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The benefits and costs of monetary union in southern Africa: A critical survey of 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 such a currency. 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 relatively small group of countries, typically including South Africa, satisfies the criteria necessary for monetary unification. The literature also suggests that, in a monetary union comprising 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 benefit 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 is known about the consequences of monetary unification and critically to review the expanding literature on the desirability and feasibility of a 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 towards increased solidarity in Africa more generally (Cobham and Robson, 1994:286; Masson and Pattillo, 2004:10)[2]. An 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 Africa (Masson and Pattillo, 2005:34; Jefferis, 2007:83)[4]. Third, 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 favourable after a country has joined a currency union

[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 organisation 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 (2007:93) 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 (2005:34 – 35).

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

than before; therefore, the creation of a monetary union can itself create conditions that are favourable for the well-functioning of the union (De Grauwe, 2007:27).

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 (under which economic structures are assumed to remain unaltered following entry into a monetary union) that has been used to assess the benefits and costs of a common currency, and the endogenous approach (under which economic structures are assumed to change following entry into monetary union) dealing with currency-area participation, respectively. 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 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.

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 (see 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 the following: (1) A monetary union, involving irrevocably fixed exchange

[5] In recent years, there have been several changes in the composition of SADC membership. Seychelles had been a member but withdrew from the organisation 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.

rates among the participating currencies, co-ordination 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, 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]. 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 a 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 foregone seigniorage[7]. With the other CMA currencies pegged to 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].

Most of the other SADC countries have exchange-rate arrangements that are classified independently (i.e. freely) floating or managed floating (see Table 1)[9]. There are two exceptions: Botswana, the currency (the pula) of which is pegged to a basket comprising (with unannounced weights) 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 (see Table 1).

[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.

[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 South African Reserve Bank adopted a formal inflation-targeting framework.

[9] 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 (see 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 industrialised and diversified while most of the other economies are small and undiversified, with a dependence on a narrow range of commodity exports (see 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, 2005:37). 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 (see Table 4). 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 centres; 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 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 (see 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 2018. In this regard, the central bank governors of the organisation laid

down a strategy for monetary union similar to the approach adopted by the European monetary union. The approach is based on two principles (De Grauwe, 2007:143). First, the transition towards monetary union should be a *gradual* one, extending over many years. Specifically, at their meeting in Tanzania in 2007, SADC governors proposed the following framework for SADC integration: (1) A free trade area (absence of tariffs on intra-SADC trade) by 2008; (2) a customs union (common tariffs on imports from non-members by 2010; (3) a common market (customs union with free movements of the factors of production) by 2015; (4) monetary union (irrevocably fixed exchange rates and co-ordination of monetary policies) by 2016; and (5) a single currency and a regional central bank by 2018 (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 [10]: (1) A 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 7,600 per cent in the year to July 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. Three countries (Malawi, Mauritius, and Tanzania) did not achieve the current-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.

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 an 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 an endeavour 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)[11].

[10] Committee of Central Bank Governors of SADC (June 2007).

[11] 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.

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* 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 to maintain both internal and external balances. Subsequently, Mundell (1961), in originating the concept of an OCA, argued that factor (especially labour) mobility is a partial substitute for wage-price flexibility as such mobility can moderate the pressure to alter real factor prices in response to disturbances affecting demand and supply.[12] 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 as, 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) McKinnon's (1963) argument that, everything else equal, relatively open economies are better candidates for monetary unions than relatively closed economies as, in the former, exchange rate changes are not likely to have significant effects on competitiveness, and (2) 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 a 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. Additionally, the adoption of a single currency eliminates the need of firms to maintain staff to look after exchange rates in the area.

Economies of scale to be derived from the move to monetary integration include those associated with the following: 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

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

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 in the area; the possible *economising* of reserves since, if members are structurally diverse, 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, 1987:140; Tavlas, 1993). The main costs of a monetary union are those attributable to the inability of the authorities of the individual countries to use country-specific monetary policies and the exchange rate as instruments of macroeconomic adjustment. The gains and losses arising from the establishment of a 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 they would be if the economies possess large non-traded goods sectors.

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, reliable data on some of the key OCA criteria, such as the degree of labour mobility among countries and the degrees of wage and price flexibility, are often difficult to obtain[13]. Therefore, much of the empirical literature dealing with the traditional criteria (which assumes that a country's structural characteristics remain unaltered following entry into a 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-

[13] With regard to labour mobility, Boughton (1993:277) 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

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). Recent work on a monetary union in southern Africa has followed the direction of the literature, focusing on these three areas.

3.2 Empirical approaches

In what follows, the empirical methodologies of ten studies dealing with monetary unification in southern Africa are considered, and the main thrust of the empirical results is presented and analysed. A summary of the basic components and the main findings of recent studies is provided in Table 6[14]. Studies differ in terms of the 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 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 others 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 or of the terms of trade (five studies); and (4) a (single) study that

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labour. Houssa (2007) provided data showing that there has been considerable labour migration among western African countries.

[14] Table 6 provides information on 14 studies as follows. (1) Authors of nine 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) assessed the degree of economic convergence among 12 SADC countries, under the (plausible) presumption that real economic convergence is necessary for co-ordination 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.

considers the degree of trade integration. 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 primarily 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[15]. In other words, the approaches may not fully capture the impact of shocks as part of the time profile of de-trended growth is likely to reflect the policy responses of the authorities.

2. Correlations of output shocks. To deal with the foregoing limitation, some authors used econometric methods to extract (i.e., separate) the underlying disturbances from real output. Bayoumi and Ostry (1997), Yehoue (2005), and Wang, Masha, Shirono, and Harris (hereafter Wang *et al*.) (2006) employed a three-step autoregressive estimation procedure[16]. In the first step, the growth of per capita GDP

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

[16] In fact, Wang *et al*. 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.

was regressed on its own first and second lags[17]. 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 to 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[18]. 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 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 a monetary union.

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

[18] 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.

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 a 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 analysed. 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 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 in the groups according the similarity of behavior of the variables considered.

3. Correlations of exchange rates/terms-of-trade. 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.

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[19]. (3) They used the squares of these unanticipated residuals as measures of underlying shocks. Khamfula and Huizinga (2004:702) characterised the monthly and quarterly residuals as the "short-run and long-run cases", respectively, a characterisation discussed below.

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 countries A and 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 have formed a monetary union, country C's bilateral trade share with that union (*i.e.*, countries A and B combined) 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

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

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 [20]. In addition, Karras did *not* include Botswana and the three CMA countries (*i.e.,* Lesotho, Namibia, 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 Zimbabwe – indicating (according to Karras) that these three countries comprise an OCA with South Africa[21].

Studies that reported correlations of shocks to output growth based on autoregressions also do not provide more than weak support for a monetary union.

[20] 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.

[21] 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.

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, his 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 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 a monetary union (in that the results indicated that supply shocks 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 a 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 a 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 a 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, Khamfula and Huizinga (2004) obtained results supporting a five-member monetary union. As noted, Khamfula 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 summarise 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 comprising a relatively small

group of countries, typically including South Africa, sometimes with other CMA countries and/or Botswana. Two main factors help to 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[22]. 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 in southern Africa are the studies by Yehoue (2005) and Jefferis (2007). 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[23]. 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. 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 comprised a "convergence group": Botswana, Lesotho, Mauritius, Mozambique, Namibia, South Africa, Swaziland, and Tanzania.

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

The findings by Yehoue (2005) 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[24]. 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) Jefferis (2007) did not provide a formal analysis of the sets of data that he considered. His inference of an eight-member "convergence club" appears to be based on a casual inspection of the data[25].

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*)[26]. 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

[24] Yehoue (2005:9) 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.
[25] The author did not define what he meant by a "convergence club".
[26] 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.

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, 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. 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)[27]. 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 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[28].

A major benefit ascribed to monetary unions in the more recent literature is the credibility gain derived from the elimination of the inflation-bias problem of 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 monetise budget deficits and debt (Alesina and Barro, 2001:382). This argument has often been used in support of currency boards or dollarisation for

[27] 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).

[28] 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).

economies that have had histories of relatively high inflation associated with profligate macroeconomic policies (*e.g.,* Barro, 1999; Hausmann, 1999)[29]. If agents in the goods, labour, 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).

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 favourable for monetary unification.[30] 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, 2007:52).

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

[29] 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).

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

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, 2005:54). Dummy variables are included to capture the possible effects of common features of the economies, including the following: Membership in a free-trade area or currency union and a common language, border and/or coloniser, and so on. The gravity equation is typically specified in logarithms, so that (excluding time subscripts):

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

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

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 coloniser, common language, common border)[31]. 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

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

with the currency-union dummy than without it, 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, 2003:227). 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 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 the following: 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 maximised 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 assumed that countries with higher per capita incomes could generally afford to offer more government services, as both revenue and spending rose in tandem, and 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 towards what the authors judged to be less crucial areas.

Masson and Pattillo (2005) performed two simulations to analyse 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 (2005:176) 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[32]; 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[33]. As was the case in the study by Masson and Patillo (2005), Masson's (2006) findings support a monetary 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 fractionalisation 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 fractionalisation 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 fractionalisation 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

[32] Masson and Pattillo (2005) did not include Mauritius in their sample of 13 SADC countries.

[33] 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.

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 fractionalisation and/or relatively-strong executive branches are likely to be better candidates for monetary unions than countries with high levels of fractionalisation 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.[34] 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 data on the above data, Guillaume and Stasavage reached a favourable assessment concerning the effects of monetary union[35]. 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 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.

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 comprising 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

[34] 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.

[35] 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.

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.

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.

(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 a low 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 would those economies if they retained separate currencies because the common central bank would internalise 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 a 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 South African economy within its region and the credibility of the monetary policy of the South African Reserve Bank[36].

[36] 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).

(8) The above factors point to the desirability of a selective and gradual approach to monetary unification in southern Africa, centred 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[37].

With the introduction of a common currency among SADC countries scheduled for 2018, there is clearly a need of further analysis of the benefits and costs of a monetary union in the SADC region. In light of the relatively few studies dealing with the endogeneity of the OCA criteria, one suggested direction for further research is to focus on the possible trade-creation effects and credibility aspects, including the form of a regional SADC central bank, of a SADC monetary union. 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 whether the creation of a SADC monetary union might itself create the conditions necessary for a well-functioning union.

[37] 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.

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Appendix

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

Country	GDP (constant 2000 of US$, millions)	Percent of Total SADC GDP	GDP (current US$, millions)	GDP per capita (constant 2000 US$)	Average GDP per capita growth 2001--2005	Trade (exports plus imports in per cent of GDP)	Population (millions)
Angola	17593	7.3	20108	990	6.2	138.1	16.4
Botswana	6835	2.8	10146	3818	4.0	74.7	1.8
Congo, Dem. Rep.	5611	2.3	7782	93	1.0	40.9	59.3
Lesotho	1049	0.4	1988	548	2.2	125.5	1.8
Madagascar	4146	1.7	4364	239	-0.5	74.9	19.1
Malawi	2004	0.8	2001	168	0.0	59.0	13.2
Mauritius	5772	2.4	6694	4426	3.5	104.6	1.3
Mozambique	5895	2.4	5548	285	6.5	62.1	20.1
Namibia	4165	1.7	7589	1966	1.8	84.2	2.1
South Africa	162267	67.4	237216	3458	2.8	52.7	47.4
Swaziland	1579	0.7	2598	1365	0.6	176.0	1.1
Tanzania	13417	5.6	10851	337	4.6	45.6	39.5
Zambia	4254	1.8	5389	371	2.5	51.2	11.9
Zimbabwe	6230	2.6	17750	479	-7.8	45.8	13.1

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 per cent change) 2002—2006: 5 years
GDP per capita (constant 2000 US$); latest year reported is 2005
Average GDP per capita growth (annual per cent change) 2001--2005
Trade (per cent of GDP): latest reported year 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 share of total exports (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 Sourth 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	0.72	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.
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.

Table 6, continued (p. 2)					
Study	**Sample period**	**Number of countries**	**OCA approach**	**Empirical approach**	**Main findings**
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.
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).

Table 6, continued (p.3)					
Study	**Sample period**	**Number of countries**	**OCA approach**	**Empirical approach**	**Main findings**
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.