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The benefits and costs
of monetary union in Southern Africa:
a critical survey of the literature

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THE BENEFITS AND COSTS OF MONETARY UNION IN SOUTHERN AFRICA: A CRITICAL SURVEY OF THE LITERATURE

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ABSTRACT

With the 14 members of the Southern African Development Community (SADC) having set the objective of adopting a common currency for the year 2018, an expanding empirical literature has emerged evaluating the benefits and costs of a common-currency area in Southern Africa. This paper reviews that literature, focusing on two categories of studies: (1) those that assume that a country's characteristics are invariant to the adoption of a common currency; and, (2) those that assume that a monetary union alters an economy's structure, resulting in trade creation and credibility gains. The literature review suggests that a relative-small group of countries, typically including South Africa, satisfies the criteria necessary for monetary unification. The literature also suggests that, in a monetary union comprised of all SADC countries and a regional central bank that sets monetary policy to reflect the average economic conditions (e.g., fiscal balances) in the region, the potential losses (*i.e.,* higher inflation) from giving up an existing credible national central bank, a relevant consideration for South Africa, could outweigh any potential benefits of trade creation resulting from a common currency.

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1. Introduction

The assessment of the benefits and costs of monetary union in Southern Africa has been a central focus of recent research on African economic integration. A substantial empirical literature evaluating the feasibility of adopting a common currency and a single central bank among countries in the southern region of Africa has emerged.[1] The purpose of this essay is to set-out what we know about the consequences of monetary unification and critically to review the expanding literature on the desirability and feasibility of monetary union in Southern Africa.

The recent interest in assessing the consequences of monetary integration in Southern Africa stems from several factors. First, it is an outgrowth of a movement toward increased solidarity in Africa more generally (Cobham and Robson, 1994, p. 286; Masson and Pattillo, 2004, p. 10)[2]. African monetary union is sometimes seen as a symbol of strength, and some of its proponents hope that it will help provide support for political integration.[3] One consequence of the formation of regional currency blocs in Africa, so the argument goes, is that they could culminate in a pan-African monetary union. Second, the experience of the European monetary union, which is perceived to have been beneficial for its members, has stimulated interest in monetary unions in regions outside Europe, including in Africa (Masson and Pattillo, 2005, p. 34; Jefferis, 2007, p. 83).[4] Third, monetary unification is often viewed as a way of perfecting a single market, especially for countries, such as those in Southern Africa, belonging to regional trading blocs (Kenen and Meade, 2008, p. 4). Fourth, recent academic work on the benefits and costs of single-currency areas suggests that the adoption of a common currency can improve the structural characteristics of the economies concerned, increasing trade-integration and business-cycle correlation, and enhancing the credibility of macroeconomic policies (Frankel and Rose, 1998; Rose, 2000). The upshot of this recent literature is that the cost-benefit calculus used to determine currency-area participation becomes more favorable

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[1] A literature dealing with the possibility of monetary unions in other parts of Africa has also emerged. See, for example, Debrun, Masson, and Pattillo (2005) and Houssa (2007), who deal with monetary union in western Africa, and Benassy-Quere and Coupet (2005), who deal with monetary arrangements in the CFA Franc Zone.

[2] The African Union, a pan-African organization the Constitutive Act of which entered into force in 2001, set the goal of a single currency in Africa by the year 2021.

[3] Jefferis (2007, p. 93) noted that interest in an African monetary union reflects, in part, the view that the African Union "would be taken more seriously in global terms if it represented a more unified powerful economic bloc". For a skeptical view of the connection between monetary union and political union in Africa, see Masson and Pattillo (2005, pp. 34-35).

[4] See Hochreiter and Tavlas (2007), and the articles contained therein, for discussions of regional currency blocs.

after a country joins a currency union than before; therefore, the creation of a monetary union can itself create conditions that are favorable for the well-functioning of the union (De Grauwe, 2007, p. 27).

The remainder of this paper is divided into four sections. Section 2 describes present exchange-rate arrangements of the economies in Southern Africa and briefly discusses key characteristics of these economies. Sections 3 and 4 discuss the traditional approach that has been used to assess the benefits and costs of a common currency and the endogenous approach dealing with currency-area participation, respectively. Under the traditional approach, economic structures are assumed to remain unaltered following entry into monetary union whereas, under the endogenous approach, economic structures are assumed to change following entry into monetary union. Section 3 begins with a discussion of some analytical aspects of monetary unions, including a presentation of the traditional criteria used to judge the appropriateness of a country's participation in a monetary union. It then critically reviews the recent empirical literature on the benefits and costs of a common currency, in terms of the traditional criteria, in Southern Africa. Section 4 begins with a discussion of the recent analytic literature dealing with the endogeneity of economic structures following entry into a monetary union. It then reviews those studies that have dealt with this issue in the Southern-African context. Section 5 concludes with a discussion of the implications of the recent literature for monetary unions among Southern African economies and the research tasks that remain to be addressed.

2.   Present Arrangements: Basic Features

The countries that have constituted the main area of focus of empirical work on monetary integration in Southern Africa are the 14 members of the Southern African Development Community (SADC), the combined population of which is about 245 million people (Table 1).[5] Established in 1992, the SADC's goal initially was to form a common market. Subsequently, the SADC included monetary integration as an objective and, at a meeting of its central-bank Governors in February 2005, proposed: (1) a monetary union, involving irrevocably fixed exchange rates among the participating

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[5] In recent years, there have been several changes in the composition of SADC membership. Seychelles had been a member but withdrew from the organization in 2004 while Madagascar joined in 2005. Consequently, some of the empirical studies reviewed below include Seychelles, but not Madagascar, in the sample of countries considered. As discussed below, some studies consider subgroups of SADC economies.

currencies, coordination of monetary policies, and full capital-account convertibility, and (2) a common SADC currency and a regional SADC central bank for the year 2018.

As shown in Table 1, the SADC members employ a variety of exchange-rate arrangements. A key feature of these arrangements is the Common Monetary Area (CMA). The CMA is a fixed-exchange-rate arrangement that groups four countries: South Africa, Lesotho, Namibia, and Swaziland.[6] The CMA originated as an informal arrangement during the colonial period in the early twentieth century. A currency union was formally established with the signing of the Rand Monetary Area Agreement (RMA) in 1974 by South Africa, Botswana, Namibia, and Swaziland, but Botswana withdrew in 1975. That agreement was revised in April 1986 to establish the CMA of Lesotho, Swaziland and South Africa. Namibia, which became independent in 1990, joined the CMA in 1992. Under the terms of the CMA Agreement, Lesotho, Namibia, and Swaziland issue national currencies - - the loti (introduced in 1980), the Namibian dollar (introduced in 1993), and the lilangeni (introduced in 1974), respectively; those currencies have been pegged (at par) to the South African rand since their introduction. In addition, the rand is legal tender in each of the other three countries. However, none of the three currencies is legal tender in South Africa. Since the rand is legal tender in the other three countries, South Africa compensates each of the countries for forgone seigniorage.[7] With the other CMA currencies pegged against the rand, the South African monetary authorities follow a floating exchange-rate arrangement for the rand against other currencies. Monetary policy for the CMA countries is set by the South African Reserve Bank based on domestic (South African) objectives.[8]

Several other features of the CMA are important to mention. First, the CMA is not a full monetary union. As is the case in the euro area, each of the CMA countries has its own national central bank but, unlike the euro area, there is no common regional central bank to which the standard instruments of monetary policy have been consigned. Also, there is no pooling of reserves and no regional surveillance mechanism (Wang *et al.*, 2006, pp. 15-16). As noted above, monetary policy is set by the South African Reserve Bank, although the Governors of the four CMA central banks meet on a quarterly basis

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[6] The above description of the CMA is based on the discussions contained in Masson and Patillo (2005) and Wang, Masha, Shirono, and Harris (hereafter Wang *et al.*) (2006).
[7] Compensation is based on a formula equal to the product of (1) two-thirds on the annual yield of the most-recently issued long-term South African government bond, and (2) the volume of rand estimated to be in circulation in the member country concerned.
[8] In February 2000, the Reserve Bank adopted a formal inflation-targeting framework.

prior to the South African Reserve Bank's Monetary Policy Committee meetings, at which interest rates for South Africa are set. Second, as pointed out by Wang *et al*. (2006), in some respects the CMA arrangement for Lesotho, Namibia, and Swaziland is similar to that of a currency-board arrangement - - domestic-currency issues are required to be fully backed by foreign-exchange reserves while monetary policy is set by the central bank of another (*i.e.,* South Africa) country. In contrast to a currency board, however, there are no legal restrictions prohibiting the three smaller countries from acquiring domestic assets and there is no formal commitment to maintain exchange-rate parities with the South African rand. In principle, therefore, the authorities of Lesotho, Namibia, and Swaziland have the ability to conduct national monetary policies; in practice, however, it appears that the monetary policies of those three countries have closely tracked that of South Africa (Masson and Pattillo, 2005, pp. 65-73). In addition, unlike other formal exchange-rate systems' arrangements, including that of the Exchange Rate Mechanism (ERM II) of the European Monetary System, there is no multilateral credit arrangement to provide support should an exchange-rate peg come under pressure. Third, as pointed out below, in recent years the CMA countries have run either budget surpluses or small deficits (in relation to GDP). Budgetary discipline among the CMA countries has been supported by (1) legislation that denies the CMA countries access to monetary financing by the South African Reserve Bank, (2) the South African Reserve Bank's conservative policy stance, and (3) the requirement that Lesotho, Namibia, and Swaziland fully back issuance of national currencies with foreign-exchange reserves.

Most of the other SADC countries have exchange-rate arrangements that are classified independently (*i.e.,* freely) floating or managed floating (Table 1).[9] There are two exceptions - - Botswana, the currency (the pula) of which is pegged to a basket comprised (with unannounced weights) of the South African rand and the SDR, and Zimbabwe, which has a dual exchange-rate system and a non-convertible currency (the Zimbabwe dollar). Each of the SADC countries has (to varying degrees) controls on capital movements (Table 1).

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[9] Under free-floating rates, there is no commitment to a specific exchange-rate target. Supply and demand in the market determine the exchange rate. The authorities do not intervene in the foreign-exchange market and do not set interest rates for the purpose of affecting the level or path of the exchange rate. Under managed floating, although there is no specific exchange-rate target, the authorities may intervene in the foreign-exchange market and/or set interest rates to influence the exchange rate (Tavlas, 2003). Classifications are based on the IMF's *Exchange-Rate Arrangements and Exchange Restrictions.*

Selected macroeconomic indicators of the SADC economies are presented in Table 2, and trade indicators are presented in Tables 3 and 4. These indicators merit several comments. First, SADC economies differ markedly in size and structure (Table 2). South Africa, by far the largest economy (accounting for about 67 per cent of total SADC GDP and around 95 per cent of CMA GDP), is relatively industrialized and diversified while most of the other economies are small and undiversified, with dependence on a narrow range of commodity exports (Table 3). Second, the composition of exports varies considerably among the countries, and the prices of these exports frequently do not move closely together (Masson and Pattillo, 2005, p. 37). As reported in Table 3, the share of total exports comprised by the three major export commodities of the SADC countries is typically in the range of 70 to 90 per cent. Third, as is the case with African economies more generally, SADC countries tend to report very low shares of intra-regional trade; intra-SADC exports are typically less than 40 per cent of each country's total exports (Table 4).[10] Factors contributing to the low shares of intra-SADC trade include the following: (i) low per capita income levels, resulting in internal markets of limited sizes; (ii) the concentration of most countries on primary-commodity exports; (iii) limited transportation facilities and large distances between population centers; and, (iv) relatively-high shares of informal trade because of permeable borders (Boughton, 1993; Cobham and Robson, 1994; Masson and Pattillo, 2005). As reported in Table 4, the intra-trade (*i.e.*, export) shares among SADC countries are considerably below the corresponding shares among euro-area countries; the latter shares are generally in the range of 50 per cent to 70 per cent. Fourth, although intra-trade among SADC countries is relatively small, an exception to this general pattern concerns bilateral trade between South Africa and its SADC partners (Table 4). Many SADC countries, particularly those in the CMA, have large shares of both exports and imports with South Africa. Thus, intra-trade shares excluding South Africa are below 12 per cent for each of the countries reported in Table 4. Fifth, most of South Africa's exports and imports are with non-African countries; as reported in Table 4, South Africa's exports to other SADC countries comprise less than 10 per cent of South Africa's total exports.

As mentioned above, the SADC has set a goal for the adoption of a common currency for the year 2018. In this regard, the central-bank Governors of that organization laid down a strategy for monetary union similar to the approach adopted by the European

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[10] The low levels of intra-regional trade contrast with the relatively-high levels (generally, over 40 per cent) that exist among euro-area countries (Table 4, Addendum item).

monetary union. The latter approach is based on two principles (De Grauwe, 2007, p. 143). First, the transition towards monetary union should be *gradual* one, extending over many years. Specifically, at their meeting in Tanzania in 2007, SADC Governors proposed the following framework for SADC integration: (1) free-trade area (absence of tariffs on intra-SADC trade) by 2008; (2) customs union (common tariffs on imports from non-members by 2010; (3) common market (customs union with free movements of the factors of production) by 2015; (4) (incomplete) monetary union (irrevocably fixed exchange rates and coordination of monetary policies) by 2016; and (5) a single currency and a regional central bank by 2018 (*i.e.*, full monetary union) (SADC Central Bank Governors, 2007).

Second, entry into the monetary union should be *conditional* on satisfying convergence criteria. In the case of the proposed SADC monetary union, the SADC central bank Governors established the following (interim) convergence criteria pertaining to the years 2004-2008: [11] (1) single digit inflation rate by 2008; (2) fiscal deficit-to-GDP ratio below 5 per cent by 2008; (3) public debt-to-GDP ratio below 60 per cent (no specific year stipulated); (4) current-account deficit-to-GDP ratio not greater than 9 per cent (no specific year stipulated); and (5) real GDP growth rate of not less than 7 per cent (no specific year stipulated).

Each country's outcomes with respect to these convergence criteria are reported in Table 5. As shown in the table, seven countries did not achieve the inflation target in 2006: Angola, Botswana, the Democratic Republic of the Congo, Madagascar, Malawi, Mozambique, and Zimbabwe. Inflation in the latter country was over 1,200 per cent in 2006 and accelerated to more than 7,900 per cent in the year to September 2007 (Central Statistical Office, Zimbabwe, 2007). Four countries (Madagascar, Mauritius, Tanzania, and Zimbabwe) did not comply with the fiscal criterion in 2006. Twelve countries - - the exceptions being the Democratic Republic of the Congo (DRC) and Zimbabwe - - complied with the public debt criterion, with five countries (Madagascar, Malawi, Mozambique, Tanzania, and Zambia) benefiting from debt relief under the HIPC initiative. Reflecting, in part, the budgetary discipline produced by the CMA arrangement, each of the four CMA countries satisfied both the fiscal and debt criteria in 2005 and 2006. Three countries (Malawi, Mauritius, and Tanzania) did not achieve the current-

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[11] Committee of Central Bank Governors of SADC (June 2007). The convergence criteria can be subject to relatively-large year-to-year fluctuations, so that success in satisfying the criteria in any particular year does not guarantee that they will be satisfied in subsequent years.

account criterion in 2006. Three countries (Angola, Malawi, and Mozambique) attained the 7 per cent growth target. In sum, there was considerable diversity among the SADC countries in terms of the satisfaction of the (interim) convergence criteria thought necessary (by the Governors of the SADC central banks) to achieve regional monetary integration; some countries, the case of Zimbabwe being a prominent example, appear to be many years away from satisfying the convergence criteria.

Two other aspects of the above convergence criteria deserve to be mentioned. First, the specific fiscal criteria appear to have been influenced by the Maastricht criteria used to assess a country's suitability for entry into the euro area. The Maastricht fiscal criteria are as follows: (1) a fiscal deficit-to-GDP ratio not higher than three per cent, and (2) a public debt-to-GDP ratio of not more than sixty per cent or less.[12] As noted above, the SADC's (interim) fiscal deficit criterion calls for a deficit-to-GDP ratio below five per cent, while the (interim) public debt-to-GDP criterion stipulates a ratio below sixty per cent of GDP, both of which are close to their Maastricht counterparts. Second, as is the case with the Maastricht criteria, the SADC convergence criteria are strictly nominal in nature. Nevertheless, the European Commission and the European Central Bank have pressed prospective entrants to the euro area to achieve a degree of *real* convergence *prior* to entry into the European monetary union (Buiter, 2008, p. 35). Underlying the concern placed on real (in addition to nominal) convergence is the view that countries that are at a relatively early stage of economic development could face the following situation upon entry into a monetary union: (i) relatively-high expected rates-of-return on investment; (ii) low real (and nominal) interest rates (because of the low area-wide inflation rate maintained by the regional central bank); (iii) with the free movement of capital, the first two factors can lead to overly-optimistic income expectations and a "wrong" incentive structure of investment (*i.e.*, investment in high-risk projects that would not have been undertaken in the absence of low interest rates), resulting in an overheating economy and a loss of competitiveness; and (iv) in the light of the above, the economy concerned may eventually be faced with the need to undergo a prolonged deflation to regain

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[12] The Maastricht Treaty provides exceptions to these two criteria. For example, a country can join the euro area if its public debt-to-GDP ratio exceeds 60 per cent but is approaching the 60 per cent reference value at a satisfactory pace (see De Grauwe, 2007). Another prospective monetary union that has established convergence criteria that appear to have been influenced by the Maastricht criteria is the Gulf Cooperation Council (GCC) (Buiter, 2008). The six countries comprising the GCC have set a goal of establishing a monetary union in the year 2010.

competitiveness (Kröger and Redonnet, 2001). The issue of the role of real convergence appears not to have been considered to date in discussions of an SADC monetary union.[13]

The above convergence criteria deal with the short-term economic performances of the countries concerned. Whether the SADC countries would benefit from a common currency requires analysis of structural characteristics of those countries, an analysis to which we now turn.

3. Benefits and Costs of Monetary Union in Southern Africa: Traditional Approach

3.1 Analytical Considerations

In seeking to determine whether members of the SADC would benefit, on net, from adopting a common currency, most of the recent empirical literature on this issue has focused on the capacity of the countries concerned to satisfy optimum-currency-area (OCA) criteria. An OCA can be thought of as an "optimum" geographic domain in which a group of countries either shares a common currency or maintains separate national currencies with permanently fixed exchange rates among these currencies and full convertibility of the respective currencies into one another. Optimality is typically judged on the basis of the ability of the members of the currency area to maintain external equilibrium without domestic unemployment but with domestic price stability (Mundell, 1961).[14]

The concept of an OCA was formulated in the context of the debate over the relative merits of flexible and fixed exchange rates. Early writers sought to identify the characteristics that an economy should possess *ex ante* in order to be a suitable candidate for participation in an OCA. Friedman (1953) observed that an economy afflicted with wage and price rigidities should adopt flexible exchange rates in order to maintain both internal and external balance. Subsequently, Mundell (1961), in originating the concept of

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[13] The study by Masson and Pattillo (2005) is an exception. Masson and Pattillo evaluated whether regional African country groups, including the CMA, form "convergence clubs", which the authors defined as a decrease in the dispersion of real per-capita income levels over time in the countries concerned. The authors found strong evidence of convergence among CMA countries during the period 1975-99.

[14] For reviews of the OCA literature, see Tavlas (1993) and De Grauwe and Mongelli (2005). Dellas and Tavlas (2005) assessed the effects of asymmetries in the degree of labour mobility among the members of a monetary union. They found that, in terms of the benefits of monetary union, asymmetries among economies matter. Economies with relatively flexible wages lose (in terms of macroeconomic volatility and welfare) when they join a monetary union with economies with relatively rigid wages.

an OCA, argued that factor (especially labour) mobility is a partial substitute for wage-price flexibility since such mobility can moderate the pressure to alter real factor prices in response to disturbances affecting demand and supply.[15] Mundell also noted that economies subjected to similar terms-of-trade shocks are more-suitable candidates for an OCA than economies that are prone to asymmetric shocks since, in the former case, the similarity of the shocks negates the need for exchange-rate adjustment between (or among) the economies and permits implementation of a common monetary policy. Other important contributions to the earlier literature included (1) Ingram's (1962) thesis that financial integration can cushion temporary adverse disturbances by encouraging capital inflows, reduce differences in long-term interest rates, and foster a more-efficient allocation of resources, (2) McKinnon's (1963) argument that, everything else equal, relatively-open economies are better candidates for monetary unions than are relatively-closed economies since, in the former, exchange-rate changes are not likely to have significant effects on competitiveness, and, (3) Kenen's (1969) thesis that more-diversified economies are better candidates for OCA membership than less-diversified economies since the diversification provides some insulation against a variety of shocks, forestalling the necessity of frequent changes in the terms-of-trade via the exchange rate.

In the traditional OCA literature, the main benefits of monetary union derive from the elimination of the transaction costs of exchanging currencies and the elimination of exchange-rate volatility, the latter of which is thought to decrease cross-border trade and investment (Robson, 1987, p. 140; Tavlas, 1993). Additionally, the adoption of a single currency eliminates the need of firms to maintain staff to look after exchange rates within the area. As noted above, however, the countries in Southern Africa have very low shares of intra-area trade, so that the reduced transactions costs are not likely to provide large efficiency gains.

Economies of scale to be derived from the move to monetary integration include those associated with: the enlargement of the foreign-exchange market, decreasing both the volatility of prices and the ability of speculators to influence prices and, thus, to disrupt the conduct of monetary policy; the elimination of the need of reserves for intra-area transactions and, to the extent that exchange-rate parities are truly immutable, the elimination of the need of reserves to offset the effects of speculative capital flows within the area; the possible *economizing* of reserves since, if members are structurally diverse,

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[15] Labour mobility is a *partial* substitute because such mobility is usually low in the short run.

any payments imbalances may be offsetting; and, the improved allocational efficiency of financing to the extent that it provides both borrowers and lenders with a broader spectrum of financial instruments, enabling borrowers, lenders, and equity investors to make more-efficient choices in terms of duration and risk (Robson, 1987, p. 140; Tavlas, 1994). In the case of a Southern African monetary union, an added benefit could be that such a monetary union would provide smaller countries with a convertible currency.

The main costs of monetary union are those attributable to the inability of the authorities of the individual countries to use country-specific monetary policies and to use the exchange rate as an instrument of macroeconomic adjustment. The gains and losses arising from the establishment of monetary union are dependent on the structural characteristics of the economies concerned. For example, *ceteris paribus*, if a group of countries is very open to intra-group trade, the net gains derived from a common currency will be greater than it will be if the economies possess large non-traded goods sectors and/or strong trade links with countries outside the group.

Empirical researchers dealing with common-currency-area formation face the problem that there is no single, overriding criterion that can be used to judge the desirability and/or viability of a monetary union. Moreover, researchers working on African regions are confronted with the problem that reliable data on the key OCA criteria, such as the degree of labour mobility among countries and the degrees of financial integration and of wage and price flexibility, are often difficult to obtain. With regard to financial market integration, common measures of such integration include covered and uncovered interest rate parities and saving-investment correlations. In the case of African economies, the data necessary to construct measures of financial integration are often not available. For example, measurement of covered and uncovered interest rate parities depend on interest rates in the countries concerned, but reliable interest-rate series for many African economies often do not exist over long time periods.[16] With regard to labour mobility in Africa, Boughton (1993, p. 277) noted that, although such mobility in Africa appears to be circumscribed by that large distances between population centers and a limited availability of transportation, there has nevertheless been a long history of intra-regional migration of labour. However, apart from Wang *et al.* (2006), who provided data on the number of migrants from Lesotho, Namibia, and Swaziland during 1950-2005, and

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[16] Wang *et al.* (2006) are an exception to the observation that the lack of available data has hindered the study of financial integration among African countries; those authors found high degrees of co-movements in short-term interest rates during 1990-2005 among the CMEA countries.

Houssa (2008), who provided data showing that there has been considerable labour migration among Western African countries, there has been little in the way of assessments of factor mobility among African economies.

In the light of the absence of adequate data on financial-market variables, labour mobility, and/or wage/price flexibility, much of the empirical literature on regional monetary unions in Africa dealing with the traditional criteria (which assumes that a country's structural characteristics remain unaltered following entry into monetary union) has focused on three areas: (1) analysis of the nature of shocks affecting the economies considered; (2) assessment of the degree of correlations of movements of real exchange rates and/or the terms-of-trade among the economies; and, (3) analysis of co-movements in cyclical real growth rates among the economies. A reason for focusing on each of these three areas is the presumption that countries facing a high degree of symmetry of shocks and/or high correlations of cyclical movements of real output and/or real exchange-rates do not need country-specific monetary and exchange-rate policies. An additional rationale for studying shock-absorption and movements in exchange-rates is that each is thought to combine the *net* influences of several of the criteria (Vaubel, 1978; Masson and Taylor, 1992).

3.2 Empirical Approaches

In what follows, the empirical methodologies of 11 studies dealing with monetary unification in Southern Africa are considered, and the main thrust of the empirical results is presented and analyzed. A summary of the basic components and the main findings of recent studies is provided in Table 6.[17] Studies differ in terms of empirical methodologies used, countries considered, dependent and conditioning variables (in regression studies), and sample periods, so that the results of the studies are not strictly comparable. Some authors of studies reporting correlation coefficients provide significance levels while other

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[17] Table 6 provides information on 15 studies as follows. (1) Authors of ten of the studies (discussed in this section) dealt with only the traditional OCA criteria (*i.e.*, they assume that a country's characteristics remain unaltered following entry into monetary union). (2) Authors of three studies dealt with only the newer endogenous OCA thesis (discussed in the next section). (3) The co-authors of one study deal with both approaches. (4) Finally, a study by Jenkins and Thomas (1997) assesses the degree of economic convergence among 12 SADC countries, under the (plausible) presumption that real economic convergence is a necessary for coordination of exchange-rate policy. As the focus of those authors differs from the other studies discussed in this paper, their results are discussed here. The authors found no evidence of convergence of per capita income of the 12 countries considered over the period 1960-90. An implication of this finding is that the 12 countries considered are not ready for monetary integration. Jenkins and Thomas (1997) also found, however, that there has been marked convergence among Botswana, Lesotho, Namibia, South Africa, and Swaziland, indicating that those five countries could form a monetary union.

authors do not. Interpretation of the results of the studies is made more difficult because some authors use more than a single empirical methodology, with sometimes conflicting results. Moreover, authors of some studies focus on SADC countries or subgroups of the SADC, while other authors consider SADC countries within a broader context of African economies. A recurrent problem running through the literature is that authors tend not to compare their findings with those of other studies, making it difficult to place particular results in a broader context. To help identify the main dividing lines running through the literature, the studies discussed below are grouped into four broad methodological approaches (with some studies using more than one approach): (1) studies that deal with correlations of real growth rates (two studies); (2) studies that consider correlations of shocks (five studies); (3) studies that consider correlations of exchange rates / terms-of-trade (five studies) and/or casual inspection of data (two studies); and (4) a (single) study that considers the degree of trade integration using a dynamic game set up. In the cases of those authors who also consider countries in other regions of Africa, the following discussion focuses only on the results that pertain to monetary union in Southern Africa.

1. *Correlations of output growth rates.* Studies that report correlations of real per-capita growth rates aim to provide information on underlying shocks, the idea being that, apart from the impact of trend, movements in output are driven mainly by shocks. That is, studies in this genre assume that cyclical movements in output are primary the result of shocks. An initial attempt to measure correlations of per-capita output growth was made by Bayoumi and Ostry (1997); these authors calculated bilateral correlations of growth rates for 11 Southern-African economies over the period 1963-89. In a similar vein, Karras (2007) calculated correlations of de-trended output growth of nine SADC countries using real GDP based on purchasing-power-parity real exchange rates, as provided in Heston, Summers and Aden (2001), over the periods 1960-2000 and 1980-2000. Karras used three methods to estimate the cyclical component of output: (1) first differencing, (2) the Hodrick-Prescott (HP) filter, and (3) the Band-pass (BP) filter; each of these techniques is a way of removing the trend from a time series. Unlike Bayoumi and Ostry, who calculated bilateral output correlations among country pairs, Karras estimated correlations of each country's cyclical output component (as estimated under each filtering technique) against the SADC total. A limitation of both the Bayoumi-Ostry and the Karras approaches is that the techniques used by the authors do not make a distinction between

disturbances to output growth and the policy responses to the disturbances.[18] In other words, the approaches may not fully capture the impact of shocks since part of the time profile of de-trended growth is likely to reflect the policy responses of the authorities. Additionally, the approach does not account for the circumstance that an identical shock may affect individual nations differently, reflecting differences in initial positions and differences in behavioral parameters about fundamental matters such as wage and price flexibility, tax structure, and trade responsiveness (Mélitz, 1991, p. 321; Tobin, 1993).

2. Correlations of output shocks. In order to deal with the foregoing limitation, some authors used econometric methods in order to extract (*i.e.*, separate) the underlying disturbances from real output. Bayoumi and Ostry (1997), Yehoue (2005), and Wang *et al*. (2006) employed a three-step autoregressive estimation procedure.[19] In the first step, the growth of per capita GDP was regressed on its own first and second lags.[20] In the second step, the underlying disturbances were calculated using the regression residuals (or a measure of the residuals, such as the standard deviation of the residuals). In the third step, authors obtained correlations of the disturbances among the countries considered. Bayoumi and Ostry estimated correlations of output shocks for 11 countries over the period 1963-89. Yehoue obtained correlations for 15 countries over the period 1980-2000. Wang *et al*. estimated correlations for five countries over the period 1980-2005.

While the foregoing autoregressive approach helps separate the underlying shocks from the data, it does not identify separate demand and supply shocks. To address this problem, Buigut (2006) and Buigut and Valev (2006) used a two-step statistical methodology developed by Blanchard and Quah (1989) to extract underlying demand and supply shocks from GDP data.[21] In the first step, the authors estimated vector autoregressions using the variables of interest. In the second step, these authors identified demand and supply shocks by assuming that demand shocks were temporary while the supply shocks were permanent. They extracted demand and supply shocks for all the prospective members of the monetary union and computed the correlations of the demand

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[18] This limitation was recognised by Bayoumi and Ostry (1997), who also considered correlations of shocks.

[19] In fact, Wang *et al*. (2006) employed a four-step procedure. The first step involved testing for unit roots in the log of per capita GDP. The authors could not reject the hypothesis that the log of per capita GDP was integrated of order one for each of the countries considered. The remaining steps were as described above.

[20] As discussed below, Yehoue (2005) estimated a second-order autoregressive model of real output in *levels* instead of growth *rates*.

[21] The above description of the Blanchard-Quah methodology is based on that contained in De Grauwe (2007). The application of the Blanchard-Quah methodology to assess the suitability of countries for monetary union was first made by Bayoumi and Eichengreen (1993). Those authors assessed the suitability of European countries for monetary union.

and supply shocks, respectively. The idea underlying the exercise is that asymmetric supply shocks are likely to continue after monetary unification (since such shocks have a structural character) while asymmetric demand shocks are likely to diminish (since they are partly policy induced). That is, since a monetary union involves a single monetary policy among the members, asymmetric demand shocks among members arising from differences in national monetary policies will be eliminated in a monetary union. Countries that are confronted with relatively-large asymmetric *supply* shocks are not likely to be good candidates for monetary union.

It is worth pointing out that the Blanchard-Quah technique involves significant limitations. The technique relies on the idea that any difference-stationery variable can be decomposed into permanent and stationary components. In order to implement the technique, at least one of the variables must be nonstationery since stationery variables do not have a permanent component. The limitations of the technique include the following: (1) it relies on a vector autoregressive (VAR) set-up, which restricts any relationship among variables to be a linear relationship; (2) it essentially implies that there are only two kinds of shocks in the economy - - a supply shock that is assumed to be permanent and a demand shock that is assumed to be temporary, and (3) it assumes that the relationships among variables are constant with respect to time. In the real world, relationships among variables are likely to be nonlinear. Also, there are many kinds of shocks that hit an economy and it is unrealistic to assume that a demand shock is temporary while a supply shock is permanent. For example, a demand shock may involve hysteresis elements, so that the effect is long-lasting. Finally, relationships among variables are likely to be time-varying so that the coefficients are not constant over time. [22]

Buigut and Valev (2006) applied the Blanchard and Quah methodology to 21 Eastern and Southern Africa countries using the sample period 1970-2002; they used correlations of shocks as the basis of their assessment of membership in monetary union. Buigut (2006) used the same correlations for a sample of 20 Eastern and Southern African economies; these correlations formed one set of variables analyzed. Buigut also considered trade integration among the economies concerned, debt-service ratios, public-debt ratios, tax-revenue ratios, and inflation rates. Using these variables, Buigut applied

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[22] The criticism of the linearity and fixed-coefficients' assumptions applies to the other statistical methods (*e.g.*, correlations) used to gauge the suitability of countries to form a monetary union. For a discussion of the implications of the linearity assumption, see Hondroyiannis, Swamy and Tavlas (2008). For a discussion of the implications of the restriction on the number of shocks, see Enders (2004, pp. 309-10). Swamy and Tavlas (2007) provided a critique of fixed- coefficient models.

cluster analysis, a technique that identifies groups of observations, whereby groups are constructed according to similarities among sample elements. That is, under cluster analysis, once the number of exchange-rate regimes (in this case, two regimes - - monetary union and all other regimes) is determined *ex ante* by the researcher, economies are placed into the groups according the similarity of behavior of the variables considered.

3. Correlations of exchange rates/terms-of-trade and/or casual inspection of data. Authors of three studies in this group calculated simple cross-country correlations - - Masson and Pattillo (2005) estimated correlations of per cent changes in the terms of trade for 14 SADC countries over the period 1987-99; Wang *et al.* (2006) calculated correlations of per cent changes in the terms of trade for Botswana and the four CMA economies over the period, 1980-2005; and, Jefferis (2007) calculated correlations of movements of bilateral nominal exchange rates of 12 SADC countries for the periods 1990-96 and 1997-2002 against the South African rand, under the assumption that South Africa would be the key member of any regional monetary union. As is the case for studies that consider correlations of output growth rates, studies that consider correlations of exchange rates and the terms-of-trade are subject to the criticism that the variables considered are endogenous, and capture both the effects of shocks and the policy responses of the authorities.

Studies by Grandes (2003) and Khamfula and Huizinga (2004) used more elaborate statistical methodologies in dealing with correlations of exchange rates than the three sets of authors above. Using monthly data over the period 1990:1-2001:4 for Botswana and the four CMA countries, Grandes tested for cointegration among bilateral real exchange rates, using the rand as the base currency. Under Grandes' set-up, the four bilateral rates were tested for cointegration in vectors containing each of the remaining bilateral rates. If the relationships were stationary, the author inferred that the real exchange rates exhibited common trends. Consequently, a finding of stationarity meant that the countries had been subjected to symmetric shocks.

Khamfula and Huizinga (2004) used a GARCH model to estimate correlations of unanticipated components of bilateral real exchange rates of nine SADC countries against the South African rand. Using both monthly and quarterly data over the period 1980-96, the authors' procedure included the following steps. (1) After calculating bilateral real rates against the rand, they seasonally adjusted the change in each bilateral rate using seasonal dummies. The authors calculated two sets of residuals - - one for the monthly

data and the other for the quarterly data. (2) The authors regressed each of the residuals on its own lags (up to seven lags). They used the residuals from *those* equations as estimates of unanticipated residuals.[23] (3) They used the squares of these unanticipated residuals as measures of underlying shocks. Khamfula and Huizinga (2004, p. 702) characterized the monthly and quarterly residuals as the "short-run and long-run cases", respectively, a characterization discussed below.

Authors of two studies relied mainly on informal inspection of macroeconomic variables. As noted above, Jefferis (2007) calculated correlations of bilateral nominal-exchange-rate movements of 12 SADC countries against the South African rand. That author also calculated inflation differentials and interest-rate differentials *vis-à-vis* South Africa for the same set of countries. All calculations were made for the periods 1990-96 and 1997-2002, the idea being to assess whether convergence *vis-à-vis* South Africa had taken place during these two periods. Similarly, Dutu and Sparks (2004) assessed the degree of convergence among 14 SADC countries over the period 1995-98. The variables considered by those authors included annual bilateral exchange-rate changes against the South African rand, inflation rates, external debt-to-GDP ratios, and openness.

4. Trade integration. Yehoue (2005) adopted a different empirical methodology from those described above; the author set up a dynamic game based on trade links. On the presumption that countries that have intra-trade above a certain threshold (in relationship to each country's GDP), Yehoue's game proceeded as follows. Suppose, as Yehoue did, that the threshold for intra-trade between a particular group of countries is two per cent; countries with bilateral trade above that threshold would (by assumption) benefit from a monetary union. To get the game started, it is necessary to identify a potential anchor country. Call this potential anchor country A. Now suppose that country B's bilateral trade (exports plus imports) with country A is 2.5 per cent of country B's GDP. Because this 2.5 per cent exceeds the threshold, according to the rules of the game it is in the interest country B to form a monetary union *in the first stage of the game*. Suppose, also, that country C's bilateral trade shares with country A and country B are 1.5 per cent and 1.0 per cent, respectively. Country C, therefore, would not form a monetary union with country A in the first stage. Yet, after countries A and B formed a monetary union, country C's bilateral trade share with that union (*i.e.*, countries A and B combined)

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[23] In effect, the residuals from the regressions of residuals on their own lags formed the unanticipated residuals.

would be 2.5 per cent, exceeding the threshold. Thus, the union would expand to include three countries in the second stage. The game would continue until the bilateral trade shares (relative to the monetary union) of each of the remaining countries outside the monetary union is less than the threshold. In setting up this game for SADC countries, Yehoue used South Africa as the anchor of the monetary union (*i.e.,* to initiate the dynamic game).

3.3 The Empirical Evidence

The empirical literature dealing with the traditional OCA criteria (*i.e.*, assuming fixed economic structures) does not provide clear-cut evidence that any particular group of countries in Southern Africa is suitable for monetary union, although some evidence suggests that a small group of countries, typically including South Africa, could form a common-currency area. Authors of studies comparing correlations of output growth typically find weak correlations of this variable among the economies. In their study of 11 SADC countries, Bayoumi and Ostry (1997) found that 42 out of 55 (bilateral) growth correlations were positive. However, most of the correlations were low; to provide some context, only four correlations exceeded 0.40. For South Africa, one correlation was higher than 0.40 - - that with Zambia (at 0.48). In contrast to Bayoumi and Ostry, who calculated bilateral correlations among SADC countries, Karras (2007) calculated correlations for nine SADC countries against the SADC as a whole, a less-informative procedure than that of Bayoumi and Ostry since the South African economy comprises about 67 per cent of the SADC economy. Essentially, Karras's correlations reflected bilateral correlations *vis-à-vis* South Africa. [24] In addition, Karras did *not* include Botswana and the three CMA countries (*i.e.,* Lesotho, Namimbia, and Swaziland) in his sample; given the relatively-high bilateral trade shares of these countries with South Africa, the correlations of their GDPs with that of South Africa would be expected to be relatively high. Three of the eight sets of correlations (apart from those involving South Africa) reported by Karras were above 0.40 - - those for Mozambique, Zambia, and

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[24] Not surprisingly, his estimated correlations for South Africa exceeded 0.90. Authors who calculated bilateral correlations between each country considered and some aggregate of countries, such as the SADC, presupposed that the aggregate itself constituted a monetary union. It could turn out, however, that some countries may decide not to participate in a monetary union, so that the aggregate (*e.g*, all SADC countries) would not be appropriate.

Zimbabwe - -indicating (according to Karras) that these three countries comprise an OCA with South Africa.[25]

Studies that reported correlations of shocks to output growth based on autoregressions also do not provide more than weak support for monetary union. Bayoumi and Ostry calculated the significance levels of the correlations of shocks; those authors found that, out of 55 correlations, only five were positive and significant at the 10 per cent level. For South Africa, the only positive and significant correlation was with Zambia. Similarly, Wang *et al.* (2006), in their study of the four CMA countries, found only two (out of six) positive correlations of output shocks - - those for South Africa and Lesotho (.09) and South Africa and Namibia (.08).

While Yehoue (2005) also used a second-order autoregressive process to generate output shocks, that author's results represent an exception to the above pattern of findings. As did Karras (2007), Yehoue estimated co-movements of shocks for each of the (nine) SADC countries considered against the SADC as a whole. All of the co-movements obtained were positive and high. What explains the difference in findings between those obtained by Yehoue and those of Bayoumi and Ostry (1997) and Wang *et al.* (2006), who also used second-order autoregressive processes to extract shocks? The latter two studies calculated correlations of shocks to real per capita GDP *growth*. Yehoue, however, estimated autoregressive equations for *levels* of real GDP, which might be expected to show higher degrees of co-movements than per-capita GDP growth. His results were generally supportive of the hypothesis that a monetary union among the entire group of SADC economies is feasible. Yehoue's results, however, did not account for the non-stationarity that is typically present in output data expressed in levels. Thus, his results may have reflected specification errors arising from non-stationarity.

As noted above, authors that use autoregressive methods to extract shocks from the data are not able to decompose shocks into their respective supply and demand components. Consequently, the finding of weak co-movements of shocks in studies using autoregressive methods may reflect a predominance of asymmetric demand shocks, which may be policy-induced. Buigut and Valev (2006), using the Blanchard-Quah decomposition to derive a measure of supply shocks, obtained results that the authors considered supportive of monetary union (in that the results indicated that supply shocks

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[25] Recall, Karras (2006) used three filtering techniques to de-trend output growth. The author reported correlations for each country using data derived from each of the three techniques.

were symmetric) among the following countries: Lesotho, Mozambique, South Africa, and Swaziland. Buigut (2006), who used cluster analysis to group several variables, including the correlation of shocks derived from the Blanchard-Quah methodology, also obtained support for a monetary union, under the assumption that the rand was the anchor currency, for a small group of countries - - Botswana, Lesotho, Namibia, South Africa, and Swaziland. Under alternative scenarios involving (i) a multilateral monetary union with no single country making policy decisions, and, (ii) the euro as the anchor currency, Buigut found that a core group of four countries - - Botswana, Namibia, South Africa, and Swaziland - - was suitable for monetary union.

A similar mixed picture applies to the results of correlations of changes in exchange rates and/or the terms of trade. Grandes (2003), who estimated cointegration relationships among the exchange rates of the currencies of Botswana, Lesotho, Namibia, and Swaziland against the South African rand, found evidence of common stochastic trends, providing support for monetary union among the five countries considered. His findings, therefore, were similar to those reported by Buigut (2006). However, the results obtained by Masson and Pattillo (2005) and Wang *et al*. (2006) were less supportive of monetary union. Masson and Pattillo (2005) derived 91 pair-wise correlations of changes in the terms of trade for SADC countries; of those, 14 were positive and significant. Of the 14, four involved South Africa - - *i.e.*, those with Botswana, the Democratic Republic of the Congo, Mozambique, and Namibia. Wang *et al*. (2006), in their evaluation of terms-of-trade correlations among the CMA countries plus Botswana, found that two (of 10) correlations were above 0.20 - - those for Botswana with South Africa, and Botswana with Lesotho.

In their study of ten SADC countries, Khanfula and Huizinga (2004) obtained results supporting a five-member monetary union. As noted, Khanfula and Huizinga estimated unanticipated components among bilateral real exchange rates using both monthly and quarterly frequencies; the authors referred to their results using monthly data as the "short-run case" and the results using quarterly data as the "long-run case". Both sets of results provided support for a monetary union involving Mauritius, Malawi, South Africa, and Zimbabwe.

To summarize the findings discussed thus far, most authors either (1) did not obtain results supportive of monetary unification among the countries considered or (2) found that their results supported a monetary union comprised of relatively-small group of

countries, typically including South Africa, sometimes with other CMA countries and/or Botswana. Two main factors help account for these findings. First, most SADC countries have narrow export bases and the composition of exports varies considerably among countries. Thus, it would be expected that movements of such variables as de-trended real GDP and the terms of trade would not exhibit high correlations. Second, some SADC countries, especially Botswana, Lesotho, Namibia, and Swaziland, have high shares of trade with South Africa. Therefore, it is expected that those countries exhibit relatively-high co-movements of output growth (through trade multipliers) with South Africa.

Two other factors deserve to be noted. First, until the late-1990s, empirical work that used methodologies similar to those described above typically showed that only a small core of European countries, often including Austria, Belgium, Germany, and Luxemburg, showed the high correlations of output growth and/or of shocks to output growth that theory held necessary for an optimum currency area.[26] Second, the CMA in Southern Africa has had a substantial history as a well-functioning, hard exchange-rate arrangement despite large differences in structural characteristics among the members.

Exceptions to the foregoing empirical results are the findings in studies by Yehoue (2005), Dutu and Sparks (2004), and Jefferis (2007); each of these studies suggested that monetary unions comprising at least seven countries are feasible. As noted, Yehoue found high co-movements of shocks in output levels among nine SADC countries, suggesting that those countries could form a monetary union.[27] Additionally, using his framework based on endogenously-formed trade externalities, Yehoue (2005) found that, with the four CMA countries as a core group, dynamic trade links would lead to a 23-member monetary union among African economies. Dutu and Sparks (2004), in their consideration of the desirability of a monetary union among 14 SADC countries, found what they interpreted as low levels of nominal convergence among most of the countries considered in their study. Although Dutu and Sparks inferred that the SADC does not constitute an OCA, the authors concluded that the CMA could be expanded to include Botswana, Mauritius, and Seychelles. Jefferis (2007), in his assessment of the feasibility of monetary union among the 14 SADC countries, considered coefficients of variation of bilateral (nominal) exchange rates against the South African rand, and interest-rate differentials and inflation differentials *vis-à-vis* South Africa. The author concluded that eight countries

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[26] For a survey of the empirical literature, see De Grawe (2007, pp. 85-90).
[27] As pointed out, Yehoue's method of extracting shocks from data in levels may have led to specification errors.

comprised a "convergence group": Botswana, Lesotho, Mauritius, Mozambique, Namibia, South Africa, Swaziland, and Tanzania.

The findings by Yehoue (2005), Dutu and Sparks (2004), and Jefferis (2007) warrant the following comments. (1) In setting up a dynamic game, under which countries would want to join a monetary union if their trade shares (relative to GDP) exceeded a pre-specified threshold, Yehoue assumed a trade-share threshold of two per cent of GDP. Countries that had trade shares with the monetary union in excess of two per cent would want to join the union. The two per cent threshold, however, appears to be low, arbitrary, and asymmetric.[28] It is asymmetric because it considers only the possible benefits to the countries that are outside the monetary union. In his game, there was no threshold for the countries *inside* the union. In other words, the author did not specify welfare criteria that could motivate countries inside the union to accept new entrants. Thus, both the low level of the threshold and the asymmetric nature of the game were conducive to the formation of large monetary unions. (2) As mentioned, Dutu and Sparks (2004) and Jefferis (2007) did not provide formal analyses of the sets of data that they considered. Dutu and Sparks' recommendation of the feasibility of a seven-member CMA was based on inferences that relied on arbitrary thresholds.[29] That is, to infer whether there existed sufficient macroeconomic convergence among countries, the authors established thresholds, or limits, which, if exceeded, were interpreted as suggesting that the countries concerned did not qualify for monetary union. For example, in assessing whether the degree of (nominal) bilateral exchange-rate movement against the South African rand qualified for convergence, Dutu and Sparks set an annual threshold of 5 per cent with regard to the maximum allowable nominal appreciation/depreciation against the rand. Jefferis' inference of an eight-member "convergence club" appears to have been based strictly on a casual inspection of the data. The author did not explain what criterion was used to assess the degree of convergence, nor did he define what he meant by a "convergence club".

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[28] Yehoue (2005, p. 9) referred to the arbitrary nature of the two-per cent cut-off. He justified it by arguing that, in a similar study, Alesina, Barro, and Tenreyro (2002) had used an arbitrary cut-off. The latter authors used a six per cent cut-off.

[29] In fact, Dutu and Sparks (2004) referred to the arbitrary nature of their thresholds.

4. Endogenous OCA Analysis

Whereas earlier work on OCAs sought to identify the characteristics that an economy should satisfy prior to joining a monetary union (*i.e., ex ante*), the "new" theory of OCAs has focused on changes in economic structure and performance that may result from participation in a monetary union (*i.e., ex post*).[30] Endogenous OCA theory has identified two main transmission channels through which a common currency may affect an economy's performance. These channels operate via increased trade integration and enhanced credibility.

1. *Trade integration.* Greater trade integration is thought to increase growth by increasing allocative efficiency and accelerating the transfer of knowledge. Endogenous OCA theory posits that a common currency (as opposed to separate currencies tied together with fixed exchange rates) can promote trade and growth. The basic intuition underlying this hypothesis is that a set of national currencies is a significant barrier to trade. According to this view, in addition to removing the costs of currency conversion, a single currency and a common monetary policy preclude future competitive devaluations, increase price transparency, facilitate foreign direct and portfolio investment, and the building of long-term relationships, and might (over time) encourage forms of political integration within the union (Mongelli, 2002). These outcomes would, in turn, promote (over-and-above what may have been attained on the basis of the elimination of exchange-rate uncertainty among separate currencies) reciprocal trade, economic and financial integration, and the accumulation of knowledge (Rose and Van Wincoop, 2001; Mongelli, 2002).[31] These effects are said to increase the productivity of capital and labor and, therefore, to raise potential output (De Grauwe, 2002). Additionally, increased trade integration is said to result in more-highly-correlated business cycles because of common demand shocks and greater intra-industry trade, lessening the need of country-specific monetary policies (Frankel and Rose, 1998).

2. *Credibility.* The earlier (*i.e., circa* 1970s and 1980s) literature on the merits of fixed exchange rates stressed the disciplining character of such regimes. Policy bias

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[30] Endogenous OCA analysis leads to the view that an economy that fails to satisfy OCA criteria prior to entry into a monetary union may, nevertheless, satisfy the criteria as a result of entry into a monetary union (see Frankel and Rose, 1998). Unlike the earlier OCA theory, which did not distinguish between a rigidly-pegged exchange-rate regime and monetary unification, the new OCA framework stresses the potential benefits of a monetary union.

[31] Theoretical and empirical work on the relationship between exchange-rate uncertainty and trade has not uncovered a negative linkage. For a recent discussion, see Clark, Tamirisa, and Wei (2004).

towards discipline was thought to be fostered for two primary reasons. First, the country's reserves are put on the line, and the quantity of such reserves is limited. Second, the authorities who devalue are often considered to have failed in their macroeconomic management. The discipline hypothesis posited that an exchange-rate commitment would help a high-inflation country attain a low-inflation equilibrium, but at a cost. Along the way to lower inflation, the country in question would experience the higher unemployment and lower output that derive from any restrictive policies.[32]

During the past thirty years or so, a number of theoretical developments have contributed to a consensus among economists stressing the role of credibility in the formulation of monetary policy, whereby credibility is typically interpreted as the extent to which the present announcement by the monetary authorities in the present of future intentions are taken at face value.[33] Several such developments are important to mention. (1) Lucas and Sargent (Lucas, 1976; Lucas and Sargent, 1981) showed that the public's expectations about inflation depend upon expectations about the evolution of policy. Specifically, inflation expectations could be made to conform to a central bank's inflation objective if a central bank was credibly committed to following a noninflationary monetary-policy rule (Goodfriend, 2007, p. 50; Lacker and Weinberg, 2007, p. 222). (2) Kydland and Prescott (1977) showed that a central bank that engaged in discretionary policies has an incentive to promise low inflation and then to run an expansionary monetary policy aimed at lowering unemployment (Goodfriend, 2007, p. 51). As such, the discretionary policy is time-inconsistent, whereby time-inconsistency refers to (under rational expectations and a vertical long-term Phillips curve at the natural rate of unemployment) the unwillingness of the public to believe that the central bank will really commit to what it pronounces, and this circumstance affects the range of choices available to the central bank (Cobham, 1998, p. 217). Among the implications of this line of research are the following: (1) a policy rule provides a better outcome (*i.e.,* lower inflation at the natural rate of unemployment) than discretionary monetary policy, and (2) to be credible, the monetary authorities must demonstrate that they are fully committed to a

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[32] The earlier literature on OCAs treated the similarity of inflation rates between or among countries as a precondition for monetary union, the idea being that, if inflation rates between countries are similar, an equilibrated flow of current-account transactions is more likely to take place among these countries than when inflation rates are divergent (see Fleming, 1971; Ishiyama, 1975).

[33] The theoretical developments have been complemented with empirical work demonstrating the inflationary bias inherent in discretionary monetary policy (Barro and Gordon, 1983). This bias stems from two main sources: (1) attempts to over-stimulate economies on average, and (2) incentives to monetize budget deficits and debts (Alesina and Barro, 2001, p. 382).

low-inflation objective so that they will not exploit the opportunity provided by high inflation (Barro, 2008, pp. 383-87).

An upshot of the foregoing developments has been the emphasis, in both academic work and practice, on the use of pre-commitment arrangements that prevent the central bank from yielding to the temptation to inflate. Pre-commitment technologies include the announcement of an inflation target and/or a statute granting independence to the central bank. In an open-economy context, fixing the exchange rate against the currency of a low inflation country or joining a monetary union (including the adoption of a common currency) with a credible central bank have been considered (and used) as pre-commitment mechanisms. In the aftermath of the succession of speculative attacks against mostly-pegged exchange-rate regimes in the 1990s and early 2000s, however, a fixed exchange-rate arrangement is no longer considered a viable option. Consequently, in the open economy context, increased attention has been given to monetary unification as a means of deriving credibility.[34]

If agents in the goods, labor, and foreign-exchange markets believe that the commitment to adopt a common currency is sustainable, so that it changes agents' expectations, the output and employment costs of attaining a low-inflation equilibrium are reduced. Since there is no devaluation risk and, therefore, no need of an interest-rate premium to cover the risk of devaluation, nominal and real interest rates are lower than otherwise. With low and stable inflation, and lower interest rates, economic horizons lengthen, encouraging a transformation of the financial sector, thereby promoting risk taking and stimulating private investment, fostering faster growth (Dornbusch, 2001).[35] It should be noted, however, that a monetary union is likely to be credible only if it is in the economic and political interests of its members to remain in the union, an issue that has not been adequately addressed in the literature.

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[34] In addition to supporting monetary unification, this argument has often been used in support of currency boards or dollarisation for economies that have had histories of relatively-high inflation associated with profligate macroeconomic policies (*e.g.,* Barro, 1999; Hausmann, 1999). The performance of alternate exchange-rate regimes with regard to inflation and other macroeconomic variables has been studied by Tavlas, Dellas and Stockman (2008).

[35] A related argument is that a pegged-rate system provides a nominal anchor in a disinflationary environment because of its effect on real money demand. If agents believe the disinflation policy associated with the peg is credible, interest rates fall so that the demand for real money balances rises and, for a given path of money growth, inflation falls. Because this argument applies to a limited set of circumstances, and because of the availability of alternative monetary rules that can provide a nominal anchor, the argument is not pursued here. For further discussion, see Stockman (1999).

The above argument suggests that the benefits (in terms of importing credibility) of joining a common-currency area with a credible regional central bank can be substantial, even if a particular country's characteristics (such as openness, asymmetry of shocks, and labour-market flexibility) do not appear to be very favorable for monetary unification.[36] Additionally, the literature on credibility leads to the following inference with respect to the use of adjustments of exchange rates of national currencies: an exchange-rate adjustment is not a flexible instrument that can be used frequently. Its present use affects its future effectiveness because it engenders strong expectational effects. Consequently, the benefits of using the instrument in the present need to be weighed against the costs of using the instrument in the future - - *i.e.*, the effectiveness of future adjustments is likely to diminish if adjustments in the present have been frequent and/or large (De Grauwe, 2007, p. 52).

4.1 Estimation Approaches and Results

Several empirical studies deal with either the endogeneity of trade and/or credibility within the specific context of Southern-African countries. Specifically, Masson and Pattillo (2005) and Carrere (2004) considered the effects of a common currency on intra-CMA trade and intra-SADC trade, respectively. Masson and Pattillo (2005), Masson (2006), and Guillaume-Stasavage (2000) considered the possible credibility gains attributable to a common currency. The approaches pursued by the authors of the studies and the results obtained are discussed in what follows.

1. Trade creation. The workhorse model used in the empirical literature on the trade-creation effects of a common currency is the gravity model (see Rose, 2000). The gravity model is usually specified to include as explanatory variables the product of the real GDPs of two economies, in both level and per-capita specifications, the distance between them, and the land area of the economies (Masson and Pattillo, 2005, p. 54). Dummy variables are included to capture the possible effects of common features of the economies, including: membership in a free-trade area or currency union and a common language, border and/or colonizer; and so on. The gravity equation is typically specified in logarithms, so that (excluding time subscripts):

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[36] This argument has been used to explain the reasons that countries such as Greece, Italy, and Portugal benefited from euro-area membership.

$$\ln\ (X_{ij}) = \beta_0 + \beta_1 \ln\ (Y_i Y_j) + \beta_2 \ln\ (\frac{Y_i}{Pop_i} \frac{Y_j}{Pop_j}) + \beta_3 \ln\ (Dist_{ij})$$

$$+ \beta_4 \ln\ (Area_i Area_j) + \sum_{k=1}^{n} \beta_{4+k} D_k$$

where X_{ij} is bilateral trade between economies i and j, Y is real GDP, *Pop* is population, $Dist_{ij}$ is distance between economies i and j, Area is land area, and the *Ds* are various dummy variables (e.g., common colonizer, common language, common border).[37] The possible effect of monetary union on trade is captured by a dummy variable, under the presumption that separate national currencies act as a barrier on trade.

Masson and Pattillo (2005) estimated equations based on the gravity model for the CMA countries. An aim of the exercise was to compare predictions of bilateral trade shares *vis-à-vis* South Africa with and without the currency-union dummy. For each of the three CMA countries other than South Africa, the results showed that bilateral trade with South Africa (as a percentage of total trade) was about 50 per cent higher with the currency-union dummy than without the dummy, suggesting that the CMA had provided a positive impact on intra-area trade.

Carrere (2004) used the gravity model to study trade creation-effects arising from regional trade agreements and currency unions. In contrast to most authors, who use a dummy variable in the gravity model to capture the effects of a common currency on trade, Carrere used a measure of the volatility of the bilateral nominal exchange rate among the currencies of the countries considered. Applying this measure to the SADC countries, the author obtained results that were "quite difficult to interpret" (Carrere, 2003, p. 227). It appears, however, that the exchange-rate-volatility variable used to examine the trade-creation effects of a common currency is not an appropriate measure of such a currency. As noted above, (1) most empirical studies that investigate relationships between trade and exchange-rate volatility obtain inconclusive results (see footnote 27), and (2) the trade-creation effects of a common currency are purported to be *over-and-above* what may have been attained on the basis of the elimination of exchange-rate volatility among separate currencies.

2. Credibility. Masson and Pattillo (2005) used a calibrated model, based on data for 1995-2000, to consider the monetary impact of country-specific differences in preferences

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[37] This description of the gravity model is based on Masson and Pattillo (2005, p. 54).

with respect to the size of the government sector, distortions (political and/or structural) affecting fiscal policy, and asymmetries of shocks. Effectively, the model was constructed around three factors that determined the benefit-cost calculus of monetary union: (1) inflation performance of each country relative to the average inflation of all the potential members of a monetary union; (2) asymmetry of shocks among the potential members; and (3) fiscal performance of each country relative to the average of all countries. The main elements of the model (described in Masson and Pattillo, 2005, pp. 171-81) were: an expectations-augmented Phillips Curve, extended to include international spillovers from neighbors' monetary policies; a government budget constraint; and an assumed objective function for the government that depended linearly on higher output, and negatively on squared deviations of inflation from a target that reflected supply shocks. Masson and Pattillo assumed that, for countries not in a monetary union, governments' exerted control over national central banks. In contrast, the authors assumed that in a monetary union the central bank maximized a weighted average of the member countries' objective functions (where weights reflected relative GDPs) while each government chose its own fiscal policy. In each case, governments satisfied a one-period budget constraint that forced spending to be financed either by taxes or by a country's share of monetary financing. A key linkage in the model was the effect of spending targets on inflation and taxes, since higher spending needed to be financed. Since spending targets were unobservable, Masson and Pattillo estimated a relationship under which countries with higher per-capita incomes could generally afford to offer more government services; as both revenues and spending rose in tandem, this component did not cause a problem for inflation. However, a second force tending to increase spending targets was the attempt by governments in power to reward their supporters - - which was a symptom of cronyism or corruption. To take account of the latter factor, Masson and Pattillo used indices of corruption and institutional development and measures of diversion of spending away from health and education toward what the authors judged to be less-crucial areas.

Masson and Pattillo (2005) performed two simulations to analyze the costs and benefits of a monetary union among SADC economies. In one simulation the authors calculated the net gains, relative to floating exchange rates, of an asymmetric monetary union under which monetary policy reflected the inflation performance of the South African Reserve Bank (based on inflation rates in South Africa during 1995-2000). Under the other simulation, the authors calculated the net gains, relative to the situation that

would pertain under floating rates, of a symmetric monetary union (based on average inflation during 1995-2000 among all countries considered). Separate simulations were made for the four CMA countries and for 13 SADC countries. For both sets of countries, the results indicated that an asymmetric monetary union would result in gains for all participants, whereas a symmetric union would result in losses for most countries. Underlying these results was the tendency for many SADC countries to have incurred large fiscal deficits, financed to a considerable extent through money creation, over the period considered by the authors. Thus, countries such as Zimbabwe, would not make desirable partners in a symmetric monetary union. Masson and Pattillo (2005, p. 176) concluded that "economic logic would suggest that the SARB [South African Reserve Bank] continue to set monetary policy [based on South Africa's economic situation], meaning that a SADC exchange-rate union would essentially be a rand zone".

In Masson and Pattillo's simulations, no account was taken of the possible trade-creation effects of a monetary union among all the SADC countries. Yet, such trade-creation effects would benefit the members of a monetary union and should be accounted for in a calibration exercise aimed at calculating the benefits and costs of a common currency. To address this issue, Masson (2006) extended the calibration model used by Masson and Pattillo (2005) so that it incorporated the benefits of increased trade resulting from a monetary unification. Assuming that a regional SADC currency would double intra-SADC trade, and that the regional central bank set monetary policy to reflect the average conditions of the region (*i.e.,* the symmetric case), Masson (2006) obtained the following results: (1) with the exception of Mauritius, each of the SADC countries that are non-CMA members would gain under a monetary union;[38] and, (2) each of the CMA countries would lose, though the losses were less than half those yielded by simulations that did not take account of trade-creation effects. Thus, in the case of the CMA countries, the losses stemming from higher inflation in a symmetric monetary union would outweigh any benefits due to the trade-creation effects of a regional currency.[39] As was the case in the study by Masson and Patillo (2005), Masson's (2006) findings support a monetary

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[38] Masson and Pattillo (2005) did not include Mauritius in their sample of 13 SADC countries.
[39] Unlike Masson and Patillo (2005), Masson (2006) did not consider the case of an asymmetric monetary union under which monetary policy reflected the inflation performance of the South African Reserve Bank, because that author's earlier work with Patillo showed that case to be welfare improving, unlike the symmetric case; thus, there was no reason to examine whether a rise in trade made monetary union desirable.

union under the condition that the South African Reserve Bank sets monetary policy for the union.

The issue of the possible gains from the credibility of a regional central bank was also dealt with by Guillaume and Stasavage (2000). The authors compared measures of checks and balances in political systems to assess what countries might gain by the credibility of a regional central bank. These measures included the degree of party fractionalization and levels of constraints on the executive branch; Guillaume-Stasavage's study covered the sample period 1968-93. The idea underlying the authors' approach is that relatively-high fractionalization and/or strong constraints on the executive branch are likely to involve higher costs of reneging on policy rules because, for example, higher levels of fractionalization tend to result in a greater possibility of coalition governments. Under these conditions, power is shared among parties, any one of which could bring down the government if the monetary policy to which it subscribed (and agreed as a condition of supporting the executive) were to be violated. Consequently, Guillaume and Stasavage argued that countries with relatively-low levels of fractionalization and/or relatively-strong executive branches are likely to be better candidates for monetary unions than countries with high levels of fractionalization and/or weak executive branches since such unions would include regional central banks, making it more costly for those countries to renege on the rules.[40] Guillaume and Stasavage also considered measures of political shocks (*i.e.*, number of coups, numbers of cabinet changes) to judge the suitability of monetary-union participation; the authors argued that countries with higher levels of political shocks would gain by the stability that could be provided by a regional central bank, which would be under less country-specific pressures to follow profligate policies.

Based on an analysis of the above data, Guillaume and Stasavage reached a favorable assessment concerning the effects of monetary union.[41] The authors found that many of the countries considered lacked the checks and balances in their political institutions necessary to conduct a credible monetary policy at the national level. Thus, Guillaume and Stasavage inferred that regional monetary unions could provide credibility

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[40] The argument that broad coalitions make reneging on rules more costly can be criticised since, under broad coalitions, the costs of reneging can be spread out, making reneging more likely.

[41] Guillaume and Stasavage's assessment pertained to monetary unions among African economies more generally. In light of the fact that the evidence on political variables presented by the authors for the SADC countries was similar to that presented for other African regions, the inference drawn with respect to Africa more generally seems to apply to the SADC countries.

if exit from the union were made costly by the existence of parallel regional arrangements and/or links to financial and/or technical assistance from industrial countries.

4.2. Discussion

In sum, those authors that have addressed the trade-creation and credibility effects of monetary unions find that, under the assumption of a *credible* regional central bank, a common currency and single monetary policy could provide net benefits for most Southern-African countries. The literature also suggests that, in a monetary union comprised of all SADC countries and a regional central bank that set monetary policy to reflect the average economic conditions (e.g., fiscal balances) in the region, the potential losses (*i.e.,* higher inflation) from giving up an existing credible national central bank, relevant in the case of South Africa and the other CMA countries, could outweigh any potential benefits of trade creation resulting from a common currency. The relatively small number of studies dealing with the endogeneity issue in the Southern-African context indicates, however, that more research is needed before anything approaching a definitive conclusion can be reached on the matter.

As is the case with all monetary unions, a monetary union in Southern Africa is likely to be credible only if the institutional design of the new regional central bank is such that the central bank is given *de facto* (and not just *de jure*) independence. In the case of the European Central Bank (ECB), for example, institutional independence and the primacy of the objective of price stability were enshrined in the Maastricht Treaty. To enhance the credibility of the ECB, a monetary-policy strategy, which includes the monitoring of money growth, was formulated and based, in part, on the strategy of the Bundesbank (Issing, 2006, pp. 3-4); the latter institution had established a reputation as a credible central bank by keeping German inflation relatively low over several decades (Tavlas, 1991). In the Southern African context, the following problems must be addressed by the member states. First, the South African Reserve Bank has established a credible reputation of keeping inflation relatively low. This credibility, combined with the dominant role of South Africa's economy in the region, suggests that the policy framework of the South African Reserve Bank should play an influential role in the design of the institutional framework of a new regional bank. Second, creation of a regional central bank would likely have to be accompanied by the creation of other consultative and/or supranational structures. Without a Southern African counterpart to the European Parliament, for example, the transfer of national sovereignty that would occur with the

establishment of a regional central bank in Southern Africa would lack accountability and legitimacy.[42] Issues related to the establishment of a credible regional central bank in Southern Africa, however, including decision procedures, guarantees of independence, accountability, the degree of operational decentralization in the implementation of open-market and discount-window operations, the composition of the monetary union, the distribution of seignorage, and the distribution of the fiscal burden in the event of lender-of-last-resort operations, have not been studied to the extent that is needed before proceeding to a regional monetary union.[43]

5. Concluding Remarks

In addition to differences in empirical methodologies, countries considered, and sample periods, a major source of difficulty in interpreting empirical findings of investigations of the desirability and/or feasibility of monetary union in Southern Africa is that there are relatively few cross-references among authors of studies, making it difficult to place particular empirical findings in a broader context. The foregoing review of the literature attempted to identify the main thrust of the empirical findings. The review points to the following conclusions.

(1) Authors of studies dealing with the traditional OCA criteria tend to focus on correlations of (a) de-trended real growth rates, (b) shocks to output growth, (c) real exchange rates, and/or (d) terms-of-trade. The underlying assumption of this methodology is that high correlations of such factors as de-trended output growth and the terms-of-trade diminish the need of country-specific monetary and exchange-rate policies. Most authors find that SADC economies are subject to asymmetric shocks (*e.g,* weak and/or negative co-movements in de-trended real growth rates), reflecting differences in the major exports among the countries concerned and divergences in movements of the prices of those exports. Thus, a general inference of studies in this genre is that a common currency and single monetary policy may not be appropriate for all the SADC countries. Some authors, however, obtained results supportive of a monetary union comprised of a relatively-small group of countries, usually including South Africa, sometimes with other CMA countries and Botswana.

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[42] This argument was made by Buiter (1999) and Kenen and Meade (2008) with respect to the creation of a regional central bank in North America.
[43] With regard to credibility, the work by Guillaume and Stasavage (2000) is a partial exception.

(2) Similar qualitative results had been obtained for euro-area countries prior to the formation of European monetary union in 1999. The early empirical literature on the correlation of GDP growth rates and/or shocks to output growth for such countries typically pointed to only small groups of European countries as suitable for a monetary union. Yet, the euro area has been a well-functioning monetary union despite membership by a much-larger group of countries. In addition, the CMA has been a well-functioning, hard, exchange-rate arrangement despite a wide diversity of structural characteristics among its members.

(3) Although many SADC countries tend to have low shares of intra-SADC trade, those countries that have relatively-high intra-trade shares within the SADC region tend to experience relatively-high business-cycle co-movements, suggesting that a common currency among these countries may be appropriate. Typically, the countries in this group have high intra-trade shares with South Africa.

(4) Trade shares are not invariant to the existence of a single currency. Empirical evidence pertaining to the fixed-exchange-rate arrangement (including the use of the South African rand as legal tender in each of the four CMA countries) among the CMA countries suggests that the CMA may have raised intra-trade by 50 per cent compared to the share that would have existed in the absence of that arrangement.

(5) A key issue in the formation of a common-currency area among SADC economies concerns the credibility of a regional central bank. Other things equal, members of a monetary union would benefit from lower inflation than they would face if they retained separate currencies because the common central bank would internalize pressures to follow expansionary monetary policies associated with exchange-rate depreciations among separate currencies (*i.e.,* beggar-thy-neighbor policies).

(6) Although national policies can, to some extent, be used to deal with asymmetric shocks among the nations participating in a currency union, as the experience of the euro area has shown the systematic use of this instrument can lead to problems of debt sustainability. The SADC approach to monetary union is based on the principles of gradualism and conditionality. These principles must be applied strictly to ensure the viability of a Southern African monetary union; endogeneity of the OCA criteria will help ameliorate some - - but not all - - asymmetries among Southern African countries.

(7) The case of the SADC is unique among potential monetary unions in the African and European regions because of the dominant role of the one economy, that of South Africa within its region and the credibility of the monetary policy of the South African Reserve Bank.[44]

(8) The above factors point to the desirability of a selective and gradual approach to monetary unification in Southern Africa, centered on the CMA as a core monetary union. As neighboring countries demonstrate an ability to deliver disciplined and stable macroeconomic policies - - particularly with respect to fiscal balances - - they could become members of the monetary union. Such a selective and gradual approach could build on the credibility of the existing monetary arrangement (*i.e.,* the CMA) in Southern Africa.[45]

(9) In the light of the narrow export base of most SADC countries, consideration could be given to a public insurance scheme among the members of a monetary union. Under such a scheme, members would be temporarily insured from large fluctuations in their revenues. The design of such a scheme would, however, have to deal with the problem of moral hazard so that it does not reduce the willingness and/or ability of countries to adjust in the event that shocks are permanent.

Although the members of the SADC have set the objective of adopting a common currency in 2018, and have proposed interim convergence criteria to help mark the road to monetary union, to date the SADC has provided very little in terms of official published documentation dealing with such key issues as the benefits and costs of a Southern African monetary union, the degree of factor mobility, both within and among the countries concerned, the rationale of convergence criteria, the reasons underlying the choice of the particular quantitative (interim) convergence criteria, the role (if any) of real convergence as a criterion for entry into the monetary union, the institutional design of a prospective regional central bank, the stability (or lack thereof) of the demand for money and the nature of the monetary transmission mechanism in the countries concerned, the delegation of banking supervision, the type of exchange-rate regime of the monetary union *vis-à-vis* the rest of the world, and the institution responsible for the management of

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[44] As noted above, South Africa's GDP accounts for about 67 per cent of SADC GDP. In the euro area, by contrast, Germany's GDP, the largest GDP in the euro area, is almost matched by that of France; in 2006, Germany's GDP accounted for 27.5 per cent of euro-area GDP while France's GDP accounted for 21.3 per cent of euro-area GDP (European Central Bank, 2007).

[45] Masson and Patillo (2005) also argued that a monetary union in Southern Africa should be selective and based on the satisfaction of fiscal convergence criteria.

exchange-rate policy.[46] Moreover, although the use of nominal convergence criteria parallels the use of such criteria for entry into the euro area, the selection of convergence criteria for the euro area zone was preceded by a substantial amount of analytical research.[47] With studies dealing with the traditional OCA criteria suggesting that a common-currency area among all SADC countries may not be appropriate, further work on the endogeneity of the OCA criteria may help illuminate the extent to which the creation of an SADC monetary union might itself create the conditions necessary for a well-functioning union. Clearly, there is a need at the official level of systematic and thorough analysis of the way monetary union will be achieved and the nature of the eventual union.

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[46] Thus, the SADC website provides essentially no information about the prospective Southern African monetary union on its website. See www.sade.int. SADC central bank governors, however, have made numerous references to the prospective monetary union in their public speeches. In addition, the South African Reserve Bank has set up a Secretariat on the SADC monetary union.

[47] See, for example, the study by the Commission for the European Communities (1990). This study provided a detailed analysis of the benefits and costs of a monetary union in Europe, and included a quantitative estimate of the reduction in transactions costs of a single currency (projected to be equal to about one per cent of the European Community's GDP).

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Table 1: SADC Countries: Exchange-Rate Regimes

Country	Currency	Regime	Capital controls
Angola	Kwanza	Managed floating	Yes
Botswana	Pula	Pegged to basket (South African rand and SDR)	Yes
Congo, Democratic republic of	Congo franc	Independently floating	Yes
Lesotho	Loti	Pegged to South African rand (CMA)	Yes
Madagascar	Ariary	Independently floating	Yes
Malawi	Kwacha	Independently floating	Yes
Mauritius	Rupee	Managed floating	Yes
Mozambique	Metical	Managed floating	Yes
Namibia	Namibia dollar	Pegged to South African rand (CMA)	Yes
South Africa	Rand	Independently floating; rand is CMA anchor currency	Yes
Swaziland	Lilangeni	Pegged to South African rand (CMA)	Yes
Tanzania	Shilling	Independently floating	Yes
Zambia	Kwacha	Managed floating	Yes
Zimbabwe	Zimbabwe dollar	Adjustable peg against U.S. dollar; dual exchange rates	Yes

Source: IMF, *Exchange Rate Arrangements and Exchange Restrictions*, 2006.

Notes:
Managed floating: The authorities influence exchange rate movements through active intervention to counter the long-term trend of the exchange rate, without specifying a predetermined exchange rate path, or without having a specific exchange rate target. Intervention may be direct or indirect. Indicators for managing the rate are broadly judgmental (*e.g.,* balance of payments position, international reserves, parallel market developments), and adjustments may not be automatic.

Independently floating: The exchange rate is market determined; any foreign exchange intervention aims at moderating the rate of change and preventing undue fluctuations in the exchange rate that are not justified by economic fundamentals, rather than at establishing a level for the exchange rate. In these regimes, monetary policy is in principle independent of exchange rate policy.

Table 2: SADC Countries: Selected Economic Indicators

	GDP (constant 2000 of US$, millions)	Percent of Total SADC GDP	GDP (current US$, millions)	Average GDP growth (annual %) 2002--2006	GDP per capita (constant 2000 US$)	Average GDP per capita growth (annual %) 2001--2005	Inflation CPI. 5 year averages	Current account balance (% of GDP)	Trade (% of GDP)	Budget Balance % of GDP	*Addendum items* GDP, PPP (constant 2000 international $, millions)	Percent of Total SADC GDP, PPP
Angola	17593	7.3	20108	13.5	990	6.2	147.6	5.9	138.1	9.7	37936	5.2
Botswana	6835	2.8	10146	4.3	3818	4.0	7.9	3.2	74.7	11.3	19887	2.7
Congo, Dem. Rep.	5611	2.3	7782	5.9	93	1.0	301.8	..	40.9	..	38498	5.3
Lesotho	1049	0.4	1988	3.4	548	2.2	9.3	-17.0	125.5	..	5554	0.8
Madagascar	4146	1.7	4364	2.6	239	-0.5	9.5	-5.6	74.9	..	16036	2.2
Malawi	2004	0.8	2001	3.9	168	0.0	19.1	-10.2	59.0	-3.6	8312	1.1
Mauritius	5772	2.4	6694	4.1	4426	3.5	4.9	2.0	104.6	-5.3	14568	2.0
Mozambique	5895	2.4	5548	7.2	285	6.5	12.6	-11.9	62.1	2.1	23414	3.2
Namibia	4165	1.7	7589	3.6	1966	1.8	8.2	7.9	84.2	..	14433	2.0
South Africa	162267	67.4	237216	3.5	3458	2.8	5.5	-3.8	52.7	0.6	489916	66.8
Swaziland	1579	0.7	2598	2.3	1365	0.6	9.4	-3.9	176.0	..	5000	0.7
Tanzania	13417	5.6	10851	6.8	337	4.6	3.9	-9.8	45.6	-6.2	25641	3.5
Zambia	4254	1.8	5389	4.6	371	2.5	23.2	-17.1	51.2	-2.5	11258	1.5
Zimbabwe	6230	2.6	17750	-6.3	479	-7.8	90.9	..	45.8	-11.3	22751	3.1

Notes:
GDP (constant 2000 millions of US$), latest year reported is 2006
GDP (current US$, millions) latest year reported is 2006
Average GDP growth (annual %) 2002--2006, 5 years
GDP per capita (constant 2000 US$) latestyear reported is 2005
Average GDP per capita growth (annual %) 2001--2005
Inflation, consumer prices (annual %), average 2000--2004, 5 years
Current account balance (% of GDP) latest reported year is 2004
Trade (% of GDP) latest reported year is 2006
Budget Balance in % of GDP, values refer to the year 2006.
GDP, PPP (constant 2000 international $, millions), latest year reported is 2006

Source: World Development Indicators, World Bank

Table 3: SADC Countries: Major Export Products

Country	Year	Exports		Share of Total Exports
Angola	2003	Crude oil		89,7
		Diamonds		8,3
		Refined petroleum products		1,4
			Total	99,4
Botswana	2005	Diamonds		72,0
		Copper nickel		9,8
		Textiles		4,7
			Total	86,5
Congo, Dem. Rep.	2004	Diamonds		45,7
		Crude oil		19,9
		Cobalt		13,8
			Total	79,3
Lesotho	2005	Clothing		65,4
		Diamonds		15,4
		Machinery		3,8
			Total	84,7
Madagascar	2004	Vanilla		46,3
		Shellfish		18,6
		Cloves		10,5
			Total	75,4
Malawi	2003	Tobacco		53,0
		Tea		9,9
		Sugar		9,1
			Total	72,0
Mauritius	2004	Sugar		85,8
		Chemicals		3,3
		Cut flowers		0,9
			Total	90,0
Mozambique	2004	Aluminum		60,8
		Electricity		6,8
		Prawns		6,1
			Total	73,7
Namibia	2004	Diamonds		45,2
		Other manufactured products		16,0
		Fish		9,8
			Total	71,0
South Africa	2006	Monetary gold		8,2
		Bituminous coal		4,7
		Platinum - unwrought or in powder form		4,2
			Total	17,0
Swaziland	2003	Edible concentrates		55,1
		Cottonseed and lint		15,9
		Wood pulp		12,9
			Total	83,8
Tanzania	2004	Gold		49,6
		Fish and Products		10,5
			Total	60,1
Zambia	2004	Copper		58,3
		Nonmetal exports		25,7
		Cobalt		16,0
			Total	100,0
Zimbabwe	2004	Gold		15,6
		Tobacco		13,5
		Ferrous alloys		11,0
			Total	40,2

Source: International Monetary Fund, Recent Economic Developments (various issues),
National Statistical Office Malawi and data provided by the South African authorities.

Table 4: SADC Countries: Country Exports as a Share of Total Exports (in per cent)

From / To	Angola	Botswana	Dem Rep of Congo	Lesotho	Madagascar	Malawi	Mauritius	Mozambique	Namibia	South Africa	Swaziland	Tanzania	Zambia	Zimbabwe	Total SADC	Total SADC less South Africa
Angola		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Botswana	0.01		0.03	0.01	0.00	0.02	0.00	0.03	0.09	7.50	0.02	0.02	0.07	2.49	10.28	2.78
Dem Rep of Congo	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lesotho	N/A	0.10	N/A		N/A	0.00	N/A	N/A	N/A	53.04	0.07	0.00	0.00	N/A	53.22	0.18
Madagascar	0.01	0.00	0.00	0.00		0.00	1.43	0.02	0.00	1.00	0.01	0.02	0.00	0.01	2.51	1.51
Malawi	0.01	0.20	0.03	0.13	0.16		0.01	2.29	0.03	22.19	0.02	0.95	2.11	3.18	31.32	9.13
Mauritius	0.13	0.01	0.00	0.05	4.77	0.00		0.05	0.01	2.15	0.01	0.06	0.04	0.07	7.34	5.19
Mozambique	0.06	0.02	0.13	0.03	0.01	1.04	0.04		0.00	14.10	0.35	0.19	0.09	3.20	19.26	5.16
Namibia	7.18	0.47	0.46	0.01	0.00	0.00	0.01	0.72		30.49	0.03	0.03	0.52	0.22	40.14	9.65
South Africa	1.31	N/A	0.69	N/A	0.14	0.47	0.54	1.73	N/A		N/A	0.76	2.19	2.03	9.87	9.87
Swaziland	0.77	0.00	N/A	0.01	0.21	0.44	N/A	5.35	0.01	67.48		1.37	0.53	2.90	79.06	11.58
Tanzania	0.17	0.00	1.37	0.00	0.06	1.06	0.05	0.63	0.02	14.31	0.11		0.91	0.07	18.77	4.46
Zambia	0.01	0.16	3.56	0.13	0.00	1.49	0.02	0.03	0.50	11.01	0.03	0.46		1.42	18.82	7.81
Zimbabwe	0.20	2.51	0.66	0.17	0.00	2.47	0.09	1.01	0.74	29.34	0.01	0.26	3.72		41.18	11.84

Addendum item: euro area countries (2006)

Intra-area exports in per cent of total exports	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain
	53	64	31	50	41	34	42	43	71	62	61	59

Sources: UN Comtrade Statistics and IMF Direction of Trade Statistics.

Note: The data pertain to the latest year for which such data are available for each country - - *i.e.,* either 2004, 2005, or 2006.

Table 5: SADC Countries: Status of Macroeconomic Convergence

Country	Inflation Rate		Budget Deficit (-) surplus (+) as percentage of GDP		Public debt as percentage of GDP		Current account balance as percentage of GDP		Real Growth rate	
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006
Angola	18.5	12.2	7.3	-3.4	37.8	25.5	15.7	16.4	20.6	19.5
Botswana	8.6	11.6	1.2	8.1	4.4	3.8	15.7	20.9	9.2	-0.8
Congo, Dem. Rep.	21.3	18.2	-1.2	-0.7	158.7	133.4	-4.4	-7.5	6.5	5.1
Lesotho	3.5	6.0	2.0	13.3	50.3	49.9	-6.8	4.3	4.0	6.2
Madagascar	18.4	10.8	-10.3	-10.3	87.0	30.0	-10.9	-8.8	4.6	4.9
Malawi	15.4	13.9	-1.2	-1.5	105.4	28.5	-34.0	-31.2	2.3	8.5
Mauritius	4.9	8.9	-5.0	-5.3	58.3	57.9	-5.2	-9.5	2.2	5.0
Mozambique [1]	6.4	13.2	-3.5	-1.0	70.0	47.7	-11.09	-8.0	6.2	8.5
Namibia	2.2	5.1	-1.1	2.1	33.6	31.4	7.1	18.3	4.2	4.6
South Africa	3.9	4.6	-0.5	0.3	36.6	33.3	-4.0	-6.5	5.1	5.0
Swaziland	4.8	5.3	-1.8	-2.1	16.9	17.1	0.26	1.8	2.3	2.8
Tanzania	4.4	6.2	5.0	-5.5	63.8	49.97	-6.9	-10.9	6.7	6.2
Zambia	15.9	8.2	-2.6	-1.9	64.5	25.8	-11.8	-1.2	5.2	5.8
Zimbabwe	585.8	1281.8	-3.5	-5.5	110.2	76.2	-12.0	-7.9	-3.8	-1.8
Average, SADC excl Zimbabwe	9.9	9.6	-0.9	-0.6	60.6	41.1	-4.3	-1.7	6.1	6.3
Average, All SADC	**51.0**	**100.4**	**-1.1**	**-1.0**	**64.1**	**43.6**	**-4.9**	**-2.1**	**5.4**	**5.7**
Convergence criteria (2004-2008)	**Single digit Inflation rate by 2008**		**Deficit smaller than 5 per cent by 2008**		**Less than 60 per cent of GDP**		**Deficit not wider than 9 per cent of GDP**		**Not less than 7 per cent**	

[1] **2006 GDP is estimated**

Source: Committee of Central Bank Governors of SADC (2007)

Table 6: Evaluating Monetary Union in South Africa					
Study	**Sample Period**	**Number of Countries**	**OCA Approach**	**Empirical Approach**	**Main findings**
Bayoumi-Ostry (1997)	1963-89	11 SADC; 4 CMA plus Botswana, Angola, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe	Traditional	1. Estimated second-order autoregressions of per-capita growth. 2. Used residuals from autoregressions of per capita growth to calculate correlations of shocks across countries.	Correlations tend to be positive but small and insignificant, while the few positive and significant shocks do not involve continuous states.
Jenkins-Thomas (1997)	1960-90	12 SADC	Traditional	Estimated three measures of convergence of real per capita incomes based on PPP exchange rates: (1) changes in the dispersion of cross-sectional income levels; (2) regressions of growth rates on initial levels of per-capita GDP; (3) probability-based approach	Found no evidence of per-capita-income convergence among the 12 countries, suggesting that they are not suitable for monetary integration. Found that Botswana, Lesotho, Namibia, South Africa, and Swaziland are suitable for monetary integration.
Guillaume-Stasavage (2000)	1968-93	5; CMA plus Botswana	Endogenous (credibility)	Compared political indicators of checks balances in government, and indicators of economic and political shocks (*e.g.*, number of cabinet changes, changes in terms of trade).	Obtained mixed results. Low-party fractionalization and low levels of constraint on executive branches indicated low cost of breaking rules - - unfavourable for monetary union. Exits from regional agreements have been rare - - favourable for monetary union.
Grandes (2003)	1990-2000	5; CMA plus Botswana	Traditional	Tested for cointegration among real exchange rates.	Significant co-movement in real exchange rates indicated the existence of common trends so that underlying country-specific shocks and/or policy changes do not lead to diverging relative prices.
Carrere (2004)	1962-96	12 SADC	Endogenous (trade creation)	Used gravity model, with bilateral nominal exchange-rate volatility employed as proxy for common-currency effect.	Obtained inconclusive results.
Dutu-Sparks (2004)	1995-98	14 SADC	Traditional	Inspection of the degree of convergence of nominal bilateral exchange rates against the South African rand, inflation rates, and external debt-to-GDP ratios; also considered foreign aid and trade openness.	The four-member CMA could gradually be expanded to include Botswana, Mauritius, and Seychelles.

Study	Sample Period	Number of Countries	OCA Approach	Empirical Approach	Main findings
			Table 6, continued (p. 2)		
Khamfula-Huizinga (2004)	1980-98	10 SADC; 4 CMA plus Botswana, Malawi, Mauritius, Tanzania, Zambia, Zimbabwe	Traditional	Used residuals from autoregressive model to estimated unanticipated component of bilateral real exchange rates against South African rand. GARCH model used to consider the share of real-exchange rate variation explained by divergent macro policies.	The 10 countries considered not suited for monetary union. An 8-member currency union, excluding Tanzania and Zambia, was judged suitable.
Masson-Pattillo (2005)	1987-2000	13 SADC (excluding Angola, Madagascar; including Seychelles)	Traditional Endogenous (trade creation, credibility)	1. Considered correlations of changes in terms of trade between country pairs. 2. Used calibrated model to simulate benefits and costs of monetary union. 3. Estimated gravity model to assess trade-creation effects.	Generally supportive of gradual, selective path to monetary union.
Yehoue (2005)	1980-2000	53, including 14 SADC plus Seychelles	Traditional	1. Used model based on trade-network external ties under which currency blocks are formed endogenously. 2. Computed measures of lack of co-movement in output levels.	Generally supportive of gradual path to common currency. Trade-network model supported monetary union of 23 countries, including all 14 SADC countries; Estimates based on lack of output co-movements supported 9-member SADC monetary union.
Buigut (2006)	Data averaged over various sub-periods, 1990-2003, depending on availability	14 SADC 6 other eastern African countries	Traditional	Applied cluster analysis to (1) correlations of demand and supply shocks, (2) trade intensity, (3) debt service ratio, (4) public debt ratio, (5) tax revenue ratio, (6) inflation rate.	Optimum cluster supported monetary union comprised of Botswana, Namibia, Seychelles, South Africa, and Swaziland.
Masson (2006)	1995-2000	14 SADC	Endogenous	Extended Masson-Pattillo calibration model to include endogenous trade-creation effects.	Under symmetric monetary union, costs of union exceeded benefits for 4 CMA countries. Most other countries were net gainers.
Buigut-Valev (2006)	1970-2002	21; 14 SADC; 7 other eastern African countries	Traditional	Studied correlation of demand and supply shocks. Shocks were decomposed using Blanchard-Quah technique.	Correlations suggest monetary union of the 4 CMA countries plus Botswana, Mozambique, and Zambia.

Study	Sample Period	Number of Countries	OCA Approach	Empirical Approach	Main findings
				Table 6, continued (p.3)	
Wang, Masha, Shirono, Harris (2006)	1980-2005	5; CMA plus Botswana	Traditional	Used Bayoumi-Ostry (1997) approach to extract shocks from per capita GDP. Calculated correlations of the shocks.	Shocks were found to be asymmetric (4 of 6 correlations were negative).
Jefferis (2007)	1990-2002	13 SADC (excluding Madagascar)	Traditional	Examined correlation of bilateral exchange-rate changes against the South African rand.	Based on bilateral exchange-rate changes, as well as inflation and interest-rate differentials against South Africa, identified a "convergence group" of countries comprised of Botswana, Lesotho, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania.
Karras (2007)	1960-2000 (IFS) 1980-2000 (Penn World Tables)	9 SADC (excluding Angola, Botswana, Madagascar, Namibia, Swaziland; including Seychelles)	Traditional	Extracted cyclical movements of both PPP-adjusted GDP and GDP valued at market exchange rates using filters. Examined cyclical correlations.	Correlations suggest monetary union of Malawi, Mozambique, South Africa, Zambia, and Zimbabwe.

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