The welfare effects of monetary union and flexible exchange rate regimes: The case for the West African Monetary Zone (WAMZ) and the West Africa Economic and Monetary Union (UEMOA) and the implications for the Gambia

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Acronyms: EMCP, Economic and Monetary Co-operation Program; GDP, Gross Domestic Produce; OCA, Optimum Currency Area; UEMOA, West African Economic and Monetary Union; WAMZ, West African Monetary Zone

Accepted 13 November 2008

Efforts for economic integration in African countries started since the early 1960s, and culminated in the establishment of an African Union in July 2001. The Union’s Constitution Act called for the establishment of an economic and monetary Union, starting at the sub-regional level. At the sub-region of West Africa comprising of the West African Monetary Zone (WAMZ), and the West Africa Economic and Monetary Union (UEMOA), the latter has been in operation for more than fifty years, whilst the WAMZ member countries have in 1999 started a fast track approach to the integration process. The model presented is an adopted version of Lane (2002) and of Dupasquier and Osakwe (2002), which incorporates endogenous transaction costs. The objective of the first part of the present study was to ascertain the relative merits of the two exchange rate regimes, that is, which regime would yield the highest possible welfare effects. Few attempts have been made to quantify the welfare consequences of alternative exchange rate regimes in the sub-region on the basis of a rigorous theoretical framework that captures the crucial trade-off between the savings in transaction costs, resulting from a common currency, and the macroeconomic stabilization benefits of a flexible exchange rate regime. The findings of our research on monetary union have shown that transaction costs or per unit costs are lower in a monetary union regime than in a flexible exchange rate regime. The exchange rate uncertainty is lower in a monetary union regime than in a flexible exchange rate regime. But while macroeconomic and institutional factors are necessary and critical for national competitiveness, they are not sufficient for creating wealth. There are certain microeconomic capabilities that are important, such as the operating practices, strategies, and the quality of the microeconomic business environment in which a nation’s companies compete. Without these microeconomic capabilities, macroeconomic and institutional reforms will not bear full fruit, or the distortion of economic behaviour will continue to persist. Hence, as the second part of the study shows, a baseline survey of the business environment in The Gambia was undertaken in order to determine whether the country has created sufficient microeconomic conditions in preparation for the WAMZ. The baseline survey was intended to evaluate the underlying microeconomic conditions that define the current sustainable level of productivity in the country. The Baseline survey has highlighted the strengths and weaknesses of the private sector of the economy. Thus, it is recommended that in this sector the focus should be on the creation of a conducive economic space, on access to the appropriate resources, and on capacity building in order to increase income growth, employment opportunities, productivity and value – added production.

INTRODUCTION

The successful setting in motion of the Euro in 1999 has generated interest in the economics of common
currencies in different parts of the World. In North America, for example, there was an ongoing debate on whether Canada should form a monetary union with the United States, including Mexico. Similar issues have been raised in the Caribbean, Asia, and Africa.

Indeed, in Africa the debate took a step further when, in December 1999, Nigeria and The Ghana joined by The Gambia, Guinea, and Sierra Leone agreed to adopt a two-track approach to the ECOWAS Monetary Co-operation Programme (a sub-regional integration initiative). Consequently, a second monetary zone in West Africa involving non-UEMOA countries was initiated in order to fast – track the integration process. It was thought then that when the second monetary zone achieves the level of economic and monetary integration attained by UEMOA countries it would be easier to merge the two regional currencies and that these would emerge into a single currency at some future date. The issue of whether Monetary Union is feasible is a particularly pertinent one given that:

(a) There is an increasing desire as well as a tendency towards Monetary Union (e.g. the West African Currency Board, and the West African Economic and Monetary Union),

(b) There is currently an attempt underway to forge another Union (the West Africa Monetary Zone) with the ultimate objective of having a single Monetary Union amongst ECOWAS member States.

From a historical perspective, Ghana (formerly, the Gold Coast), Nigeria, Sierra Leone, and The Gambia were part of a West African Currency Board from 1913 until the establishment of their respective Central Banks. The Board was set up to be responsible for the issue of currency in these former British Colonies.

Also, there currently exists in West Africa probably one of the longest surviving Monetary Union in the World, the CFA franc Zone. It has eight members: Benin, Burkina Faso, Cote d’Ivoire, Guinea – Bissau, Mali, Niger, Senegal, and Togo. The CFA zone has its origins from the economic and political relations between France and its former African Colonies. After independence of France’s former Colonies in the 1960s, the responsibility for issuing the CFA franc and overseeing the functioning of the Zone was shifted to two regional Central Banks.

The Economic Community of West African States (ECOWAS) comprises the Portuguese speaking countries, the Anglophone countries, and the Francophone countries in West Africa and was established in 1975, with the goal of greater economic integration. In the pursuit of this goal, the Heads of State of ECOWAS adopted the ECOWAS Monetary Co-operation Programme (ECMP) in 1987 to accelerate the process of integration within the sub-region. The Programme entailed the adoption of collective policy measures designed to achieve a harmonized monetary system. A single monetary zone for the ECOWAS member States was envisaged. Four Primary Convergence Criteria were set and were to be met by the participating countries by 1999. These included:

a) A ceiling on central bank financing of budget deficits to 10% of the previous year’s tax revenue by 1998.

b) The maintenance of a single digit inflation rate.

c) A restriction of the Budget deficit to GDP ratio of no more than 5% by 1998, and then a maximum of 3%.

d) The decision that:

i) Countries with floating exchange rates were to reduce the variability of the nominal exchange rate to less than 10% by the end of 1998, and to less than 5% by the year 2000.

ii) Countries with fixed exchange rates were to eliminate any overvaluation by 1998.

The progress envisaged along these lines by the EMCP was slow. By 1995 it was clear that the majority of ECOWAS countries were far from meeting the convergence criteria and that many were not making sustained efforts in that direction.

At the 22nd summit meeting of Heads of States and Government held in Lome, Togo, from 9 – 10 December 1999, it was agreed that;

A two-track approach to integration in the sub-region be pursued.

(b) Any two countries can commence the two-track approach within the framework of the ECOWAS Monetary Programme.

In the spirit of the Lome agreement, Nigeria, Ghana and later Guinea, Sierra Leone, and The Gambia agreed to establish a Second Monetary Zone, the West African Monetary Zone (WAMZ) by 2003. However, the date for setting up this zone was postponed to July 1st 2005, and recently it was rescheduled for July 1st 2009.

In the literature of “New Open Macroeconomics” it is cited that the high volatility of exchange rates during the post-Bretton Woods era has generated debate on reforming the “International Architecture”. Similarly, recent years have witnessed a renewed interest in the working of the international monetary system during the period of the classical gold standard, that is, the period from the late 1870s to the onset of the First World War. The literature has highlighted the following five factors that help explain such lasting stability.

i) The limited resort to sterilization policies in the pre-1914 era, which allowed the freer working of the specie –
flow mechanism of the balance of payments adjustment.

ii) The degree of credibility underpinning Central Bank interventions, because adherence to gold was widely perceived as a “good housekeeping seal of approval”, which facilitates access to capital markets. The system provided a clear incentive for the pursuit of time – consistent policies that helped back the exchange rate peg, with other policy goals being secondary to this task, and with the public being given assurance that any departure from convertibility would only be contemplated in rare emergencies. Hence the prevailing policy regime exerted a stabilizing influence on asset markets, which in turn facilitated the task of monetary management.

iii) Strong complementarities, between productive structures in the “core” and “periphery” economies, also appeared to have been key. Since the periphery specialized in the production of primary commodities (the demand for which was highly sensitive to world income growth) and was mostly financed by capital imports from the Core, income growth in the Core had a powerful impact on the periphery; this impact in turn boosted the periphery’s demand for industrial exports from Core countries, thus mitigating current account imbalance.

iv) There is evidence that nominal inertia, at the time, was lower than in the inter-war and post-war era, entailing steeper aggregate supply curves, and faster macroeconomic adjustment to shocks.

v) With labour being more flexible to move internationally during the period, supply could respond more promptly to international wage differentials, leading to a well-known pattern of transatlantic migration flows, which helped to stabilize labour [Calao and Solomons (2003), Exchange rate in the Periphery and International Adjustment under the Gold standard, IMF Working Paper, WP/03/41].

The research objectives

The research objectives of this study were:

To quantify the welfare consequences of exchange rate regimes resulting from a flexible exchange rate regime, and from a common currency or monetary union regime. To determine, to an extent the net benefits of a monetary union regime relative to a flexible exchange rate regime in the WAMZ and UEMOA monetary zones, in terms of having the highest welfare maximizing regime if the transaction costs in each of the monetary zones are expressed as a percentage of each zone’s GDP.

To determine whether the country has created sufficient micro-economic conditions in preparation for the WAMZ.

LITERATURE REVIEW

Introduction

The establishment of the European Economic and Monetary Union has focused discussions on exchange rate regimes in African countries prompting policy makers to debate in detail the possibility of creating monetary unions in all the regions of the African Continent (Dvarajan and Rodrick 1991). The conclusions of these debates imply that despite the existence of other exchange rate regimes and their relative strengths and weaknesses, a monetary union is found to be the optimal regime for Africa (Chantal and Osakwe, 2002). Implication for The Gambia since member states have committed themselves to a monetary cooperation programme of ECOWAS, and AU respectively. Given the interest in these issues at the level of various strata of society in the continent, and in the ECOWAS sub-region in particular, it will be a worthwhile endeavour to examine and quantify the net benefit of flexible exchange rate regime and Monetary Union in the West African Monetary Zone (WAMZ), and West African Economic and Monetary Union (UEMOA) countries respectively.

There are two major types of exchange rate regimes, namely, the fixed and the floating Exchange rate Regimes (Hallwood and MacDonald 1995). However, there are several variants of these regimes. Among the Fixed Exchange rate regimes, there are currency boards, crawling pegs, and dollarization and examples of Floating Exchange rate regimes include free and managed or dirty floats.

Flexible exchange rate regimes allow Governments to pursue independent monetary policies, and to rely on the exchange rate as an instrument of adjustment to shocks (Hallwood and MacDonald, 1995). Flexible exchange rates increase transaction costs which can arise from two sources:

Conversion from a local currency to a foreign currency for the purpose of international transaction.

ii) The cost of hedging exchange rate uncertainty, as a result of which there are indirect costs to society due to the reduction in trade, and investment.

On the other hand, the most observable benefits of monetary unions are a reduction in both transaction costs and exchange rate uncertainty which has the potential of improving efficiency in resource allocation. In addition, the inability to pursue an independent monetary policy (thereby relying on the exchange rate as an instrument of macroeconomic adjustment) constitutes another cost of monetary union. By implication, a member of a currency area is likely to find increased constraints on its fiscal policy as it may be necessary to coordinate fiscal policy with that of other members, so as to internalise fiscal externalities and to avoid free–rider problems.

Other factors identified as barriers to monetary union in the case of ECOWAS, include:

Language.

Institutional hurdles to employment in the sub region.

Low labour mobility.

Weak political commitment.
The fiscal transfer system.

The West African leaders need to remove these biases if the institution of a common currency in the sub-region is to become a reality. This is in view of the challenges of putting in place an efficient and workable transfer system in the face of a high level of poverty in the sub-region together with political challenges and civil strives.

The type of exchange rate regime that a country may adopt depends on its economic set up and its sustainability. For example, dollarization is technically feasible, but it may be politically sensitive for African countries. This is because the adoption of a foreign currency may undermine national identity as it is seen to be representative of foreign cultures and interests. Thus countries have to either float their currencies and rely on fluctuations in the nominal exchange rate for the achievement of domestic macroeconomic objectives or adopt a credible fixed exchange rate regime and lose the nominal exchange rate as an instrument of adjustment to shocks.

Theoretical review

The Optimum Currency Area theory developed by Mundell (1961), and extended by Mckinnon (1963), and by Kenen (1969), established criteria to determine the groups of countries or the countries that are best suited for a monetary union. Mundell posited that Optimum Currency Areas are those within which people move freely. His supposition was predicated on the tenet that labour mobility could act as an automatic stabilizer for shocks in a monetary union. De Grauwe’s (1994) findings substantiated Mundell’s arguments that, in the long run, nominal exchange rates variations do not affect the real exchange rate of a country or mitigate the problems of structural disparities, which are better addressed through structural policies. However, the Mundell and Mckinnon models of the optimum currency area have been described as ‘single criterion cases’ (Ishiyama, 1975), and as such, may be regarded as overtly restrictive in scope. A preferable approach would be to lay down an explicit list of the benefits and costs likely to be associated with the creation of a currency area.

Traditional Optimum Currency Area (OCA) theory or lema has been expanded on by new ideas and thinking such as those that postulated the loss of monetary policy instrument as a pitfall of the OCA theory. A contrary standpoint to this thinking is that, since inflation can be anticipated, it may not affect real variables eventually. Therefore, the loss of monetary policy sovereignty may not be a serious downside to monetary union.

Review of empirical studies

Guillaumé and Stasavage (2001) in a study that compares flexible exchange rate regimes with monetary union regimes elaborated on the fact that the formation of a monetary union in Africa can improve policy credibility if the exit from such a union is made costly, and institutions are designed to guarantee and enforce monetary rules.

In a related study, Dvaraj and Rodrick (1991) analysed the trade-off involved in the choice between a fixed exchange rate regime and a flexible one with regard to the CFA franc in the UEMOA Zone. However, this study did not consider transaction costs in its analysis. Furthermore, no distinction was made between correlated and idiosyncratic shocks. It is important to note that a Monetary union regime enhances price transparency and eliminates the transaction costs associated with currency conversion and hedging, whereas a fixed exchange rate regime does not.

The model adopted from Dupasquier and Osakwe (2002) incorporates two features accentuated in the OCA literature as critical factors in the choice of exchange rate regimes in open economies: transaction costs, and asymmetric shocks. The study stresses these factors because the choice between a flexible exchange rate regime and a monetary union regime entails essential trade-offs, between the transaction costs savings with a common currency, and the stabilization benefits resulting from the ability to use a nominal exchange rate as an adjustment mechanism to asymmetric shocks. If there is free mobility of labour or a fiscal mechanism for the transfer of resources within the domestic economy, and within economies in the union, the cost of adjustment to asymmetric shocks will be lower.

Stasavage (1997) found that the formation of monetary union in West and Central Africa (in the UEMOA Zone) did not eliminate the excessive trend in fiscal deficits in the said union. Hence the model adopted for this study did not factor in the countries’ fiscal, financial policy discipline, and credibility.

Dupesquier and Osakwe (2002) have observed that African countries have relatively high levels of administrative bottlenecks and underdeveloped financial systems, and that the costs associated with these factors are likely to be substantial; hence the importance of the right choice of exchange rate regime.

Mongelli (2002) has stated that inflation rates could be a viable outcome due to participation in a monetary union, which is a necessary condition for example by joining a monetary union; may bring about policy credibility in terms of member countries that have historically higher inflation rates. Except where the initial source of disequilibrium is corrected, nominal exchange rate adjustments are criticized for applying long time series and hence are unable to predict the impact of policy shifts.) Frankel and Rose (1992) have argued that the correlation between international trade pattern and the business cycle is endogenous and as such OCA characteristics can be attained ex-post (after commencing the union) rather than ex-ante. Howath
applies the model empirically to the WAMZ and UEMOA issue of credible monetary policy. Furthermore, the study mobility and fiscal transfers. Also, it does not cover the developed in this study does not incorporate labour regions of ECOWAS for the purpose of providing the present study is geared towards informing policy makers, local authorities, and economics agents about the utility of a creating conducive economic space in terms of lower transaction costs, and the stability of the exchange rate, in order to spur on higher income growth, employment opportunities, and output growth. In this first part of the study we examine economic behaviour at the macroeconomic level using the structural model. In the second part of the study we report on our baseline survey which attempted to examine specifically economic behaviour at the microeconomic level.

Our econometric model of economic behaviour is a simulation of the structural model of Lane (2000) and of Chantal and Osakwe (2002), which incorporates endogenous costs whilst in the computer programming used is the Generalized Method of Moments (GMM).

The model consists in a mathematical derivation of the parameters in the structural model. For example, equations (1) and (2) yield derivations for output, employment, and the determination of real wages. The model is aimed to capture efficiency losses (associated with multiple currencies) in the form of transaction costs. The other equations try to capture the following:

Equations (3) to (9) capture the real interest rates, the exchange rate pass-through coefficient, and the money market equilibrium in each zone.

Equations (10) to (14) capture the money supply and the velocity shocks, the real exchange rate function, and the loss function in the two Zones (WAMZ and UEMOA). The nominal exchange rates between these two Zones are also formulated using these equations.

Equations (15) to (37) are about the variables in the two monetary regimes and are focused on real interest rates, real exchange rate, demand shocks and velocity shocks.

The baseline survey was an attempt to delineate how the zone under flexible exchange rate regime fared, with reference to the economy of The Gambia, given the results of the research about a monetary union. The questions asked in the survey were designed to look into factors such as:

- The access to start-up capital and credit.
- The operating conditions for businesses including government policies, the legal provisions, the interests of shareholders, the standards set for entry into other markets, and the cost of doing business in The Gambia.

The theoretical framework: The structural model

The plan for this sub-section is as follows:

The structure of the model
The model for the flexible exchange rate regime.
The case for the monetary union regime is considered.
The simulation of the model using data for WAMZ and UEMOA, and a comparison of the Welfare effects between the two alternative regimes.

An analysis of the results and a discussion about the implications for The Gambia follow.

Remarks about the two monetary Regimes.

The version of the model presented here is structural model of Lane (2000), and Dupasquier and Osakwe (2002)’s modified endogenous transaction costs is also incorporated.

The economy under study refers to that of two sub-regional Zones: WAMZ and UEMOA. The assumption is that the member countries of each Zone is specialized in the production of one good, whilst the output shows decreasing return to scale with respect to labour (There is, implicitly, a second factor of production in the model, capital. However, it is assumed to be constant and its value is, without loss of generality, normalized to 1 so that the analysis can be conducted as if there were single factors of production). Structural parameters in the model are positive, and are assumed to be the same across the two Zones. Consequently, this layout of the model (in which the structural parameters are the same across countries) implies that differences in results across exchange rate regimes are due to the nature and magnitude of underlying shocks rather than to differences in structural coefficients between the countries in the two zones. The sub-regional framework or approach is useful due to its analytical tractability. In addition, it is also assumed that the structural parameters are the same across the Zones. From an empirical point of view, the use of a model which permits structural parameters to differ across countries is problematic, because most member countries of the two sub-regional Zones do not have consistent time series data on the variable of concern which would enable one to obtain meaningful econometric estimates derived from country specific regressions.
Other features of the model are that:
a) The variables for WAMZ are distinguished from those for UEMOA with an asterisk for the latter.
b) The variables in the equations (other than interest rates) are expressed in natural logarithms, and are expressed as deviations from a no-shock equilibrium.

For example:

if \( Y \) and \( Y^* \) represents WAMZ and UEMOA output levels respectively, and supply schedules in the WAMZ, and UEMOA Zones are given by:

\[
Y_t = (1 - \alpha) n_t, \quad Y^*_t = (1 - \alpha) n^*_t \tag{1}
\]

Where:

\( n_t \) and \( n^*_t \) are WAMZ and UEMOA employment levels respectively, \((1 - \alpha)\) is the share of labour in output, and \((0 < \alpha < 1)\).

Profits maximizing competitive firms hire labour up to the point at which real wages are equal to the marginal product of labour. However, if we assume that employment decisions are made after the shocks are realized, the profit maximizing conditions are (The expression of marginal product of labour is \((-an + \log (1-\alpha))\), and due to notational simplicity the constant term is omitted):

\[
W_t - P_t = -an_t, \quad W^*_t - P^*_t = -an^*_t \tag{2}
\]

Where; \( W_t \) is the WAMZ wage rate, and \( P_t \) is the price of WAMZ output, \( W^*_t \) is the UEMOA wage rate, and \( P^*_t \) is the price of UEMOA output.

Accordingly, to capture all the impediment and efficiency losses associated with the use of multiple currencies it is assumed that a percentage \((\theta_n)\) of output is lost by the economy in the form of transaction costs parameter with an attached subscript is showing that it depends on the exchange rate.

With positive transaction costs, the output demand:

in the WAMZ is given by \((1 - \theta_n)Y_t = \delta Z_t - \lambda r_t + \varepsilon_t\)

and in the UEMOA is given by \((1 - \theta_n)Y^*_t = \delta Z^*_t - \lambda r^*_t + \varepsilon^*_t\)

\[
\tag{3}
\]

Where:

\( Z_t \) is the real exchange rate for WAMZ zone, \( r_t \) is the WAMZ real interest rate, \( \varepsilon_t \) is the shock to WAMZ demand, \( Z^*_t \) is real exchange rate for UEMOA zone, \( r^*_t \) is the UEMOA real interest rate and \( \varepsilon^*_t \) is the shock to UEMOA demand.

Equation (3) states that output demand in each country less transaction costs depends on the real exchange rate, the real interest rate, and demand shocks. All shocks in the model are assumed to have zero mean and finite variance.

If \( S_t \) is the nominal exchange rate, defined as the number of units of WAMZ currency required to buy one unit of UEMOA currency, then the real exchange rate is:

\[
Z_t = P^*_t + S_t - P_t \tag{4}
\]

That is, the measurement units are logarithmic for example, \( P_t = \text{Ln}(\text{price}) \). The real interest rate in each Zone is equal to the nominal interest rate minus the expected rate of inflation.

\[
r_t = i_t - (E_t q_{t+1} - q_t); \quad r^*_t = i^*_t - (E_t q^*_{t+1} - q^*_t) \tag{5}
\]

Where

\( i_t \) is the WAMZ nominal interest rate, \( i^*_t \) is the UEMOA nominal interest rate, \( q_t \) is the WAMZ price level \( q^*_t \) is the UEMOA price level, \( E_t \) is an expectation operator conditional on information available at time t. (see note above with equation (5))

Capital mobility is introduced into the model through the uncovered interest rate parity condition. (Chantal and Osakwe, 2002)

\[
i_t = i^*_t + (E_t S_{t+1} - S_t) \tag{6}
\]

Equation (6) simply states that if capital market is in equilibrium, (Chantal and Osakwe 2002) the WAMZ nominal interest rate must be equal to UEMOA nominal interest rate plus the expected real rate of depreciation of the WAMZ exchange rate.

Assuming that \( \beta \) is the share of imports in WAMZ consumption (or exchange rate pass-through coefficient), the consumer price levels in the WAMZ and UEMOA Zones are defined as:

\[
q_t \equiv (1 - \beta)p_t + \beta (p^*_t + S_t) = p_t + \beta z_t; \quad q^*_t \equiv (1 - \beta)p^*_t + \beta (p^*_t + S_t) = p^*_t + \beta z_t; \tag{7}
\]

Where;

it is assumed that the share of imports in WAMZ consumption \( \beta \) lies in the interval \((0,\beta_0)\). This assumption implies that the real interest rate differential and the expected rate of depreciation of the real exchange rate, between the WAMZ and UEMOA countries move in the same direction (Buitel et al., 1995).

More importantly, it is consistent with the empirical evidence of real exchange rate pass-through and the expected rate of depreciation of the real exchange rate, between the WAMZ and UEMOA countries move in the same direction (Buitel et al., 1995).

Thus it is assumed that domestic residents in each country do not hold foreign money. In addition, it is well known in the relevant literature that nominal wage or price rigidity is needed in an economy for the choice of an exchange rate regime to matter. To find this feature in the model, it is assumed that wages are set one period in advance. In particular, wages are determined before the realization of shocks. Because the shocks are unanticipated, if this was case that \( w_t = w^*_t = 0 \) in equilibrium (To derive this result, note that variables are expressed as deviations from no-shock equilibrium, and that the objective of wage setters is to minimize the variance of employment. Given that all shocks have zero mean, the optimal wage rate equal to the expected money supply from equilibrium is zero. Consequently, the deviation of wages from equilibrium must be zero).

Using this result in equation (8) implies that employment level is a function of monetary supply. That is

\[
n_t = m_t - v_t; \quad n^*_t = m^*_t - v^*_t \tag{9}
\]

Before finding a solution for the model, it is useful to express real exchange rate, and the consumer price levels as a function exclusively of exogenous, predetermined or control variables. From
Using equations (2) and (10), in (7) the consumer price levels in the WAMZ and UEMOA zones can be expressed as:

\[(r_t - r_t^*) = (1 - 2\beta)(E_t z_{t+1} - z_t) .\]

Equations (1) and (3) together with the expression for the real interest rate differential between the WAMZ and UEMOA zones can be used to derive a first order stochastic expectational difference equation in \(z_t\). Solving this difference equation and imposing a no-bubble terminal condition yields the following expression for the real exchange rate:

\[Z_t = \rho [1 - \Theta_n](1 - \alpha)(n_t - n_t^*) - (\varepsilon_t - \varepsilon_t^*)] \tag{10}\]

Where \(\rho \equiv 1 / [2\Theta + \lambda (1 - 2\beta)]\)

Using equations (2) and (10), in (7) the consumer price levels in the WAMZ and UEMOA zones can be expressed as:

\[q_t = \alpha n_t + \beta \rho (1 - \Theta_n)(1 - \alpha)(n_t + n_t^*) - (\varepsilon_t - \varepsilon_t^*)]; \tag{11}\]

\[q_t^* = \alpha n_t^* + \beta \rho (1 - \Theta_n)(1 - \alpha)(n_t + n_t^*) - (\varepsilon_t - \varepsilon_t^*)];\]

Using equations (2), (4) and (10), it is straightforward to show that the nominal exchange rate differential between the WAMZ and UEMOA zones is:

\[S_t = [\alpha + (1 - \Theta_n)(1 - \alpha)\rho] (n_t + n_t^*) - \rho (\varepsilon_t - \varepsilon_t^*)] \tag{12}\]

**Policy-Makers’ preferences**

The respective preferences of the WAMZ and UEMOA monetary authorities are represented by the Loss Functions \(L_1\) and \(L_1^*\) defined as follows:

\[L_1 = \frac{1}{2} [n_t^2 + \delta q_t^2 + TC_R]; \quad L_1^* = \frac{1}{2} [n_t^2 + \delta q_t^2 + TC_R]\] \tag{13}\]

Where \(\delta\) is the relative weight for price stability; and \(TC_R\) represents transaction costs.

It should be noted that given that the wage contracts last one period, the use of a static Loss Function is appropriate because the monetary authorities would have re-optimized each period even if they have long horizons.

Specifically, \(TC_R\) compares the direct welfare costs (of currency conversion and hedging exchange rate risk) with the indirect costs to society (resulting from the potential negative effects of exchange rate volatility on trade and investment).

It should be noted that although there are well known theoretical channels through which exchange rate instability reduces trade and investment, the empirical evidence is inconclusive due to largely measurement problems.

The transaction costs in the Loss Function are expressed as a percentage of labour and so have the same weight as employment (Chantat and Osakwe, 2002). Hence, expressing transaction costs as a percentage of labour involves dividing the ratio of transaction costs to output (\(\theta_R\)) by the share of labour in output (\(1 - \alpha\)). Which is:

\[TC_R = \theta_R / (1 - \alpha)\] \tag{14}\]

Accordingly, four points should be noted as follows:

The Loss function implies that the monetary authorities care about transaction costs, about instabilities in employment and about prices.

The analysis is simplified by using a Loss function that does not contain an inflation bias in order to focus on the trade-off between the transaction costs savings with a common currency; and the stabilization benefits resulting from the use of the nominal exchange rate, in the case of flexible exchange rate regime, in order to respond to asymmetric shocks. Therefore, credibility issues are not addressed in this study.

There is an externality in the model in the sense that the WAMZ consumer price level depends on the real exchange rate, and hence on both WAMZ and UEMOA employment levels. This implies that there are potential gains to monetary policy co-ordination, because the WAMZ monetary authority does not have complete control over the WAMZ price level.

The structure of the model is such that, in both of the exchange rate regimes considered in this study, optimal monetary policy fully accommodates velocity shocks. Thus (by accommodating velocity shocks) each monetary authority will be able to stabilize employment, without sacrificing either price or exchange rate stability. Hence, velocity shocks do not pose a stabilization problem in this context.

**Flexible exchange rate regimes**

In this sub-section, the assumption is that each zone has a flexible exchange rate regime. In such a regime, each zone runs an independent monetary policy and, therefore, movements in the nominal exchange rate can help the economy to achieve WAMZ’s macroeconomic policy objectives. Furthermore, due to the fact that transaction costs are incurred in a flexible exchange rate regime, the parameter \(\theta_R\) is positive. The relevant equations are:

\[n_t^* = \psi_0 n_t + \psi_1 (\varepsilon_t - \varepsilon_t^*); \quad n_t^* = \psi_0 n_t + \psi_2 (\varepsilon_t - \varepsilon_t^*)]\] \tag{15}\]

\[6\beta \rho (1 - \Theta_n) (1 - \alpha) [\alpha + \beta (1 - \Theta_n) (1 - \alpha) \rho]\]

\[\psi_0 = \frac{1 + 6 [\alpha + \beta (1 - \Theta_n) (1 - \alpha) \rho]^2}{1 + 6 [\alpha + \beta (1 - \Theta_n)(1 - \alpha) \rho]^2}\]

Equations for \(n_t\), \(n_t^*\) are used to obtain the reduced form of equations for \(n_t\) and \(n_t^*\). These are then used to find

The global shift in employment (\(n_t + n_t^*\)), and

The asymmetric shift in employment (\(n_t - n_t^*\)).

Therefore, one can solve for the resulting expressions for \(n_t\) and \(n_t^*\) in what follows is the procedure for the expressions of the WAMZ and UEMOA employment levels in a flexible exchange rate regime:

\[n_t^\text{flex} = \psi_1 (\varepsilon_t - \varepsilon_t^*) / (1 + \psi_0)\] \tag{16}\]

\[n_t^*^\text{flex} = \psi_2 (\varepsilon_t - \varepsilon_t^*) / (1 + \psi_0)\] \tag{17}\]

Equations (16), and (17) imply that when the WAMZ demand shock is larger than the UEMOA demand shock, the WAMZ employment
level increases, and the UEMOA employment level decreases. Therefore, using the solution for \( n_t \) and \( n^*_t \) in equations (11) and (12) one can obtain solutions for the nominal exchange rate, as well as the WAMZ and the UEMOA consumer price levels in a flexible exchange rate regime. These exact expressions are:

\[
\text{St} \bigg|_{\text{flex}} = \frac{[2(\alpha + (1 - \Theta_t)(1 - \alpha)])}{1 + \psi_0} \left[ q_t + \rho (1 + \psi_0) \right] (e_t + \epsilon^*_t) \\
\text{W}_t \bigg|_{\text{flex}} = \frac{1}{2} E_{1 - \gamma} \left[ (n^*_t |_{\text{flex}})^2 + \Theta_t |_{\text{flex}} \right] TC_R \\
\text{W}^*_t \bigg|_{\text{flex}} = \frac{1}{2} E_{1 - \gamma} \left[ (n^*_t |_{\text{flex}})^2 + \Theta_t |_{\text{flex}} \right] TC_R
\]

(18)

Equation (18) shows that part of the burden of adjustment to asymmetric demand shocks is borne by the nominal exchange rate. Having derived the equilibrium values for the nominal exchange rate, employment, and consumer price levels, the expected welfare effects can be computed for the WAMZ and UEMOA Zones under a flexible exchange rate regime as follows:

\[
\text{W}_t \bigg|_{\text{flex}} = \frac{1}{2} E_{1 - \gamma} \left[ (n^*_t |_{\text{flex}})^2 + \Theta_t |_{\text{flex}} \right] TC_R
\]

(21)

In the preceding explanations it has been clearly shown that the precise expression for the expected Welfare effects in both WAMZ and UEMOA Zones under a flexible exchange rate regime can be obtained using equations (16), (17), (19) and (20) in equations (21) and (22).

**Monetary union regimes**

This sub-Section examines the macroeconomic and Welfare consequences of the creation of a Monetary Union. In such a Union the two Zones would have the same currency and a single monetary policy. There would be neither exchange rate risk, nor the need to convert currencies, and hence transaction costs (TC_R) would be zero, which imply, \( \Theta_t = 0 \). Furthermore, the monetary authority could choose a union-wide monetary supply \( m^\ast_t \) to minimize the Loss Function.

\[
\text{L}^\ast_t = \frac{1}{2} (n^*_t + n^{*2}_t) + \rho \left[ q^2_t + q^{*2}_t \right]
\]

(23)

The use of the same currency in a monetary union implies that the logarithm of the nominal exchange rate is zero. That is \( S_t = 0 \). Therefore, from equation (12), it must be the case that

\[
n_t - n^*_t = \rho (\epsilon_t - \epsilon^*_t) \\
\]

(24)

\[
[\alpha + (1 - \alpha) \rho]
\]

When in equilibrium money demand must be equal to money supply. Now, let the assumption be that the Union –wide, money demand in the two zones and the money market equilibrium is given by \( m^\ast_t \)

\[
m^\ast_t = \frac{1}{2} (n_t + n^*_t) + \frac{1}{2} (v_t + v^*_t)
\]

(25)

Where, \( m^\ast_t \) is the Union – wide money supply for the Loss Function to be a minimum. Equations (24) and (25) can be used to express \( n_t \) and \( n^*_t \), as functions of the Union – wide money supply. The expressions are:

\[
n_t = m^\ast_t - \frac{1}{2} (v_t + v^*_t) + \rho (\epsilon_t - \epsilon^*_t) \\
\]

(26)

\[
n^*_t = m^\ast_t - \frac{1}{2} (v_t + v^*_t) + \rho (\epsilon_t - \epsilon^*_t)
\]

(27)

The next step is to use equations (11), (26) and (27) to express \( q_t \) and \( q^*_t \) as functions of the Union – wide money supply, noting however that, given the structure of the model, the monetary authority of the Union cannot affect the real exchange rate between the two Zones. That is:

\[
q_t = \alpha m^\ast_t - \alpha/2 (v_t + v^*_t) - \rho (\epsilon_t - \epsilon^*_t) + \beta z_t
\]

(28)

\[
q^*_t = \alpha m^\ast_t - \alpha/2 (v_t + v^*_t) - \rho (\epsilon_t - \epsilon^*_t) + \beta z_t
\]

(29)

Using equations (26) to (29) in (23) and minimizing the resulting expression with respect to \( m^\ast_t \), it is straightforward to show that the solution to the monetary authority’s problem is

\[
m^\ast_t = \frac{1}{2} (V_t + V^*_t)
\]

(30)

Equation (30) suggests that optimal monetary policy in a monetary Union fully accommodates Union – wide velocity shocks \( (V_t + V^*_t) \), but does not respond to Union – wide demand shocks \( (\epsilon_t + \epsilon^*_t) \). Union –wide demand shocks are fully absorbed by adjustments in the real interest rates. In addition, in a monetary Union regime, optimal monetary policy does not respond to asymmetric demand shocks (Hallwood and MacDonald, 1995). Furthermore, it is noted although that this policy reduces the volatility of union – wide employment, it does increase the volatilities of employment in the National economies. Hence the burden of adjustment to these shocks will fall on WAMZ and UEMOA employment levels. This in contrast to a flexible exchange rate regime where the nominal exchange rate adjusts itself to cushion the effects of asymmetric shocks, thereby reducing the volatility of employment and hence of output (De Grauwe, 2000).

Substituting for \( m^\ast_t \) in equations (26) and (27), the optimal employment levels in the two zones are:

\[
n_t \bigg|_{\text{union}} = \frac{1}{2} E_{1 - \gamma} \left[ (n^*_t |_{\text{flex}})^2 + \Theta_t |_{\text{flex}} \right] TC_R
\]

(31)

\[
n^*_t \bigg|_{\text{union}} = \frac{1}{2} E_{1 - \gamma} \left[ (n^*_t |_{\text{flex}})^2 + \Theta_t |_{\text{flex}} \right] TC_R
\]

(32)

The real exchange rate in a monetary union is:

\[
Z_t \bigg|_{\text{union}} = \frac{1}{2} E_{1 - \gamma} \left[ (n^*_t |_{\text{flex}})^2 + \Theta_t |_{\text{flex}} \right] TC_R
\]

(33)

Using the solutions for \( m^\ast_t \) and \( Z_t \) in equations (28) and (29), the consumer price levels in WAMZ and UEMOA economies in a monetary union are:

\[
q_t \bigg|_{\text{union}} = \left[ \alpha (1 - 2\beta) \right] (\epsilon_t - \epsilon^*_t)
\]

(34)
Hence, the expected welfare effects in the WAMZ, and UEMOA Zones under a monetary union is given by:

\[
W_t = \frac{1}{2} E_{t-1} \left( \left[ \left( q_1 \right)_t \right]^2 + \delta \left( q_2 \right)_t \right)
\]

and

\[
W^*_t = \frac{1}{2} E_{t-1} \left( \left[ \left( q_1^* \right)_t \right]^2 + \delta \left( q_2^* \right)_t \right)
\]

The econometric model: Simulation and estimation procedures

As already indicated, the framework for the econometric model is the modified version of the structural model of Lane (2000) and of Chantal and Osakwe (2002), which incorporates endogenous costs. The region consists of two zones: the WAMZ and UEMOA monetary zones. For analytically tractable a cross-section of WAMZ and UEMOA countries were used in the study and the data were from 1982 to 2002 (both years inclusive).

The regression framework used was of the Panel type, which specifically, involves the use of the General Method of Moments (GMM). This method is based on the first-difference GMM estimators for Auto-Regression with first Lag \([AR (1)]\) Panel data model, and is due to Holtz –Eakm et al. (1988), Arellano and Bond (1991), and Arellano and Bover (1995), who built on the fundamental work of Hensen (1982). Specifically, the method involves solving first-order differential GMM equations by iterative methods.

The formal description of the model’s variables for the countries involved will be featured and the equations will be calibrated or expressed as deviations from non-shock equilibrium.

For example, if \(Y_t^w\) and \(Y_t^u\) represent the WAMZ and UEMOA’s output levels (at a future time \(t\)) respectively, and \(W_t\) and \(W^*_t\) are the future expected welfare effects in WAMZ and UEMOA respectively, the fixed effect output regression model is as follows:

For Country \(i\) in the WAMZ zone with Country \(j\) in the UEMOA zone, the model for the OUTPUT Levels in time \(t\) will be:

\[
Y_{it} = \alpha + (Y)_{it-1} + (Y')_{it-1} + (r)_{it-1} + (Z)_{it-1} + (\bar{Y}) + \varepsilon
\]

Where

- \(r_{it}\) is the change in real interest rate, and
- \(Z_{it}\) is the change in real exchange rate,
- \(\bar{Y}\) is the output gap,
- \(\varepsilon\) is the unobserved random term,
- \(i\) represent the \(i^{th}\) country in the WAMZ zone, and likewise
- \(j\) represent the \(j^{th}\) country in the UEMOA zone, and
- \(t\) represent the \(t^{th}\) time period. and \(t-1\) represents the previous time period.

The simulation experiment required estimating values for the key structural parameters of the model. The approach adopted in choosing values for these parameters was as follows. In order to speed up the iterative process, the share of labour in output was set at 0.66. This is consistent with the estimates used by Kose and Riezman (2001) in order to calibrate a general equilibrium model for the data. In their model they used three factor production functions for the final goods sector, the share of labour, and capital were 0.45 and 0.23 respectively. Adjusting for the fact that production function in this experiment has two factors give relative share of labour in output to 0.66%. It has also been observed that there are no estimates available or relative weights, which Central Banks in West Africa place on price stability.

The growth rate for real output in the five WAMZ countries and in the eight UEMOA countries used the model given by equation (38). The parameters were estimated by using an unbalanced data set for the period 1982 to 2002. A fixed-effect panel approach allows the intercept terms (\(\alpha\) in the model) to differ across countries, and was used in the estimations. Furthermore, E – views Econometrics software tests the Variance/Covariance Matrix for heteroskedasicity using the methodology in the Generalized Method of Moments.

The share of imports in domestic consumption was taken to be approximately the share of imports in GDP (otherwise commonly known as the exchange rate pass-through coefficient). The parameter for this coefficient was set at 0.37 due to the fact that the average ratio of imports to GDP from 1982 to 2002 was close to this figure for each of the two zones. This estimate was consistent with the exchange rate pass-through coefficient reported in the literature. Also, in order to account for the probability that the pass-through coefficient in the two zones may have some variability in the benchmark simulation of the model, a pass-through coefficient of 0.30 to 0.37 was used. A summary of the key benchmark parameter values is presented in Table 2.

The magnitude of the transaction costs parameter is empirically difficult to pin down, but this parameter was simulated using different critical values ranging from 0.01 to 1.5 per cent of output.

ANALYSIS OF RESULTS

The results of the estimation are presented in Table 1 (Appendix V). The adjusted R–squared from the GMM equation was 0.94, which is to say that it explains a large percentage of the observed variation in the dependent variable. The Real output growth was significant at the 1 per cent level, whilst output gap, and interest rates were significant at the 10% level, and the real demand or output shock is 0.068. Convergence was achieved after one weighted matrix at two total coefficient iteration (The principle of convergence in mathematics and statistic suggest that, for any two series, X and Y, convergence between the series can be defined as requiring \(\lim_{t \to \infty} (X - Y) = \alpha\), which implies that the probability that two series differ by a given amount is required to be arbitrarily small). The first derivatives of lag real interest rate, and of output gap variables are significant, whilst the lag real exchange rate variable is the omitted variable in the equation as required in dummy variable analysis. As already indicated also, following from the empirical work of Chantal and Osakwe (2002) in comparing alternative exchange regimes, the focus in the present study was on the three types of real demand shocks: perfect negatively correlated shocks (\(\varepsilon_1 = - \varepsilon_2\)); common or symmetric shock (\(\varepsilon_1^* = \varepsilon_2^*\)); and idiosyncratic or uncorrelated shocks (\(\varepsilon_1^* \neq 0\) and \(\varepsilon_2^* \neq 0\)) (Note that correlated and idiosyncratic shocks are different types of asymmetric shocks).

The results for the Welfare losses under exchange rate regime without transaction costs are presented in Table A (Appendix V). The results show that with perfect negatively correlated shocks, and no transaction costs, the WAMZ Zone had higher Welfare losses than the UEMOA zone. The ratio of the Welfare loss in the monetary union (UEMOA) to Welfare loss in flexible exchange rate regime (WAMZ) is 0.832. This result
indicates that the ability of monetary authorities to harness Welfare gains (in the form of cushioning the effects of asymmetric real shocks through movements in the nominal exchange rate) will in the long run result in high transaction costs, and exchange rate movements under the flexible exchange rate regime.

However, the results suggest too that the nature of shocks is important, because there will be no Welfare loss in both regimes when the two zones face symmetric or common shocks. Losses will be absorbed or offset by changes in the real interest rates thereby neutralizing the Welfare effects. In each exchange rate regime, Welfare losses under perfect negatively correlated shocks are about 3.3 times higher than under idiosyncratic shocks. Hence, relatively speaking, the losses are the same across regimes regardless of whether shocks are correlated or idiosyncratic. The results presented in Table A. suggest that increasing the value of \( \beta \) from 0.30 to 0.37 does not increase the relative attractiveness of a flexible exchange rate regime over a monetary union regime. The idea behind this analysis is that a reduction in the value of \( \beta \) implies a less exchange rate pass-through coefficient. Consequently, with sticky wages and nominal prices, the analysis suggests that changes in the nominal exchange rate will enhance the effectiveness of the exchange rate as a tool for macroeconomic stabilization.

This result is consistent with macroeconomic theory which states that open economies are better candidates for monetary union. It is the reason that open economies are more likely to have higher exchange rate pass-through coefficients, and hence less ability to affect the real exchange rate (through changes in the nominal exchange rate) without inducing the undesirable effects of reducing Welfare.

It is also observed that increasing the relative weight on price stability in the loss function results in the relative attractiveness of the flexible exchange rate regime. The ratio of Welfare losses in a monetary union regime (UEMOA) to the losses under a flexible exchange rate regime (WAMZ) decreased from 0.832 to 0.811 when the relative weight on price stability was increased from 0.005 to 0.015 percent.

Table B shows Welfare losses under each exchange rate regime in the part of the model with positive transaction costs. Under this simulation, different values of transaction cost parameters were used ranging from 0.005, 0.010 to 0.015. The ratio of Welfare losses under flexible rate regime increased from 0.832 to 0.845, with a point differential of 0.013 points. If transaction costs ranged from 0.005 to 0.015 percent of output respectively, the ratio of monetary union (using the range of 0.005 to 0.015) divided by welfare loss in a flexible exchange rate regime decreased from 0.832 to 0.811. This finding corroborates the notion in economic theory that transaction costs reduce the relative attractiveness of a flexible exchange rate regime.

**Remarks on the two monetary regimes**

This theoretical study has shown that monetary union will dominate a flexible exchange rate regime if transaction costs represent more than 1% of both zones GDP (of GDP for both Zones). The real critical value of transaction costs in terms of magnitude in the two zones will be difficult to pin-down; however, the magnitudes used in the study are based on estimates used in other studies such as the Case Studies in the financially developed economies of the European Union. For example, the estimate of transaction cost savings before the formation of European Monetary Union was about 0.5% of the Union's GDP. At that point in time it was even thought that this figure underestimates the true savings in transaction costs, and as a result it is regarded as the lower bound figure.

In addition, Mendizabal (2002) study provided an extensive estimate for Europe, which ranges from upper bound efficiency gains in terms of the suppression of transaction costs, indicated by savings for individual countries, and of relative costs for individual countries. On the other hand, similar to Mendizabal's findings, Chantal and Osakwe (2002) have also advanced that transaction cost savings for the less financially developed economies in the European Union such as Italy, Spain, and Portugal are estimated to be above 1 per cent of their GDP, and this figure also is a lower bound for the countries concerned, due to the underlining assumption of the study, that they do not take into account transaction savings resulting from the reduction or elimination of exchange.

A corollary of the above is that exchange rate risks due to the cost of hedging are supposed to be higher in the WAMZ and UEMOA zones than in the less financially developed economies of the EU. Furthermore, intra-WAMZ trade and intra-UEMOA trade are reported to be marginal, and each is lower than intra-EU trade.

This study on the Welfare effects of monetary union, and on the flexible exchange rate regimes in the WAMZ and UEMOA zones was conducted by using the GMM method. The model has illustrated the trade-off between the reductions in transaction costs resulting from a common currency, and the stabilization benefits of a flexible exchange rate regime. Hence, one can conclude that monetary union dominates flexible exchange regime in this study. However, it is important to note that the parameter values for welfare losses under the WAMZ and UEMOA zones are relatively close, but the choice of exchange rate regime should have as an objective an improvement in the living standards of the population. For example, the choice of exchange rate regime can help ease the burden of adjustment to shocks, but it cannot be the remedy for all the economic ills in the regions. A
operational environment for business in The Gambia with a view to ascertaining and comparing the relative merits of the two exchange rate regimes in the ECOWAS region in terms of transaction costs, while the survey looks at the factors that are conducive to economic activity at the microeconomic level. Economic activity at the Macroeconomic level is an aggregation of economic behaviour at the microeconomic level, that is, the respective activities of economic agents and entities such as, large companies/firms, and small and medium size enterprises.

PART II

The baseline survey

The background: This aspect of the study elaborates on the functions of the private sector in an economy, and specifically the Gambian economy. It is in an attempt to shed light on the question of how businesses in The Gambia can continue to grow and contribute to meaningful economic development. This point is relevant to the extent that a country stands to gain from a monetary arrangement by virtue of how much it is able to take advantage of relevant opportunities – if championed in this drive by the private sector. Consequently, the motivation for this survey was to assess the established operational environment for business in The Gambia with a view to ascertaining and comparing the relative merits of the two exchange rate regimes in the ECOWAS region in terms of transaction costs or per unit cost comparisons, notwithstanding the fact that The Gambian economy is currently operating a flexible exchange rate regime.

First and foremost, the question was: has the Gambian economy created sufficient microeconomic conditions in order to maintain a competitive edge in a West African Monetary Union arrangement? Accordingly, the survey looked into such issues as: the requisite skills and knowledge, the access to working capital, and the stream of credit line for business operation. For instance, every business operation requires capital, and the composition of this capital could be as follows: assets, equity or owner’s capital, and credit. The relevant question here is how available is capital for setting up a business.

The survey also tried to establish the conditions in which the provision of public goods (such as the basic infrastructure and the energy services) contributes as an enabling factor to the conduct of business in The Gambia. Such provision facilitates the movement of goods and services to the end users and reduces the cost of production, given that, for example, good road networks, and road conditions reduce the time in which goods and services are moved from one destination to the other at minimum cost. In a nutshell, a good infrastructure in terms of roads, energy services, river-transport, air-cargo, and other services is an inherent prerequisite for the maintenance of price stability in an economy, and for the creation of enterprises that can spur socio-economic development.

On the other hand, the first part of the present study (on the welfare effects of monetary union and flexible exchange rate regime) has shown that the per-unit cost is lower in a monetary union regime than in a flexible exchange rate regime. Similarly, it is a well established fact that exchange rate uncertainty is lower in a monetary union regime than in a flexible exchange rate regime. Pursuing this line, the baseline survey also tried to delineate how the economy had fared under the flexible exchange rate regime at micro-level, and the questions asked were designed to look into factors such as: the access to start-up capital and credit, the operating conditions for business (including government policies, legal provisions, the interest of shareholders, and the standards set for entry into other markets), and the cost of doing business in The Gambia.

Data collection procedures

Sixty self-completion questionnaires were distributed randomly to selected organizations (in the various sectors of The Gambian economy in the greater Banjul area) including four parastatals, one NGO and thirty private institutions, and the overall response rate was 58 percent. Based on the questionnaire, 33 variables and their categories were identified. The frequency distributions for the organisations’ responses to the questionnaire items were obtained, and analyzed.

Data analysis and the survey results (Tables in Appendix IV)

Taking first the question of capacity needs (that is, the requisite skills and knowledge), and the extent to which professionals in these sectors could prepare and translate government policies into advantages for their
entities should the WAMZ regime become a reality, of the 184 qualified employees that the organizations required (see figure 1 and Table 2 of Appendix IV), 42% were for business and accountancy, 12% for economic and finance, 39% for management and administration, 7% for legal work. Also, 34 percent indicated that the question did not apply to their organisations.

Figure 2 and Table 3 of Appendix IV indicate that it was more difficult to recruit staff who hold degrees and staff with professional qualifications than staff with sub-degree qualifications.

Furthermore, 54% of the respondents indicated that government policies are of no hindrance to the conduct of their businesses; more so in trade and export. With regards to the issuing of credit, 57% of the respondents thought that the rationing of credit was a major deciding factor as to who should qualify for credit.

In addition, 66% of the organizations thought that they had healthy balance sheets, but that raising capital by way of issuing shares was not possible in their modes of operation, and that foreign direct investment was good for their businesses. The literature on financial intermediation has shown that borrowing constraints may increase variability in consumption, output, and employment. In addition, information asymmetric is often the motivating factor in credit rationing where the market denies funds to borrowers, but a monetary policy too matters to real business activity by offsetting the flow of credit. Also borrowers’ balance sheets affect the degree of credit rationing, but financial capacity matters very much to private spending. Therefore, the institutionalisation of measures that could eliminate this distortion of economic behaviour (such as increasing the level of high quality borrower for economic activity, the mobilization of domestic savings, and the measures affecting wages and prices) are necessary and sufficient conditions for wealth creation and employment generation.

On the question of competing demand for foreign currency, 46% of the businesses did not think that the number of Letters of Credit (LCs) to be cleared in a week (or a month) exerted undue pressures on their organizations’ foreign currency holding or increased their exposure levels to foreign currency risks.

Having a well-functioning financial market (in particular, a credit and foreign exchange market) does not necessarily mean that the market can take care of itself. Indeed, it only provides a starting point for analysis and for the institution of measures and standards in order to affect economic behaviour positively or to increase its competitive edge, and to affect such measures in the run-up to monetary union in the WAMZ would be an added advantage.

The most worrying factor (in terms of cost impediments) for the businesses in the survey was the cost of energy – a cost which a majority (66%) of the respondents found prohibitive. Sizeable minorities found transport, storage space and logistics prohibitive (46% in the case of transport and 40% for storage space and logistics). Interestingly too, Communication and the Administrative Red-Tape were not found to be prohibitive when doing business in The Gambia. Only 49% of the
respondents indicated that the interest of minority shareholders in their organizations was protected by law.

In the area of international trade, 63% of the organizations considered access to markets as satisfactory, whilst 49% thought that the cost of importing foreign equipment and materials was reasonable; and this was in relation to the combined effects of import tariff, license fees, bank fees, the time required for clearing at the ports, and going through the administrative procedures.

Another finding was that 49% of the organisations indicated that starting-up a new business in the service sector and in industry was not easy. Furthermore, 66% of the respondents thought that the European Union (EU) standards for the quality of products, and services, and other EU regulations were said to be beneficial to their business operation. Finally, 91% of the organizations were also thought that they were highly responsive to their customers, and customer relation and retention.

In Conclusion, the survey has highlighted the strengths and weaknesses of the private sector operators in the economy. At the same time it has shown that there is a correlation between the operations of economic agents, and economic behaviour (such as low transaction costs, output growth, level of employment, and a growing nation-wide income). Consequently, if The Gambia is to maintain its competitive position, its focus should be on meeting the need for capacity building, increasing investment in both private and public initiatives, setting-up standards in goods and products markets, and creating conducive economic activity (such as establishing a lower cost structure, the rule of law, and sound macroeconomic policies).

Conclusion and Recommendations

Based on the results of the research on the simulation of the respective welfare effects of the two regimes, the conclusion was that welfare loss is higher in the flexible exchange rate regime than in the monetary union regime.
Therefore, allowing the shocks to depend on the exchange rate regime will increase the relative attractiveness of a monetary union regime. Also, if the transaction costs are greater than 1 percent of the output in the two zones, the welfare effects will be higher in the monetary union regime than in the flexible exchange rate regime. This critical point for the welfare loss function can be termed a lower bound figure due to the fact that it is derived from an ex–ante analysis, which does not take into account endogeneity conditions of optimum currency areas. For example, the burden of adjustments to shocks under a flexible exchange rate regime is borne by the nominal exchange rate. In order to cushion the effect of asymmetric shocks, thereby reducing fluctuations in employment and output. On the other hand, in a Monetary Union regime asymmetric shocks reduce the rate of change of employment, and do not increase it in national economies; consequently the burden of adjustment falls on employment levels. For instance, if the bulk of the workforce is in the civil service, such an imbalance in employment may lead to structural reforms.

From the studies cited above, it has been advanced that the formation of a monetary union can increase the symmetry of shocks within a region thereby increasing the probability of success of the union. However, as a reaction to this statement, it is also said that integration could lead to increased specialization and hence to a greater asymmetry of shocks among the countries in a monetary union. However, these statements are all based on propositions about how monetary authorities and economic agents respond to union-wide, consistent policies over time and complementarities between production structures within the union, notwithstanding the factor of mobility such as the mobility of labour and capital.

The findings of the research work on monetary union have indicated that transaction costs are lower in a monetary union regime than in a flexible exchange rate regime, and moreover, uncertainty about the exchange rate is also lower in a monetary union. Therefore, improvements are called for in the energy sector, in road infrastructure, and in other facilities such as air-cargo and shipping. It is therefore recommended that efforts geared towards the private sector focus on the creation of a conducive economic space, on access to resources, and on capacity building in order to increase high income growth, employment opportunities, productivity, and value–added production.

ACKNOWLEDGEMENTS

We would like to extend our sincere gratitude to the sponsors of this study. Also, we appreciate very much the support given by the other research team members for the first part of the study about the welfare effects of monetary union, namely, Mr. Musutapha Yarboe, and Mr. Momodou Musa Ceesay of the Department of State for Finance and Economic Affairs who collected the necessary data. We appreciate too the work of the Baseline survey team. That team included Mr. Abdouli Bittaye, Mr. Charles Camara, Mr. Momodou Musa Ceesay, and Mr. Ebrima Suma Corr. The staff of Gambia College, and students of the University of The Gambia were involved in collecting data for the survey and we are grateful for their useful input.

In addition, we would like to thank the Technical Committee of The Gambia Economic and Social Development Research Institute for their helpful comments and suggestions, in particular, Mr. Lamin Ceesay, and Lamin Nyabally; our sincere thanks and gratitude goes to the regional Co-ordinator ROCAPE, Mr. Gaye Daffe and the senior programme officer IDRC. Mr. Dikalla Sanogo, for their immense contribution/observations made during the pre-validation workshop held in The Gambia in November 2005. We appreciate and wish to thank SISERA/IDRC for finding the study. We are also very grateful to the following for their professional and technical support: Horeja Bobb, Project Secretary and Kebba Sallah, Project Computer Technician.

We know how much we owe to colleagues at the United Nations Economic Commission for Africa in Ethiopia, the Central Bank of The Gambia, and the Department of State for Finance and Economic Affairs. The ideas that appear in this study are in many cases as much theirs as ours. To all of the above we say thank you; the study is stronger because of your comments, suggestions, and assistance. Any remaining errors and deficiencies in the study should only be attributed to me.

REFERENCES

Mundell (1963) and McKinnon (1963) Canadian Journal of Economics and Political Science 475 – 485. Mundell (1963) and McKinnon (1963) Please specify the write date because we cannot use both)
Appendix 1A: Data sources, models and software

(a) Data were sourced from:
the World Bank’s African database
the Central Banks of member countries of WAMZ and UMOA
the African Development Bank: African Development Indicators 2004
GESDRI’s research network database

(b) the Mathematical Models used were
Structural monetary models which were suggested by Lane (2000)
which use Generalized method moments (GMM), and pooled sample regression

(d) the Countries from which data were obtained for the study are:
(i) for the West African Monetary Zone (WAMZ): The Gambia, Ghana, Guinea Conakry, Nigeria, and Sierra Leone,
(ii) for the Economic and Monetary Union of West Africa (UEMOA), (Benin, Burkina Faso, Ivory Cost, Guinea Bissau, Mali, Niger, Senegal, and Togo)

(e) Variables used in the Regression Analysis
*Real output growth rate* was computed using GDP at 1995 constant prices
(Source: ADI in local currency).
*Real interest rate* was computed as nominal discount rate minus current rate of inflation. (Sources: ADI, and the World Bank Africa database)
*Real exchange rate* was computed using nominal exchange rates (adjusted for inflation) and the inflation rates were computed using the consumer price indices (1995 = 100).
*Output gap* was computed as the difference between real GDP and the potential output. The latter was computed using the Hodrick–Prescott filter which is a feature in the E – Views computer package.
### Appendix 1B: The Macroeconomic Data Sets by Year and Country

<table>
<thead>
<tr>
<th>Year</th>
<th>BENIN</th>
<th>Burkina Faso</th>
<th>Cote D'Ivoire</th>
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<tbody>
<tr>
<td></td>
<td>Real gdp growth rate</td>
<td>real interest rate</td>
<td>exchange rate</td>
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Data is sourced from the World Bank’s African database
Central Bank of member countries of WAMZ and UMOA
World Bank’s: African Development Indicators 2004
GESDRI’s research network
Data: Electronic means
Appendix II: Proof of the relationship between real interest rate and demand shocks

From equation (1), the global shift in output:

\[(Y_t + Y_t^*) = (1 - \alpha)(n_t + n_t^*)\]  \hspace{1cm} (38)

From equation (3), the derivation for global shift in output is:

\[\frac{\lambda (r_t + r_t^*)}{(1 - \theta)} + \frac{(\varepsilon_t + \varepsilon_t^*)}{(1 - \theta)}\]  \hspace{1cm} (39)

Using equations (38), and (39) the implication is that:

\[\frac{(1 - \alpha)(n_t + n_t^*)}{(1 - \theta)} = \frac{\lambda (r_t + r_t^*)}{(1 - \theta)} + \frac{(\varepsilon_t + \varepsilon_t^*)}{(1 - \theta)}\]  \hspace{1cm} (40)

Therefore, under each exchange rate regime, \((n_t + n_t^*) = 0\) hence;

\[\frac{(\varepsilon_t + \varepsilon_t^*)}{\lambda}\]  \hspace{1cm} (41)

For example if the two shocks are perfectly negatively correlated (perfect asymmetric shocks), there is no change in real interest rates. Conversely, if demand shocks are common, equation (41) becomes;

\[\frac{2 \varepsilon_t}{\lambda}\]  \hspace{1cm} (42)

Consequently, the real interest rate fully absorbs or offsets common or symmetric real demand shocks.

Appendix III: The Baseline Survey Questionnaire

Questionnaire for the Managing Director or Personnel Manager of this Organisation

The Gambia Economics and Social Development Research Institute (GESDRI) is grateful to you for your co-operation in this project. Your responses will be most valuable for the economic development of the Country.

Please return the completed tables to GESDRI Mile 7 Quarters, Behind Radio Gambia, Quarter No. 3.

1. Background Information

Please complete the following:

<table>
<thead>
<tr>
<th>The name of the organisation</th>
</tr>
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<tr>
<td>The address of the organisation</td>
</tr>
<tr>
<td>The Telephone Number for the organisation</td>
</tr>
<tr>
<td>The Fax Number for the organisation</td>
</tr>
</tbody>
</table>

The number of qualified workers in your Organisation

[Note for the Managing Director/Personnel Manager: Please complete the tables below for your organisation]

(i) Estimate in Table 1 the additional numbers of employees with a university degree or a sub-degree/Higher Diploma or an equivalent professional qualification, that your organisation will require within the next five years in those occupational areas listed below that are relevant to your organisation; and put the numbers in the appropriate boxes below

(ii) Highlight with a tick in Table 2 those occupational areas and qualifications for which you have had difficulties, in the past five years, to recruit suitably qualified people. ]
Table 1. The number of employees qualified in Economics, Banking and Financial Insurance, and Management that the organization will require in the next five years

<table>
<thead>
<tr>
<th>Occupational areas</th>
<th>a Master’s or PhD degree</th>
<th>a Bachelor’s degree</th>
<th>a Sub-degree Qualification (Higher Diploma)</th>
<th>a Professional Qualification only</th>
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<tr>
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Table 2. Qualifications for which recruitment has been difficult in the past five years.

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<th>Occupational areas</th>
<th>A master’s or PhD degree</th>
<th>A bachelor’s degree</th>
<th>A sub-degree qualification (Higher Diploma)</th>
<th>A professional qualification only</th>
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</tr>
<tr>
<td>Legal work</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

3. Trade Barriers

[Note: Please circle the appropriate number in each box below]

Is there any Government Policy, which you think may be hindering trade and export?

3.2 When considering client issue of credit, does rationing weigh in as your major deciding factor as to who should qualify for the issuance of credit?

Do you consider your institution as generally healthy with sound balance sheets?

Is raising money by issuing shares possible for your company?

3.5 Do you consider the rules governing foreign direct investment as beneficial to your Organisation?

4.0 General Questions

4.1 Does the number of LCs to be cleared in a week or month exert undue pressure on your foreign currency holdings?

4.2 The list below illustrates the most worrying factors in terms of cost impediments to doing business in The Gambia

1: prohibitive; 2: not prohibitive.

(a) Energy Cost

(b) Administration red-tape

(c) Transport

(d) Communication

(e) Storage space and logistics
From the following list, please select the five most problematic factors for doing business in The Gambia, and rank them as 1 (most problematic) etc.

- Access to financing
- Restrictive labour regulations
- Foreign currency regulations
- Inadequate supply of infrastructure
- Inefficient government bureaucracy
- Inadequately educated workforce
- Poor work ethic in national labour force
- Policy instability
- Political instability
- Crime and theft
- Corruption
- Tax regulations
- Tax rates
- Inflation

5. For the Service Sectors and/or Industry

Are the interests of minority shareholders in your company, and its activity protected by law?

How do you consider market access for agents operating in import/export in terms of market entry with our major trading partners.

When your company needs to import foreign equipment or materials, the combined effort of import tariffs, license fee, bank fees, and the time required for administrative red-tape raise the cost of doing business. Do you consider this cost as prohibitive?

Do you consider current Customs procedures as beneficial for your Business or organization?

5.4 Is starting a new business generally easy in the Service Sector or Industry you are in?

Are EU Standards on products / service quality, such as energy, and other regulations (outside our regulations for the environment) beneficial to your business or institution

customer Orientation: Is your company highly responsive to Customers and Customers’ relations and retention?

Any other additional comments

Thank you for completing this questionnaire
Please return to
GESDRI,
Mile 7,
Quarter Number 03
Tel: 4497627
Appendix IV: The Baseline Survey Tabulated Data

Table 1. The number of organizations by sectors of the economy

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<td>-</td>
<td>35</td>
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Table 2. The required Number of qualified Employees by occupational area

<table>
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<th>A Bachelor’s Degree</th>
<th>A Sub-degree qualification</th>
<th>Professional Qualification</th>
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<td>28</td>
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<td>4</td>
<td>12</td>
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<td>27</td>
<td>43</td>
<td>62</td>
<td>52</td>
<td>184</td>
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Table 3. The number of organizations that found it difficult to recruit suitably qualified employees by Occupational area and level of qualification.

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Table 4A shows that a majority of the respondents (54%) thought that there was no government policy that could be a barrier to trade and export. With regard to considering clients for credits, 57% of the respondents thought that the rationing of credits weighed in as a major deciding factor as to who should qualify for credits.

Turning to Table 4B, the most worrying factor (in terms of cost impediments) when doing business in The Gambia was the cost of energy.

Table 4A. The number of organizations for which the listed issues were seen as trade barriers (n = 35).

<table>
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<th>The issues *</th>
<th>No. of organizations which responded</th>
<th>No. of Organizations that did not respond</th>
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<td>Are Government Policies a hindrance?</td>
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<td>Is the rationing of credits a deciding factor?</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Is the organization one with sound balance sheets?</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Is raising money by issuing shares a possibility?</td>
<td>8</td>
<td>23</td>
</tr>
<tr>
<td>Are rules about foreign direct investment beneficial?</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>Is the number of LCs to be cleared periodically exerting pressure?</td>
<td>8</td>
<td>16</td>
</tr>
</tbody>
</table>

[key: * = the issues are those that underpinned the items in Section 4 of the questionnaire]
**Table 4B.** The number of organizations for which the listed factors were prohibitive (n = 35).

<table>
<thead>
<tr>
<th>The Factors</th>
<th>N° of organizations for which the factors were prohibitive</th>
<th>N° of Organizations that did not answer the related question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy costs</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>Administration red tape</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>Transport</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Communication</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>Storage space and Logistics</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

**Table 5.** Organizations’ responses to the issues about the service sector/industry.

<table>
<thead>
<tr>
<th>The issues* are whether . . . . .</th>
<th>N° of organizations that responded . . . . .</th>
<th>N° of Organizations that did not respond</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interests of minority shareholders are protected by law</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>There is access to the markets of The Gambia’s major trading partners</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>The total administrative cost of importing foreign goods is prohibitive</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>Customs procedures are beneficial to the organization</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Starting a new business in the sector is generally easy</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>The EU standards for the quality of products/services are beneficial to the organization</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>The organization is highly responsive to customers and to customer relations</td>
<td>32</td>
<td>0</td>
</tr>
</tbody>
</table>

[Key: * = these issues are those that underpinned the items in Section 5 of the questionnaire]

**Appendix V: the Tables for Part I of the study**

**Table 1.** Estimates of the parameters for the Model used

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Estimated Coefficient b</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real output growth rate (-1)</td>
<td>0.82*</td>
<td>0.280</td>
</tr>
<tr>
<td>Change in real interest rate (-1)</td>
<td>0.01*</td>
<td>0.004</td>
</tr>
<tr>
<td>Change in real exchange rate (-1)</td>
<td>Omitted variable</td>
<td>Omitted variable</td>
</tr>
<tr>
<td>Output gap (-1)</td>
<td>- 0.003**</td>
<td>0.010</td>
</tr>
<tr>
<td>Dummy variable WAMZ</td>
<td>0.0013**</td>
<td>0.002</td>
</tr>
<tr>
<td>Dummy variable UEMOA</td>
<td>- 0.017*</td>
<td>0.018</td>
</tr>
</tbody>
</table>

Standard Error of Regression = 0.068
Standard deviation of domestic demand shock (see Table 2)
R – Squared = 0.96
Adjusted R–Squared = 0.94
P – Value = 0.4823
Data Sample Years 1982 to 2002
Country specific intercept terms are not reported because quarterly data were not available from member countries of WAMZ and UEMAO.
b.* and ** significant at 10 and 1 percent levels respectively
c. Dummy variable coefficient in terms of difference from the omitted category of regression for particular classificatory variable.
d. see the Glossary for an explanation of some of the technical terms

Table 2. Benchmark simulation parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1 – (\alpha))</td>
<td>0.66</td>
<td>Share of labour in domestic output</td>
</tr>
<tr>
<td>(\sigma)</td>
<td>0.02</td>
<td>Real exchange rate elasticity of demand</td>
</tr>
<tr>
<td>(\lambda)</td>
<td>0.01</td>
<td>Interest rate semi-elasticity of demand</td>
</tr>
<tr>
<td>(\beta)</td>
<td>0.37</td>
<td>Share of import in domestic consumption (or the exchange rate pass-through coefficient)</td>
</tr>
<tr>
<td>(\delta)</td>
<td>1.00</td>
<td>Relative weight on price stability in loss function</td>
</tr>
<tr>
<td>(\theta)</td>
<td>0.00</td>
<td>Transaction costs parameter</td>
</tr>
<tr>
<td>(\delta_r)</td>
<td>0.068</td>
<td>Standard deviation of domestic demand shock</td>
</tr>
</tbody>
</table>

Table 3A. Welfare loss (No Transaction Costs)

<table>
<thead>
<tr>
<th>Case</th>
<th>Exchange Rate Regime</th>
<th>Negatively Correlated Shocks</th>
<th>Common (Symmetric) Shocks</th>
<th>Idiosyncratic (Uncorrelated) Shocks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benchmark</td>
<td>18.51 (1.62)</td>
<td>5.76 (0.6)</td>
<td>0.832 (0.97)</td>
</tr>
<tr>
<td></td>
<td>(\beta = 0.37)</td>
<td>22.23 (2.71)</td>
<td>6.82 (0.7)</td>
<td>0.845 (0.85)</td>
</tr>
<tr>
<td></td>
<td>(\delta = 1.45)</td>
<td>19.57 (2.03)</td>
<td>5.06 (0.6)</td>
<td>0.881 (0.93)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23.51 (2.88)</td>
<td>5.74 (0.6)</td>
<td>0.845 (0.85)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.05 (1.29)</td>
<td>3.37 (0.4)</td>
<td>0.881 (0.93)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.67 (1.9)</td>
<td>4.12 (0.5)</td>
<td>0.845 (0.85)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.833 (0.1)</td>
<td>0.818 (0.1)</td>
<td></td>
</tr>
</tbody>
</table>

[key: a. = The Ratio of the welfare loss in a monetary union regime to the welfare loss in a flexible exchange rate regime]

Table 3B. Welfare loss (With Transaction Costs)

<table>
<thead>
<tr>
<th>Values used for the Transaction parameter</th>
<th>Exchange Rate Regime</th>
<th>Negatively Correlated Shocks</th>
<th>Common (Symmetric) Shocks</th>
<th>Idiosyncratic (Uncorrelated) Shocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\Theta = 0.005)</td>
<td>Monetary Union</td>
<td>18.50 (1.62)</td>
<td>5.73 (0.6)</td>
<td>0.845 (0.85)</td>
</tr>
<tr>
<td></td>
<td>Flexible Rate</td>
<td>22.23 (2.71)</td>
<td>6.82 (0.7)</td>
<td>0.881 (0.93)</td>
</tr>
<tr>
<td></td>
<td>Ratio(^a)</td>
<td>0.832 (0.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Theta = 0.010)</td>
<td>Monetary Union</td>
<td>19.57 (2.03)</td>
<td>5.55 (0.6)</td>
<td>0.845 (0.85)</td>
</tr>
<tr>
<td></td>
<td>Flexible Rate</td>
<td>23.51 (2.88)</td>
<td>5.68 (0.6)</td>
<td>0.881 (0.93)</td>
</tr>
<tr>
<td></td>
<td>Ratio(^a)</td>
<td>0.832 (0.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Theta = 0.015)</td>
<td>Monetary Union</td>
<td>13.05 (1.29)</td>
<td>3.29 (0.4)</td>
<td>0.881 (0.93)</td>
</tr>
<tr>
<td></td>
<td>Flexible Rate</td>
<td>15.67 (1.9)</td>
<td>4.06 (0.5)</td>
<td>0.845 (0.85)</td>
</tr>
<tr>
<td></td>
<td>Ratio(^a)</td>
<td>0.833 (0.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[key a. = The Ratio of the welfare loss in a monetary union regime to the welfare loss in a flexible exchange rate regime]

Glossary

**Adjusted Coefficient of multiple determination** (adjusted $R^2$). An adjusted $R^2$ takes into account the number of independent variables used in the model and also the amount of data used to calculate the estimated values of the parameters in the model. It attempts to reflect more closely how well the model fits the observed data. It is important that the number of observations must be greater than the number of parameters which need estimating.

**Coefficient of multiple determination** ($R^2$). Sometimes called the Measure of Goodness of Fit of the model, this coefficient measures the proportion of variation in the dependent variables which can be explained by the particular model. Its value cannot be negative and it is never greater than 1. If the value is small (near to zero) it can be deduced that the model is not useful as an explanation of the variations in the observed data.

**Correlation Coefficient**. An index of association between two continuous variables, also known as the Pearson correlation coefficient (and denoted by the small letter $r$); the coefficient can have a value between $-1$ and $+1$. If one of the variables increases as the other decreases then the value will be negative. If both variables increase together, or decrease together then the value will be positive. If there is little or no linear association then the value is near to ZERO.

**Dummy variable(s)**. When the responses for a variable fall into distinct mutually exclusive categories it is necessary to code the categories in a special way so that the variable can be used in the construction of a mathematical model. The number of Dummy Variables needed for this type of independent variable is always 1 less that the number of categories (e.g. The gender variable needs only ONE Dummy Variable; but if the country variable was used to classify FIVE different countries (say) this country variable would need FOUR Dummy Variables). A dummy variable takes the value 1 if an observation is in a predefined category and the value 0 if it is not in that category. The researcher decides which will be the 1 category. In the case of the country variable, if the five countries were known as Algeria, Belgium, Canada, Denmark, Egypt then the four dummy variables could be names Algeria, Belgium, Canada, and Denmark. All the respondents from Egypt would be recorded as zero on each of these four variables. The parameters in the model would indicate how the different countries differ from Egypt.

**Generalized Method of Moments** (GMM). The starting point for a GMM estimation of the parameters for a theoretical relation between a set of variables is to minimise the total of the “statistical error squared”; that is, computer iterations are repeated until this total is as small as possible, given the data.

**Transaction Cost parameters** These are used as starting values for the iteration in the computing of the estimation of the parameters in the model and range from 0.005 to 0.015 percent.

**Welfare Effects of Monetary Union regime and of Flexible Exchange Rate Regime**: these effects are defined in terms of the transaction costs derived from WAMZ and UEMOA, and of the stability of the exchange rate. The implications for The Gambia refer to the benefits to be derived from lower transaction costs (in terms of economic activity).

In comparing the two alternative exchange regimes, the focus has been on the three types of real demand shocks namely: perfect negatively correlated shocks, common or symmetric shocks and idiosyncratic or uncorrelated shocks.