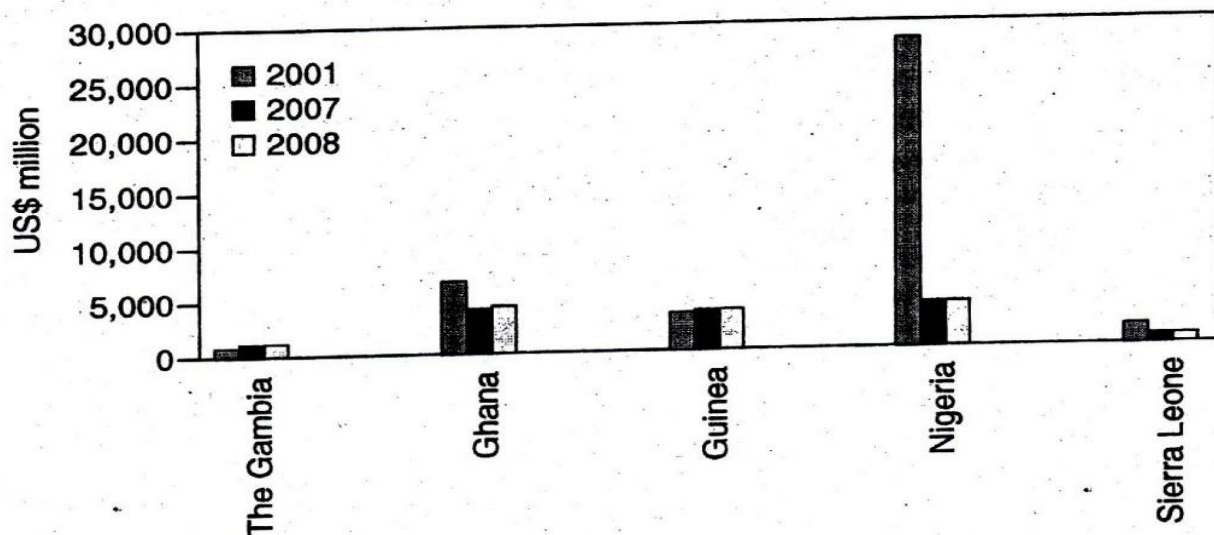
*Figure 4.3* WAMZ countries' external debt ($ million) (source: WAMI (2008)).
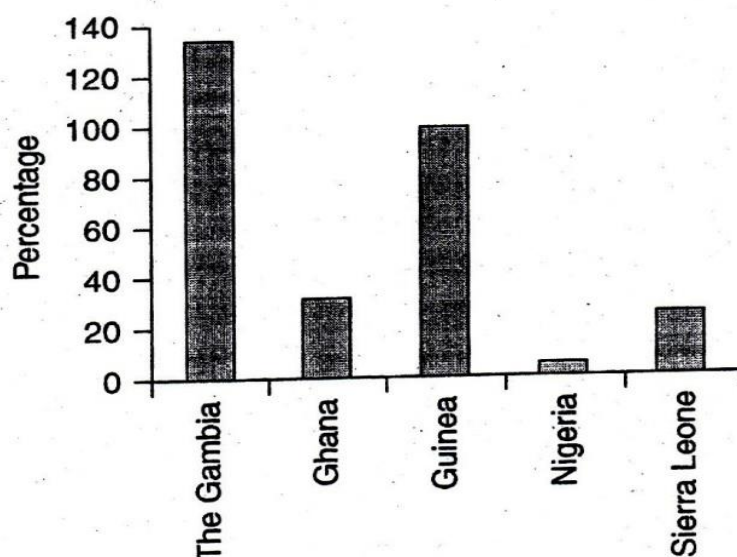
*Figure 4.4* WAMZ countries' external debt (% of GDP) (source: WAMI (2008)).

Gambia incurred huge domestic debt relative to all other countries during the review period. Furthermore, Ghana's domestic debt also remained high during the period, while Nigeria's debt declined consistently between 2001 and 2007, but increased in 2008. For Sierra Leone, domestic debt was relatively stable, averaging 10 per cent of GDP during the period.

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### Box 4.1 The HIPC Initiative in the WAMZ

The HIPC Initiative was first launched in 1996 by the International Monetary Fund (IMF) and World Bank, with the aim of easing the debt burdens of poor countries. It entails coordinated action by the international financial community, including multilateral organizations and governments, to reduce to sustainable levels the external debt burdens of the most heavily indebted poor countries.

Once a country has met or made sufficient progress in meeting pre-set criteria, the Executive Boards of the IMF and the International Development Association (IDA, World Bank) formally decide on its eligibility for debt relief, and the international community makes commitments to reduce debt to the sustainability threshold. This is called the decision point. The country can then receive interim relief on its debt service falling due. In order to receive a full and irrevocable reduction in debt, however, the country is expected to: establish a further track record of good performance under IMF and IDA-supported programmes; implement key reforms agreed at the decision point and adopt a Poverty Reduction Strategy Paper for at least one year. After it has met these criteria, a country can reach its completion point, whereupon lenders provide full debt relief.

In the WAMZ, as at the end of November 2008, The Gambia, Ghana and Sierra Leone had reached completion point, while Guinea was between decision point and completion point. The debt relief for The Gambia was US$91 million, for Ghana US$3,700 million and for Sierra Leone US$950 million.
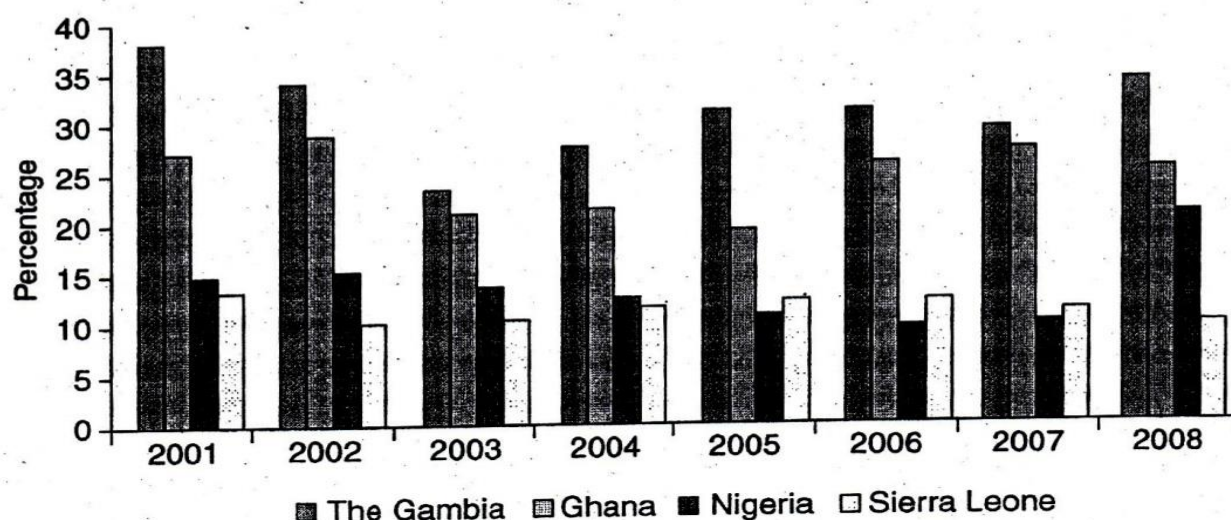
Source: www.worldbank.org

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*Figure 4.5* Domestic debt/GDP in the WAMZ countries (source: WAMI (2008)).

## Structure of merchandise imports and exports

The pattern of merchandise imports and exports has a significant impact on the visible trade balance, hence on current account and balance of payments. The pattern of trade differs across countries and is largely based on the structure of the economy, availability of natural resources and domestic demand. However, the uneven distribution of natural resources and differences in tastes also influence trade between the member countries. There are major intra-industry trades in the WAMZ countries as is evident in the structure of their merchandise export and import shown in Table 4.5. The structure of merchandise exports shows that food products remain the major exports of The Gambia, Ghana and Sierra Leone, followed by manufactures. Fuel, agricultural raw materials, ores and metals account for a small proportion of total exports in these countries. However, crude oil accounts for over 97 per cent of Nigeria's exports, while manufactures account for the rest. In Guinea, ores and metals form the greatest share of merchandise exports, while manufactures and food represent 25.3 per cent and 2 per cent, respectively.

Conversely, manufactures form the largest share of merchandise imports for all the countries except Sierra Leone, whose major import is fuel. Food imports also contribute significantly to merchandise imports for all the countries. In addition, fuel imports are relatively high for The Gambia, Guinea and Nigeria.

## Survey-based indicators

Survey-based indicators may also be used to ascertain possible structural weaknesses that could eventually undermine external stability in the WAMZ countries. The World Bank *Doing Business* indices showed the performance of the member countries in nine key indicators (Table 4.6). Overall, Ghana and Nigeria

*Table 4.5* Structures of exports and imports (2006)

| Exports (% of total) | Food | Agriculture raw materials | Fuel | Ores and metals | Manufactures |
|---|---|---|---|---|---|
| The Gambia | 81.0 | 4.0 | 0.0 | 0.0 | 14.0 |
| Ghana | 61.0 | 4.0 | 1.0 | 3.0 | 31.0 |
| Guinea | 2.0 | 0.8 | 0.1 | 71.6 | 25.3 |
| Nigeria | 0.0 | 0.0 | 97.9 | 0.0 | 2.1 |
| Sierra Leone | 91.6 | 0.8 | 0.0 | 0.1 | 7.5 |
| *Imports (% of total)* | | | | | |
| The Gambia | 31.0 | 2.0 | 17.0 | 1.0 | 49.0 |
| Ghana | 13.0 | 1.0 | 14.0 | 1.0 | 70.0 |
| Guinea | 23.1 | 1.2 | 21.7 | 0.8 | 53.0 |
| Nigeria | 15.5 | 0.6 | 16.0 | 1.6 | 66.3 |
| Sierra Leone | 22.5 | 7.6 | 39.7 | 0.8 | 29.3 |

Sources: World Bank (2008) and (2007).

achieved the best performances, followed by The Gambia, Sierra Leone and Guinea. The difficulty encountered in paying taxes, registering property and getting credit are particularly high in the WAMZ.

The major strengths for the member countries indicated by the indices were in enforcing contracts, employing workers and trading across borders. The report also suggested that the WAMZ countries compared favourably with other ECOWAS countries in the ease of doing business with Ghana, Nigeria and The Gambia, which were placed in the top three in the overall ranking in the sub-region.

## Monetary policy framework in the WAMZ

With the advent of economic liberalization and deregulation of the financial system, the conduct of monetary policy in the WAMZ was premised on the use of indirect instruments. In implementing monetary policy, the WAMZ central banks used their influence on money market conditions via reserve requirements, rediscount window, open market operations, foreign exchange swaps, etc. to achieve their objective of price stability. They implemented monetary policy primarily through the control of monetary aggregates at the level adjudged consistent with a programmed rate of economic growth. With this framework, monetary aggregates are the intermediate target, with reserve money being the operational target, channelled through open market operations. In The Gambia, the conduct of monetary policy by the Central Bank of The Gambia (CBG) is through monetary targeting framework, where the central bank sets an intermediate target for growth in broad money (the nominal anchor) and uses reserve money as its operational target.

In Ghana, the Bank of Ghana (BOG) adopted an inflation targeting framework in 2007 (Addison, 2001), using a core measure of the consumer price index, which excluded energy and utility prices. Prior to 2007, the strategy for monetary management was based on monetary targeting. The strategy for

*Table 4.6* WAMZ: *Doing Business* indicators (2009)

|  | The Gambia | Ghana | Guinea | Nigeria | Sierra Leone |
|---|---|---|---|---|---|
| Starting a business | 101 | 137 | 177 | 91 | 53 |
| Employing workers | 55 | 145 | 114 | 27 | 173 |
| Registering property | 111 | 31 | 157 | 176 | 163 |
| Getting credit | 131 | 109 | 163 | 84 | 145 |
| Protecting investors | 170 | 38 | 170 | 53 | 53 |
| Paying taxes | 175 | 65 | 168 | 120 | 160 |
| Trading across borders | 73 | 76 | 110 | 144 | 132 |
| Enforcing contracts | 63 | 50 | 131 | 90 | 145 |
| Closing a business | 120 | 104 | 109 | 91 | 145 |
| Overall rank | 130 | 87 | 171 | 118 | 156 |

Source: World Bank (2009).

monetary management in Guinea is also based on monetary targeting framework. However, the central bank sets two intermediate targets: a minimum amount of net foreign assets of the central bank and a ceiling on the net credit to government. The conduct of monetary policy in Nigeria is also based on monetary targeting.

In November 2006, the Monetary Policy Committee of the Central Bank of Nigeria (CBN) adopted a new monetary policy framework involving the introduction of a new Monetary Policy Rate (MPR) that replaced the Minimum Rediscount Rate (MRR). The MPR determines the lower and upper band of the CBN standing facility and is expected to have the capability of acting as the nominal anchor for other rates. Monetary targeting also remained the vibrant monetary policy framework for the conduct of monetary policy in Sierra Leone

## Inflationary trends

The achievement of single-digit inflation on a sustainable basis proved to be challenging for WAMZ member countries over the years, with mixed performance during the period 2001–2008. While inflation rates were generally high between 2001 and 2005, there was marked improvement in 2006, in which The Gambia, Nigeria and Sierra Leone recorded single-digit inflation rates of 0.4, 8.5 and 8.3 per cent, respectively (WAMI, 2008). However, Ghana's inflation rate of 10.5 per cent in 2006 was the lowest rate it achieved during the period 2001–2008, while Guinea's inflation rate of 39.1 per cent was the highest during the reference period. There was an inflation rate rebound in 2007 and 2008, as inflation rates accelerated in all WAMZ member countries, engendered by escalation in global food and fuel prices as well as monetary expansion arising from deficit financing from government.

## Fiscal deficit (excluding grants) as a ratio of GDP

Fiscal policy slippages remained a major factor that inhibits the attainment of the WAMZ fiscal deficit criterion[8] by member countries. Fiscal performance was generally unsatisfactory during 2001–2004, but improved significantly in 2006. The fiscal position of The Gambia, Guinea and Nigeria remained relatively strong as these countries satisfied the WAMZ criterion in most of the period under review. However, Sierra Leone and Ghana never satisfied this criterion, indicating a weak fiscal position in these countries.

## Economic distance in the WAMZ

The notion of economic distance gives an indication of the likely costs of forming a monetary union. The typical approach when analysing and comparing the similarities in the economic structure of one partner of a monetary union to that of their largest trading partner is by measuring the correlation coefficients of output growth and inflation. In accordance with this concept, the cost of a

monetary union depends on the volatility of output growth and inflation between the target and candidate countries. In other words, the greater the differences between the candidate and target countries' output variance and the smaller the correlation between the candidate and target countries' output growth, the larger are the potential costs of forming a monetary union.[9] The measure of economic distance is defined in such a way that, the higher the economic distance, the greater the costs of joining a monetary union. In this regard, economic distance gives an indication of the deviation of the candidate countries' output growth and inflation from the target country. A high positive correlation coefficient means a convergence of business cycles and similarities in the partners' economic structures, and consequently any external shock would impact the member countries in the same direction. A negative correlation implies a divergence of business cycles. The similarity of economic structure lessens the instability of output and inflation. Also, the similarities reduce the possibilities of different cycle paths in a given country relative to the other members of the monetary union. For the countries of the WAMZ, Nigeria was considered the target country due to its relative size, structure of its economy and contribution to the WAMZ programme, while Ghana, Guinea, The Gambia and Sierra Leone were jointly considered as candidate countries.

The results of the economic distance are shown in Figures 4.6 and 4.7. The data set was divided into two sub-samples, i.e. the period before the implementation of WAMZ programme (1993–2000) and the period corresponding to the WAMZ programme. The breakdown of the data into two sub-samples provided a valid judgement on the costs of joining a monetary union, by comparing the economic distance for the two periods. Figure 4.6 plots the output growth correlation coefficients and standard deviation between the candidate and target countries respectively for the two-periods. It is evident from Figure 4.6 that output growth correlation rose for Ghana during the WAMZ period compared to a lower value during 1993–2000. On the other hand, output volatility as measured by the standard deviation marginally decreased between 2001 and 2008. This result showed that the cost of Ghana forming a monetary union with Nigeria declined substantially during the WAMZ period, due to the rise in output growth correlation and decline in output volatility.

The Gambia's situation showed much improvement in reducing the cost of entering a monetary union. The result revealed that output growth correlation between The Gambia and Nigeria increased during the WAMZ period relative to the *ex-ante* sub-sample period 1993–2000. In addition, output volatility also declined significantly during the period 2001–2008 compared with 1993–2000. This analysis also showed that the cost of The Gambia joining a monetary union with Nigeria was comparatively lower during the WAMZ period, relative to the period prior to the WAMZ programme. The result was mixed for Sierra Leone, with a sharp fall in output volatility being offset by a fall in output growth correlation. However, despite the cost of joining a monetary union for Sierra Leone being high, the result showed that the country made significant progress towards reducing the cost of monetary union as evidenced

by the positive output growth correlation with Nigeria and the significant decline in output volatility. In the case of Guinea, the cost of joining a monetary union increased during the WAMZ period. The result showed that the output growth correlation with Nigeria became negative during the WAMZ period relative to a positive value prior to the WAMZ period. Furthermore, the output volatility which remained negative in both periods also increased during the WAMZ period.

Figure 4.7 gives a stylized presentation of inflation correlation coefficient and volatility between the candidate and target countries respectively. The results revealed that the inflation correlation coefficient between Ghana and Nigeria increased during the WAMZ period from a lower value during 1993–2000. In addition, inflation volatility, which remained negative in both periods, declined
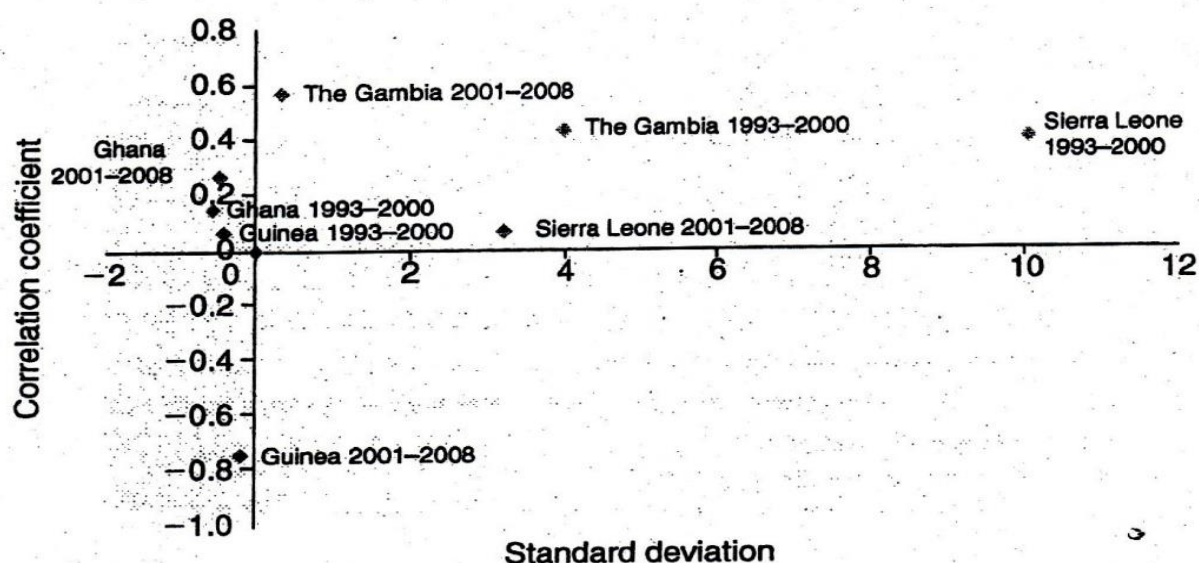


*Figure 4.6* Economic distance output growth; Nigeria as target country (source: IMF (2008)).
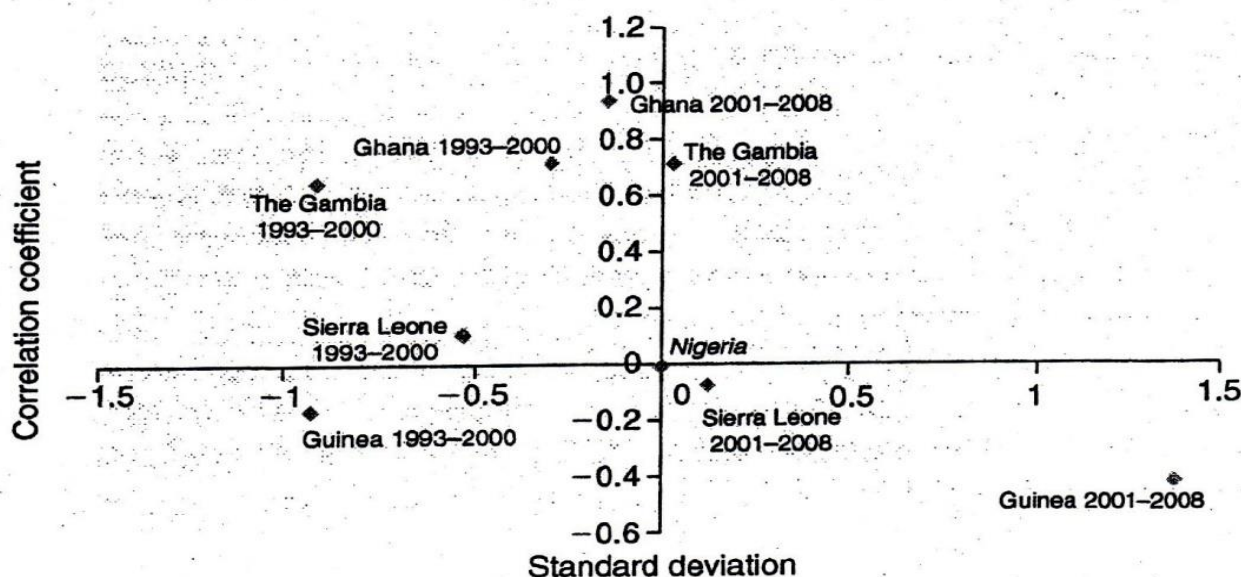


*Figure 4.7* Economic distance inflation; Nigeria as target country (source: IMF (2008)).

in absolute terms during 2001–2008. These developments give an indication that the cost of monetary union was lower for Ghana. This result was not at variance with the result on output growth. For The Gambia, the result revealed that the cost of monetary union declined during the WAMZ period relative to the period before the implementation of WAMZ. This was justified on the grounds that the inflation correlation coefficient increased during the WAMZ period compared with a much lower value during 1993–2000. In addition, inflation volatility between The Gambia and Nigeria declined during the WAMZ period. The picture for Sierra Leone indicated that the cost of monetary union remained higher. The inflation correlation coefficient was negative during the WAMZ period compared with a positive relationship prior to the WAMZ period. Also, the inflation volatility, which was negative during 1993–2000, increased to a positive value during the period corresponding with the WAMZ programme. Finally, Guinea has consistently maintained a negative inflation correlation with Nigeria for both periods, with the value decreasing during the WAMZ period. In addition, the country experienced increased inflation volatility during the WAMZ period. Conclusively, the result showed that the cost of monetary union remained higher for Guinea.

The measure of economic distance shown in Table 4.7 also confirms the preceding results. The result revealed that economic distance in terms of output growth was much lower during the WAMZ period, and the inflation variance was also lower for both periods. The results suggest that Ghana is a good candidate for monetary union. The result also showed that The Gambia had made great effort in reducing the cost of joining a monetary union with the target country, as evidenced by a reduction in output growth variance by more than half during the WAMZ period, relative to the period 1993–2000. The results seem to re-echo the progress made by The Gambia towards meeting the convergence criteria. For Sierra Leone, the result showed that the costs of joining a monetary union with Nigeria are quite high in both periods as evidenced by the

*Table 4.7* Economic distance; Nigeria as target country

| Candidate country | 2001–2008 | |
| --- | --- | --- |
| | Output growth | Inflation |
| Ghana | 0.90 | 0.85 |
| Guinea | 1.94 | 2.76 |
| The Gambia | 1.39 | 1.07 |
| Sierra Leone | 4.29 | 1.55 |
| | 1993–2000 | |
| Ghana | 0.97 | 0.74 |
| Guinea | 1.12 | 1.16 |
| The Gambia | 3.03 | 0.35 |
| Sierra Leone | 6.67 | 1.01 |

Source: IMF (2008).

large economic distance for output growth and inflation. However, Sierra Leone appeared to have made efforts in reducing the costs as measured by both the fall in output and inflation variances from 6.67 and 2.44 during 1993–2000 to 4.29 and 1.55 during 2001–2008, respectively. In the case of Guinea, the cost of joining a monetary union with Nigeria has actually increased during the WAMZ period. Comparatively, prior to the implementation of the WAMZ programme, the cost of monetary union based on output growth tends to be lower for Guinea as evidenced by the low economic distance values of 1.12 and 0.97 of output and inflation variances, respectively. However, during the WAMZ programme, there were marked increases of 1.94 for output variance and the value almost tripled in the inflation variance.

Overall, while the costs of joining a monetary union remained high for countries such as Sierra Leone and Guinea, comparison of the two sets of data showed that the costs of monetary union corresponding with the WAMZ programme tends to be lower relative to the *ex ante* WAMZ period. In essence, the WAMZ programme helped to lower economic distance measured by output and inflation variances between the target country and the candidate countries. The long-term costs of forming a monetary union between Nigeria and the candidate countries are likely to continue to decline with the consistent implementation of the WAMZ programme.

## Conclusions

The countries of the WAMZ are heterogeneous in terms of GDP and population and do not share common borders except Guinea and Sierra Leone. The Zone's economies are prone to relatively large and asymmetric shocks, given the member countries' heavy reliance on exports of different primary commodities. These asymmetric shocks pose potential risks to the WAMZ economies towards the formation of a monetary union. However, despite the heterogeneity in the economic structure of the WAMZ countries, there are clear indications that the cost of joining a monetary union is relatively low, according to the evidence on the volatility and variation of output growth and inflation. Nevertheless, asymmetric shocks would require close harmonization of financial markets and carefully coordinated application of policy, as well as fiscal discipline across the Zone.

## Notes

1 Aggregate demand is defined as the total demand for goods and services (at any time by all groups within a national economy) that makes up the GDP. Component-wise, aggregate demand comprises consumption expenditure, investment expenditure, government expenditure and net exports.
2 Net export is the difference between exports and imports. A negative value implies export is less than import, while a positive value indicates export is greater than imports.
3 See Ambler *et al.* (2004), Backus *et al.* (1992) and Canova (1998).

4 Real GDP was de-trended using the Hodrick–Prescott filter, which separated the data into temporary and permanent components. The de-trended value (permanent component) of real GDP was used in the correlation analysis.

5 Deterioration in terms of trade implies export prices are lower than import prices.

6 Depreciation is a reduction in the value of the domestic currency in relation to other currencies.

7 Ricardian equivalence is an economic theory that suggests consumers internalize the government's budget constraint and thus the timing of any tax change does not affect their change in spending. Consequently, Ricardian equivalence suggests that it does not matter whether a government finances its spending with debt or a tax increase, the effect on total level of demand in an economy being the same.

8 Members countries' fiscal deficit (excluding grant) should not exceed 4 per cent of GDP.

9 These two factors define the notion of economic distance (Alesina and Grilli, 1992). To better understand the notion of economic distance, a simple model which assumes a standard loss function for the central bank, wherein inflation variability and output variability as determinants is used. $ED = \left\{ \left( \dfrac{\sigma_C}{\sigma_T} \right)^2 + (1-\rho_i)^2 \right\}^{\frac{1}{2}}$. Where: ED is economic distance, $\sigma_C$ is the standard deviation of output or inflation in the candidate country; $\sigma_T$ is the standard deviation of output or inflation in the target country and $\rho_i$ represents the correlation coefficient of output or inflation between the candidate and target countries. Based on the equation above, the larger the economic distance, the greater the costs of monetary union, and the smaller the economic distance, the lower the cost of monetary union.

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