

**The Determinants Of Exchange Rate Flexibility And The
Theory Of Optimum Currency Areas: An Application To
SADC.**

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ABSTRACT

This study has its foundation on a model developed by Holden, Holden and Suss (1979). The model is on the determinants of the flexibility of an exchange rate. These determinants are: the openness of an economy; the level of economic development; the diversification of the external sector; geographical concentration of trade; the mobility of capital and the inflation differential.

In the present study, the model by Holden, et al is adapted in order to determine whether SADC forms an optimum currency area or not. SADC has a number of objectives which it aims to achieve. One of these objectives is the formation of a monetary union in the future. This is the widest objective for SADC and the path towards achieving this is the establishment of a Trade Protocol that aims to form a Free Trade Area in the region.

A number of criteria have to be assessed in order to determine whether SADC does form an optimum criteria or not. The Holden et. al model forms the basis for this assessment. The model reveals that SADC does not form an optimum currency area. SADC has not yet converged on the criteria for a monetary union.

DECLARATION

I declare that this dissertation is my own work, except where acknowledged in the text, and has not been submitted for a degree in any other university.

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1. Introduction

1.1 Background

SADC has as one of its wider objectives the formation of a monetary union in future. This will have major consequences for the relationship between SADC members regarding trade, and policy measures taken in the region. SADC is currently undergoing negotiations over a Trade Protocol that aims to form a Free Trade Area in the region. Whether a monetary union in SADC will succeed or not is another question and this question can be answered by looking at the criteria for forming such regions and then assessing whether SADC conforms to the criteria or not.

Globalisation and integration, as in forming regions and opening up trade, have brought about concerns on the type of exchange rate policy that will be suitable at the country level and the regional level. Countries and regions have often been pushed towards choosing between flexible and fixed exchange types of exchange rate policy since these are the most frequently pronounced types of exchange rate policy in economic literature. Many regions contemplate pegging their currencies against another currency or a basket of currencies. Some of those regions are in Africa and they include the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Development Community (SADC) as mentioned above. COMESA has as one of its objectives forming a monetary union, as with SADC.

The path to monetary union formation has been paved by the European Monetary Union¹, which saw a successful move into the currency union. Other regions may be encouraged, therefore, to follow suit. However, Frenkel (1999) argues that no single currency regime is right for all countries at all

¹ The European Monetary Union (EMU) comprises 11 European countries, these are: Austria, Belgium, Netherlands, Finland, France, Germany, Ireland, Italy, Luxembourg, Portugal and Spain.

times. This is, indeed, the conventional wisdom on currency regimes. Countries' characteristics and circumstances are the ones that should determine the type of exchange rate policy that they should adopt. Regions should establish their state of being against the suitable criteria, which determine the success of a currency union.

The theory on optimum currency areas has brought some light into the characteristics of areas in which a single currency regime is optimal as Mundell (1961) suggests (cited in Mckinnon, 1996). Mckinnon (1996) develops the idea of optimality by discussing the openness of the economy. He regards openness as one of the factors that determine the optimum size of the domain of a single currency. Openness is defined as the ratio of tradable to nontradable goods. Mckinnon (1996) suggests that if the optimum currency area is sufficiently large such that the non-tradables are large, pegging the value of the domestic currency to the nontradable goods is sufficient to give money liquidity value in the eyes of the residents of the area, but not in the eyes of potential investors. Mckinnon (1996) however suggests that investor perceptions should not override the goals of internal capital accumulation and full employment, since these are much more important than the external capital movements. Flexible external exchange rates would be optimal only when the trade patterns are unstable to such an extent that relative price changes in tradables and non-tradables are needed to maintain external balance and full employment.

On the other hand, if the ratio of tradables to non-tradables is large, i.e. implying that the optimum currency area is small, and the prices of the tradables are fixed to the outside currency, then it is optimal for the area to peg against the outside currency. Resultantly, a number of small areas that trade extensively with each other would peg with each other (Mckinnon, 1996, 246). Mckinnon also suggests that capital movements among small areas are necessary to promote efficient economic specialisation and

growth more so than in large, economically developed areas. Therefore, a common currency would facilitate contractual arrangements for the movement of capital.

The choice between flexible and a fixed exchange rate policy is a choice between two extreme types of exchange rates. There are a number of intermediate types of exchange rate regimes that tend to be ignored by economic literature. Frenkel (1999) identifies the following 9 types of exchange rate regimes from the most rigid, to the most flexible exchange rate regime:

- 1.1.1 **A currency union.** In a currency union, the same currency circulates among members. Examples of a currency union are some East Caribbean Islands which use the dollar; and the European Economic and Monetary Union (EMU). Members of a currency union co-ordinate their exchange rate policy, monetary policy and fiscal policy.
- 1.1.2 **A currency board.** A currency board is a monetary institution that issues currency only that is fully backed by foreign assets (Frenkel 1999, 14). What distinguishes a currency board from a currency union is that (a) an exchange rate is not fixed by policy, but by law; (b) a reserve requirement stipulating that each dollar's worth of domestic currency is backed by a dollar's worth of foreign reserves; and (c) a self-correcting balance of payments mechanism, where a payments deficit automatically contracts the money supply, resulting in a contraction of spending.
- 1.1.3 **A "truly fixed" exchange rate.** This is where countries fix their currencies to a strong currency. For an example, members of the West African and Central African currency unions fix to the French Franc and many other countries fix to the US dollar for example the Brazilian Peso.

- 1.1.4 **An adjustment peg.** This refers to the Bretton Woods regime where currencies were fixed but adjustable. Countries with fixed exchange rates periodically realign them.
- 1.1.5 **A crawling peg.** Highly inflated countries usually use the crawling peg. The peg can be set regularly as often as weekly in a series of mini devaluations. One strategy is to set the crawl lower than the forecasted rate of inflation in order to help work the country out of its inflation cycle. Another strategy is to index the exchange rate to the price level thereby giving up the fight against inflation and ensuring a steady real exchange rate.
- 1.1.6 **A basket peg.** The exchange rate is fixed in terms of a weighted basket of foreign currencies instead of one major currency. This type of exchange rate regime suits countries with trade patterns that are highly diversified geographically.
- 1.1.7 **A target zone or band.** In this type of exchange rate regime, authorities intervene when the exchange rate hits pre-announced margins on either side of a central parity. The European Monetary System (EMS) exchange rate mechanism (ERM) is an example from 1979, until the EMU was established in 1999.
- 1.1.8 **A managed float (or dirty float).** The Central Bank stands ready to intervene in the foreign exchange market without defending any particular parity. A currency is bought when it rises, i.e. is depreciating, and sold when it falls, i.e. is appreciating.
- 1.1.9 **A free float.** The Central Bank does not intervene in the foreign exchange market. Supply and demand for the currency is allowed to clear on its own. The country that is closest to a free float is the United States.

The above clearly indicate that exchange rate regimes are not limited to flexible and fixed exchange rates. There is a host of intermediate exchange rate regimes. Different exchange rate regimes would suit countries and regions differently depending on the countries' characteristics and

circumstances. A number of currencies have been tied together against other currencies as joint floats and thus forming exchange rate unions. An exchange rate union is not a monetary union, but members of this union maintain fixed rates between themselves and retain their central bank and control over monetary policy. This union is also called a "pseudo exchange rate union" (Marston, 1984 and Corden, 1972).

This study concentrates on SADC. The following section outlines the main aims of this study.

1.2 The aim of the study

The question that this project aims to answer is: Do the members of the Southern African Development Community (SADC) form an optimum currency area in terms of exchange rate arrangements between its members and the country characteristics that determine such areas? An optimum currency area is defined as a region for which it is optimal to have a single currency and a single monetary policy. Mckinnon (1996) describes the word "optimal" as a single currency area within which monetary-fiscal policy and flexible external exchange rates can be used to give the best resolution of three objectives: 1) maintaining full employment; 2) maintaining balanced international payments and; 3) maintaining a stable internal average price level. The country characteristics are the most important ingredients in assessing eligibility for a monetary union. There is consensus in economic integration theory that wage and price flexibility, capital mobility between sectors of the economies in a region and openness of the economies in the region all contribute positively to the co-ordination of exchange rate policy. It is upon similar criteria taken from economic literature that SADC will be assessed for currency union eligibility.

Theory on regional integration suggests that countries

- whose external sector is highly diversified;

- whose economies are highly open;
- whose inflation rates do not diverge a lot from their trading partners;
- whose capital is highly mobile; and
- whose level of economic development is high, are very good candidates for a monetary (or currency) union.

A model developed by Holden, Holden and Suss (1979) suggests that the above factors significantly determine the fixation of an exchange rate. SADC currently contemplates becoming a Free Trade Area. This will have major effects on the level of openness in the region, the diversification of the external sector, the development of the economy, etc. as in the factors stated above.

1.3 Research methodology

The method of research employed in this study involves:

- 1.3.1 analysing the literature on optimum currency areas. The aim is to give an insight on the issues involved in this research. The factors that determine the success of a monetary union are evaluated. Also, the model developed by Holden et. al (1979) is used to support the theory on the determinants of forming and optimum currency area. The model is used to determine if SADC forms an optimum currency area. Details about the model are given in chapter 4.
- 1.3.2 Collecting data in order to run the above model. The data is extracted from the following main sources:
 - 1.3.2.1 The International Financial Statistics
 - 1.3.2.2 The Direction of Trade Statistics
 - 1.3.2.3 The United Nations yearbook
 - 1.3.2.4 The World Bank Development Indicators

A detailed discussion of these sources and the type of data that is extracted from them is given in the fourth chapter of this research.

What follows is a brief historical account of SADC, i.e. when the region was formed, why it was formed, its organisational structure and its objectives. It is against this background that one can proceed with assessing whether SADC forms an optimum currency area or not in terms of the relevant criteria arising out of the theory for the co-ordination of exchange rate policy.

✓ 1.4 A Historical background on SADC.

SADC was established in August 17, 1992 in Windhoek, Namibia by signing the Declaration and Treaty. The treaty replaced the Southern African Co-ordination Conference (SADCC), an organisation which was formed in Lusaka, Zambia on April, 1980, following the adoption of the Lusaka Declaration-Southern Africa which aimed at economic liberation by nine members which were Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe (SADC sectorial briefs 1999.)

1.4.1 Rationale for SADC

SADC was formed out of the recognition by Southern African countries of the need for close co-operation among the governments and people of Southern Africa. The driving force was the state of backwardness in the Southern African countries which had developed in the 1960s when the struggle for political independence in the region gained momentum, leading to a need for collective action in the region (The SADC handbook, 1999). Southern African countries ultimately achieved political independence against a backdrop of mass poverty and economic backwardness (The SADC handbook, 1999). The need to work collectively was initiated through bilateral co-operation and through Front-line State groupings. A meeting in May 1979 by the Foreign

Ministers of the Front-line States² in Gaborone, Botswana, led to the Arusha Conference in July 1979 which brought together for the first time, government³ and international agency representatives from all parts of the world to discuss regional co-operation in Southern Africa. This Conference led to the landmark Lusaka Summit, held in the Zambian capital in April 1980, the day on which SADCC was formed. SADCC committed itself “to pursue policies aimed at economic liberation and integrated development of our national economies” (The SADC handbook, 1999). SADCC did not aim to create a free-trade area or a common market. The Front-Line States began negotiations on establishing SADCC in 1978. SADCC aimed at “promoting regional co-operation and integration to accelerate economic growth in order to improve living conditions of the people of Southern Africa and to reduce their external economic dependence, particularly that with South Africa”(The SADC handbook, 1999).

The oil price shocks of the 1970s, the world economic recession in the 1980's and drought affected most SADCC member countries and led to balance of payments difficulties. SADCC was formed because of the anticipation that SADCC would help alleviate balance of payments problems by “opening up the regional markets for exports and imports that would use national currencies and release needed foreign exchange for imports of machinery and technology for further development” (Kisanga, 1991, 135). The following tables indicate the vulnerability of SADCC at the time.

² Front-Line States are Angola, Botswana, Mozambique, Tanzania, Zambia and Zimbabwe. Botswana, Tanzania and Zambia were the first Front-Line States formed in 1974. Mozambique and Angola joined in 1975 and 1976 respectively, following the overthrow of the Portuguese colonial rule. Zimbabwe joined in 1980 following its independence. The Front-Line States acted as : “a caucus on Southern African affairs both inside and outside the continent” (Kisanga, 1991, 175).

³ In the meeting held in 1979, Lesotho, Malawi and Swaziland, who were the majority-ruled states in Southern Africa, were also invited to participate in the negotiations for the formation of SADC (Kisanga, 1991, 129).

Table 1.1: Basic data on SADCC countries, 1988

Country	Population (millions)	Area (‘000) sq. km	GNP <u>a</u> \$ mn.	\$ per capita	Export s of goods and service s \$mn.	Imports of goods and service s \$mn.
Angola	9.4	1,247	10,430 <u>b</u>	1,136 <u>b</u>	1,737	1,324
Botswana	1.2	582	1,204	1,034	1,865	1,529
Lesotho	1.7	30	690	412	742	566
Malawi	8.2	118	1,320	162	334	516
Mozambique	15.0	802	1,550	104	179	1,006
Swaziland	0.7	17	580	787	667	558
Tanzania	24.7	945	3,780	153	499	1,479
Zambia	7.5	753	2,160	289	1,244	1,452
Zimbabwe	9.3	390	6,070	656	1,803	1,851
Total	77.7	4884	17,354 <u>c</u>	254 <u>c</u>	9,070	10,279

Notes: a GND at current prices; b 1987; c excludes Angola.

Source: Kisanga, 1991, 136

The table indicates, amongst other things, that by 1988, imports of goods and services had exceeded exports in most of the SADCC member countries.

Table 1.2: Growth of manufacturing value added, selected period and years in SADCC states (at constant 1975 prices)

COUNTRY	TOTAL MVA GROWTH			PER CAPITA MVA VALUE		
	RATES (%)			\$		
	1963-73	1973-81	1968-73	1973-81	1973	1981
Angola	10.2	-10.0	8.3	-12.2	51	15
Botswana	6.2	17.3	3.9	14.0	24	88
Lesotho	34.3	3.8	31.4	1.4	8	9
Malawi	14.9	6.4	11.7	3.1	15	18
Mozambique	13.6	-6.6	11.1	-9.0	48	23
Swaziland	18.1	11.5	15.6	8.5	91	213
Tanzania	10.2	-2.8	7.1	-5.7	18	9
Zambia	12.7	-0.7	9.5	-3.8	86	67
Zimbabwe	10.9	2.8	7.0	-0.6	138	145

Source: Kisanga, 1991, 137

As indicated by the table, the growth in manufacturing value added in SADCC fell from 1963 to 1981. This indicates that there was less manufacturing and the members were mainly primary good producers.

The above-mentioned poor record of performance in SADCC regarding more imports than exports and less foreign exchange, debt service rose. Table 1.3 and appendix D, indicate the levels of the external public debt and debt service in SADCC between 1970 and 1988. Then Appendix E shows total debt service as a percentage of GNP.

Table 1.3: External public debt in selected years and manufacturing sector's share.

COUNTRY	EXTERNAL PUBLIC AND PUBLICITY GUARANTEED DEBT OUTSTANDING AND DISBURSED (US \$ MILLIONS)			MANUFACTURING SECTOR'S SHARE OF TOTAL DEBT IN 1983 (%)	
	1970	1982	1983	1983	1983
Angola	-	558.0	-	-	-
Botswana	14.7	209.0	383.9	-	-
Lesotho	8.1	138.6	222.3	3.3	1
Malawi	122.4	691.8	860.3	0.6	0
Mozambique	-	585.0	-	-	-
Swaziland	37.0	177.7	245.4	36.7	15
Tanzania	248.5	1,631.6	3,234.5	465.1	14
Zambia	622.5	2,380.6	3,210.4	321.0	10
Zimbabwe	232.7	1,220.8	2,166.6	74.6	3

Source: Kisanga, 1991, 148

SADCC countries had great demand for foreign currency to import industrial technology and meet its current debt servicing as a result of industrial development since the 1960's. SADCC countries borrowed to finance imports and their debt levels rose and the region was therefore vulnerable to pressures from the World Bank and the IMF to implement structural adjustment programmes for finance. The structural adjustment programmes involved, among others, deflationary policies and the devaluation of the currency (Kisanga, 1991, 135-149).

Initially SADC excluded South Africa and one of the objectives of SADC was to reduce dependence on South Africa. However, South Africa elected to join SADC in 1994 during its process of political transition. The South African government elected in April 1994 placed regional co-operation at the forefront of its foreign policy and was convinced that membership in SADC would benefit South Africa (Brummerhoff, 1998, 37).

SADC head quarters are situated in Gaborone, Botswana and each member state has the responsibility to co-ordinate a sector or sectors on behalf of others. Initially, the main objective of the regional group was to promote an improvement in transport and communication between members. Later, issues relating to trade, food security, energy and industry were introduced (Holden, 1998,6). Sectoral divisions amongst members are as follows:

✓ **Table 1.4 Sectoral responsibilities of SADC members**

COUNTRY	SECTOR
Angola	energy
Botswana	Agricultural research; livestock production and animal disease control
Lesotho	Water; environment and land management
Malawi	Inland fisheries; forestry and wildlife
Mauritius	Tourism
Mozambique	Culture and information; transport and communication
Namibia	Marine fisheries and Resources
South Africa	finance and investment and health
Swaziland	Human resources development
Tanzania	Industry and Trade
Zambia	Mining; employment and labour
Zimbabwe	Food, agriculture and natural resources; and crop protection

Source: The SADC handbook (1999).

Divisional responsibilities facilitate co-ordination and the ease in the movement of capital, labour, goods and services and technology between the members of SADC. This is one of SADC's main objectives as outlined later in this chapter.

Currently, member states in SADC are Angola, Botswana, the Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. New

membership to the regional group may be allowed by a unanimous decision of the SADC summit and upon acceding to the SADC treaty. The following section looks at the treaty governing SADC.

1.2.2 The treaty

The SADC treaty is a legally binding and all-encompassing framework by which member countries shall co-ordinate, harmonise and rationalise their policies and strategies for sustainable development in all areas of human behaviour (The SADC handbook, 1999). The Treaty commits members to the following principles: sovereign equality of member states; solidarity, peace and security; human rights; democracy and rule of law; equity; balance and mutual benefit. The treaty also commits members and their governments towards fully involving the people in the region, and non-governmental organisations in the process of regional integration (The SADC handbook, 1999). Members who fail to fulfil obligations assumed under the treaty shall be sanctioned against and the Summit will determine sanctions on a case by case basis. Without the treaty, it would be virtually difficult or impossible to achieve sustainable development in the region.

When countries integrate, it is important to have the structural responsibilities of different bodies clearly laid out. The distribution of these responsibilities among different bodies ensures adherence to the treaty and provides an organised way of carrying out the objectives of the region. The next section therefore covers the organisational structure of SADC and the division of responsibilities among the various levels.

1.4.3 How is SADC organised?

From policy making to administration, SADC is organised in the following manner:

SUMMIT
Council of Ministers
Sectoral Committees and Commissions
Standing Committee of Officials
National Contact Points
Sectoral Contact Points
Secretariat
Tribunal
Additional Institutions

The summit is the ultimate policy-making institution of SADC made up by heads of state. It is responsible for the overall policy direction and control of the regional group. The council is made up by ministers from each member state who are responsible for overseeing the functioning and development of SADC and ensuring that policies are properly implemented, such as, deciding upon sectoral areas of co-operation and the allocation of responsibility for carrying out these sectoral activities. The Council advises the Summit and approves SADC policies , strategies and work programs. A permanent secretary or an official of equivalent rank represents the Standing Committee of Officials from each member state. It acts as a technical advisory committee to the Council to whom it reports. National Contact Points are responsible for regular consultation with the briefings of relevant government institutions, the enterprise community and media on matters related to SADC. Sectoral Contact Points are all government ministries with line responsibilities for SADC sectors. They work closely with the Sector Co-ordinating Units in the preparation of sectoral policies and strategies, and formulation of project proposals. The secretariat is the principal executive institution of SADC and is responsible for strategic planning and management of SADC programs. The Tribunal ensures adherence to, and proper interpretation of the SADC Treaty and subsidiary instruments, and adjudicates disputes that are referred to it (The SADC handbook by the Secretariat, 1999).

This organisational structure ensures easier implementation of the objectives of the region as outlined in the following section.

1.4.4 SADC's objectives

SADC's objectives can be referred to as the challenges that the region faces. It is upon the achievement of these objectives that SADC can realise sustainable development as is the intention of the Treaty. Currently, SADC has the following objectives as stated in The SADC handbook:

- To achieve development and economic growth, alleviate poverty, enhance the standard and quality of life of the peoples of Southern Africa and support the socially disadvantaged through regional integration.
- To evolve common political values, systems and institutions.
- To promote and defend peace and security.
- To promote self-sustaining development on the basis of collective self-reliance, and the inter-dependence of member States.
- To achieve complementarity between national and regional strategies and programs.
- To promote and maximise productive employment and utilisation of resources of the region.
- To achieve sustainable utilisation of natural resources and effective protection of the environment.
- To strengthen and consolidate the long-standing historical, social and cultural affinities and links among the peoples of the region.

For the expected results to be realised in the region, the objectives must be implemented. The above objectives are the plan for SADC to shape up the foundation for the achievement of sustainable development in the region. In order for SADC to achieve the above objectives, it shall (The SADC handbook, 1999):

- Harmonise political and socio-economic policies and plans of member States.
- Mobilise the peoples of the region and their institutions to take initiatives to develop economic, social and cultural ties across the region, and to

participate fully in the implementation of the programs and projects of SADC.

- Create appropriate institutions and mechanisms for the mobilisation of requisite resources for the implementation of the programs and operations of SADC and its institutions.
- Develop policies aimed at the progressive elimination of obstacles to free movement of capital and labour, goods and services, and of the people of the region generally among member States.
- Promote the development of human resources.
- Promote the development, transfer and mastery of technology.
- Improve economic management and performance through regional co-operation.
- Promote the co-ordination and harmonisation of the international relations of member States.
- Secure international understanding, co-operation and support, mobilise the inflow of public and private resources into the region.
- Develop such other activities as member States may decide in furtherance of the objectives of SADC.

This is how SADC plans to improve the standards of living of the members of the region, thereby achieving sustainable development. This implies that SADC is not only concerned with achieving its objectives but is mainly concerned with sustaining the improvements in the levels of development of its members. The term 'sustainable development' is a very important term as it emphasises the implications of economic policy and activity on future generations (Reid, 1995).

SADC has recently extended its aims when the heads of states of the member countries signed the Trade Protocol in 1996. The protocol seeks to establish a single market in the region. The protocol sets a programme for the gradual reduction and elimination of tariffs in SADC leading to the

establishment of a free trade area⁴ in the region (Kalenga, 1999, 12). The protocol came into force in January 2000. Intra-regional trade is expected to rise from the current level of 22% because of the protocol (Madakufamba, 1999). A few years ago, intra-regional trade in SADC was 12% but then rose to 22%, its present rate. The SADC deputy executive Secretary expects intra-regional trade to rise to 35% by 2005 because of the protocol (Madakufamba, 1999). Therefore SADC is moving towards more co-operation and interaction between members.

SADC has set up targets for itself and these involve:

- Creating a Free Trade Area as stated earlier on. This was institutionalised when the heads of state of the member countries signed the Trade Protocol in August 1996,
- Setting up a regional rapid deployment peacekeeping force that will contain conflicts and clashes that occur between members of the region,
- Enabling the members to reap the benefits of cheap South African electricity by establishing the Southern African power pool,
- Establishing a regional development bank, and
- Establishing a regional parliament.

SADC does not necessarily stand alone as a regional group in Southern Africa. There are a number of other regional groups and different types of regional agreements between the Southern African countries. Most members of SADC are also members in these other regional groups. This may lead to spillover effects of SADC plans to these other regions. SADC, therefore, need not ignore the policies of these other regional groups. A deeper description on these regional groups, their inter-relationships and developments is given in chapter 2.

The theory underpinning this study is provided in Chapter 3 of this project where the implications of a monetary union; the criteria for formation of such

⁴ A free trade area is defined in chapter two with other forms of regional integration.

regional groups; the characteristics of countries which enter such regional groups; and the assessment of SADC based on this criteria is performed.

Chapter 4 gives an econometric model that is used in evaluating the determinants of exchange rate policy and in evaluating whether SADC countries form an optimum currency area or not. The background to the econometric study and the results of the study are then given. Chapter 5 concludes the study by highlighting the main findings of the study.

2. Regional groups in Southern Africa.

This chapter aims to give a brief overview of the types of regional groups that exist in Southern Africa and their development. What should be evident from this chapter is that SADC is one of a number of Southern African regional groups and that some members of SADC hold membership in these other regional groups. It is important to consider these other Southern African regional groups in the analysis of SADC because there may be spillover effects and potential conflicts with SADC policies to these other regions. These other regional groups are the Common Monetary Area (CMA), Southern African Customs Union (SACU), which involve only Southern African countries, then the Cross Border Initiative (CBI) and the Common Market For Eastern and Southern Africa (COMESA) which includes Southern African and East African countries. The existence of these regional groups highlights the existence of different types of economic integration in the global economic world between countries. Keet (1999) writes that

“In Africa, the strategic objective of re-grouping African countries and (re) integrating the continent was a fundamental reaction to the legacy of colonialism; to arbitrarily created, artificial, largely non-viable and distorted economies, characterised by pronounced under-development and deep external dependence. Regional groupings in Africa were conceived in the 1960's and 1970's as more rational economic units and formally endorsed in the 1980 Lagos Plan of Action. These putative regions would provide larger markets and economies of scale in investment and production, with combined or complementary resources, and would generally be more effective frameworks within which to correct disarticulated and ineffective economic structures.”

Regional groups in Africa are formed with the aim of improving the economic, social and political conditions of the African States through co-operation. Bela Balassa (1961) defines economic integration as a process and as a state of affairs. As a process, it encompasses measures established to

abolish discrimination between economic units that belong to different national states. As a state of affairs, it can be represented by the absence of various forms of discrimination between national economies. Countries that engage in economic integration choose to improve the level of economic co-operation and co-ordination between themselves and adopt a certain pattern of treatment for non-members.

2.1 Forms of economic integration.

The world has seen countries strengthening ties with their neighbours through regional groups. However, different forms of integration exist. Generally, the following six types of economic integration are identified by trade theory.

2.1.1 Preferential trade arrangements: This is the loosest form of economic integration. Preferential trade areas provide lower barriers on trade among participating nations than on trade with non-member nations (Salvatore, 1995, 299). Countries give special preference to each other in a region by dampening the trade barriers between themselves.

2.1.2 Free-trade areas: Member countries trade with each other in the absence of tariffs between themselves, but each country determines its own tariffs for non-members. Recent developments in SADC have been the negotiations for a free trade area in the region. Issues at the core of the negotiations include rules of origin, the customs co-operation system to be used in the region, and dispute management and support structures. These negotiations will occur at the end of March in Mauritius. The negotiations have to be finalised before the implementation of the EU free trade agreement with South Africa so that it would be easier for the EU to compensate SADC for the losses in revenue that would result from the EU-South Africa free trade agreement (The Mercury, 2000, Jan. 18). The rules of origin have become very important for SADC since most of the members in

the region hold multiple membership with other regions. The aim of looking closer at the rules of origin is to prevent an outsider from feeding goods into a region through a low external tariff partner in the region, resulting in that good competing unfairly with other goods produced in the region.

2.1.3 A customs union: member countries suppress discrimination among each other on commodity movements and adopt a common tariff towards non-members. The Southern African Customs Union (SACU) between Lesotho, Namibia, Swaziland, South Africa and Botswana is a good example.

2.1.4 A common market: All that applies to a customs union also apply in a common market, but additionally, a common market allows for the free movement of labour and capital among member countries. A good example is the Common Market for Eastern and Southern Africa. In chapter one, it was noted that one of SADC's objectives is "to develop policies aimed at the progressive elimination of obstacles to the free movement of capital and labour, goods and services, and of the people in the region". One can, therefore argue that SADC aims to eventually become a common market in the future when this objective is accomplished and a common tariff adopted towards non-members of the region.

2.1.5 An economic union: It goes beyond the common market by harmonising the monetary and fiscal policies of member states. For example, the European Union harmonised its monetary and fiscal policies first before progressing to a monetary union.

2.1.6 A monetary union: In addition to the activities of an economic union, a monetary union is the "full monetary integration of an area imposing a fixed relationship between currencies and leads to a permanent absence of exchange controls with respect to both current and capital account transactions within the area" (Lundahl and Peterson, 1991, 271). This is the type of economic integration for which SADC is evaluated in this project.

Trade liberalisation between members of a regional group is a precondition for co-ordinating exchange rate policy because openness is one of the most important determinants of the success of a monetary union as will be shown in the third chapter (Hallwood and MacDonald, 1994).

There is only one free trade area in South Africa, i.e. SACU. Trade should be increased between countries before they co-ordinate exchange rate policy. However, improving trade is not easy since a lot of other factors are to be considered when countries regionally integrate to improve trade between themselves by forming trade blocks. These other important factors are considered next.

2.2 What are the effects of regional groups?

Regional groups are formed in order to reap the perceived benefits from forming such groups. However, losses from forming such groups are also present. Formation is in the perception that the benefits will outweigh the losses. Regional groups result in trade creation effects; trade diversion effects and economies of scale and these are all discussed below:

2.2.1 Trade creation and trade diversion effects.

The trade-creation and trade diversion effects become very important when countries open up trade to each other. The trade literature points to the trade creation and trade diversion effects of regional groupings when assessing their desirability. The theory behind these effects is that regional groups eliminate trade barriers between members and create a favourable trading ground for members while discriminating against non-members. Trade creation results in increased trade among members of a regional group due to the introduction of free trade between themselves. Here, domestic production in a nation that is a member of a regional group is replaced by low-cost imports from another member nation (Salvatore, 1995, 300). Each

country, therefore, is able to specialise according to intra-union comparative advantage.

Trade diversion occurs when trade is shifted from a low-cost producer outside the regional group to a high-cost producer inside the region. Trade diversion reduces welfare since production is shifted from a more efficient producer outside the regional group to a less efficient producer inside the region. The international allocation of resources is thus worsened since production is shifted away from comparative advantage (Salvatore, 1995, 302).

Regional groups usually result in both trade creation and trade diversion and can therefore either increase or reduce the welfare of members depending on the relative strengths of these two opposing forces.

Regional group members gain when a low-cost domestic producer, as a result of intra-region comparative advantage, replaces a high-cost domestic producer and increased output result. Integration is harmful however when a low-cost producer from outside the region is excluded from the regional group and trade diverted towards a high-cost producer inside the regional group. Two important generalisations can be adopted from the traditional theory of integration which are: 1) the larger the economic size of the integrated area and the more numerous the countries of which the union is composed and 2) the greater the share of intra-area trade in the countries' total trade, the greater will be the scope for trade creation as opposed to trade diversion (Lundahl and Petersson, 1991, 172).

When one fits SADC into the above generalisations it is apparent that there can be both trade-creation and trade diversion effects in SADC. This is because of the following points:

- SADC comprises 14 members and the size of the region has been growing steadily over the years. Measures are underway to increase the economic size of the region through infrastructural development policies, the promotion, transfer and mastery of technology in the region and a host

of others as outlines in the previous chapter. SADC, however, remains a small region by international standards, even including South Africa. Also, South Africa and other SADC members still trade intensively with the developed nations of the world. This works in the favour of trade-diversion.

- The removal of obstacles on the free movement of capital and labour, goods and services and the people will encourage or improve intra-area trade in SADC. This will work in favour of trade creation effects. The measures underway as outlined in chapter 1 should improve trade between SADC members. However, intra-regional trade in SADC has improved as was stated earlier on that it has improved from 12% to 22% in the past few years.

The above points strongly support the view that the trade-creation effects in the region should be dominant in the near future.

2.2.2 Economies of scale.

Scale economies operate when the long-run average total cost falls as plant size increases. Since the scale of an enterprise or the size of a plant reflects the amount of investment made in the relatively fixed factors of production, the plant and equipment which vary only in the long-run, economies of scale are associated with the long-run average cost only (Tewari and Singh, 1996, 133). There are two types of economies of scale and those are internal economies and external economies. Internal economies are unit cost advantages to a firm resulting from a change in the size of the plant. External economies arise from outside the firm. Regional integration enables the countries concerned to gain economies of scale by ensuring access to larger markets, leading to an increase in the demand for goods and services, which the members specialise on according to intra-region comparative advantage.

Regional trading groups encourage specialisation by members in the production of goods in which they have a comparative advantage. Also, the elimination or fall of tariffs between member countries ensures easy access to larger markets by firms in the region. This leads to high concentration of production in each member country, increased output and realisation of economies of scale in the long run.

Economies of scale could, therefore, result in large cost savings on projects realised through regionally co-ordinated and initiated investments in physical, social and institutional infrastructure (Brummerhoff, 1998, 35). Regional integration usually overcomes the obstacles of economic development such as a small market size, market distortions, inefficient production techniques and barriers to the movement of productive factors, thereby resulting in efficiency gains (Brummerhoff, 1998, 35).

The following issues also lie behind the formation of regional groups in Southern Africa as noted by Brummerhoff, (1998, 35-36):

- Southern African countries aim at achieving self-sufficiency, but at the same time they are confronted with attempts to industrialise and modernise their economies. This is one of the main areas of concern in SADC as outlined in its objectives.
- The large number of small countries competing with one another in international markets reduces their bargaining power in such markets, and by forming the regional groups among themselves, their bargaining power is increased in the region. Many countries in the region are also dependent on a narrow set of similar primary products which negatively impact on their participation in world trade; and
- The facilitation and mobilisation of investments, both from local and foreign sources, will increase if a much broader and integrated market can attract the interest of foreign investors.

These are the challenges facing regional groups in Southern Africa.

2.3 Southern African regional groups.

This section gives a brief overview of the different regional groups present in Southern Africa.

2.3.1 The Common Monetary Area (CMA)

A *de facto* customs union existed between South Africa, Botswana, Lesotho and Swaziland since 1910. This union was formalised in 1974 as a Rand Monetary Area (RMA) between South Africa, Lesotho and Swaziland. In the RMA agreement, members were allowed to circulate their currencies along with the South African Rand. The South African Rand is accepted as legal tender in member states but as from April 1986, the Rand no longer constituted legal tender in Swaziland but is still accepted as a means of payment (Brummerhoff, 1998, 36). The agreement accommodated a free movement of funds between member countries and ready access to the South African market. The South African Reserve Bank (SARB) took the responsibility for managing the Rand, gold and foreign exchange for the union (Holden, 1998). CMA membership at the moment is comprised of South Africa, Lesotho, Namibia and Swaziland. CMA members are also SADC members.

South Africa dominates the CMA through its more established and stronger economy (especially a stronger central Bank). Since the South African Rand circulates among the CMA members, these other countries are subject to South Africa's monetary policy that may work against them. South Africa therefore pays compensation to other CMA members for their loss of seignorage (surrendering the freedom to determine one's own monetary policy independently). Seignorage is calculated by estimating the number of Rands in circulation, which are estimated by the amount agreed to in the

agreement in December 31, 1973. The estimation assumes that interest had been lost on two thirds of the Rands in circulation. These amounts are corrected each year by 1.2% of the increase, or by 0.8% of the decrease of the notes in circulation of the South African Reserve Bank and the coin liabilities of the treasury. The CMA group is said to have been running quite smoothly (besides the introduction of own currencies by other member states) since its formation.

No restrictions apply to the transfer of funds to or from the area of any other member. Institutions in the government, financial and business sectors of Lesotho, Namibia and Swaziland have the right of access to the South African capital and money market. Each member is responsible for handling foreign exchange transactions in accordance with policies adopted by the CMA. Also, exchange controls remaining in South Africa are in agreement with the provisions that still apply to other CMA countries, and members shall permit the repatriation of notes and coins issued by them which may be in circulation in another CMA country.

2.3.1. The Cross-Border Initiative (CBI).

The CBI was formed at the Maastricht conference in July 1990 by certain Eastern and Southern African countries in consultation with and funded by the European Union, the World Bank, the International Monetary Fund and the African Development Bank. The CBI aims to develop the regional market economy, promote regional economic growth and regional economic integration. It facilitates other regional organisations and concentrates mainly on cross-border trade, investment and payments. There are 14 member states in the CBI. Eight of these are members of SADC. These are Malawi, Mauritius, Namibia, Seychelles, Swaziland, Tanzania, Zambia, and Zimbabwe. Other member countries are Burundi, Comoros, Kenya, Madagascar, Rwanda and Uganda. The second Ministerial meeting of the CBI on March 1995 drew a road map for trade reform. This map incorporates:

1) convergence to an external tariff structure with 2 to 3 non-zero rates and an average trade weighted tariff of 15% with a maximum of 20 to 25 by 1998, 2) the elimination of tariffs on intra-regional trade by 1998, 3) aim for a maximum, absolute margin of preference between imports from CBI countries and non-COMESA countries of 15% by 1998, 4) harmonisation of definitions of goods bearing similar tariffs and permitted NTBs, 5) adoption of simplified rules of origin based on tariff headings and value-added rules (Holden, 199, 7).

2.3.3 The Southern African Customs Union (SACU)

SACU is the deepest form of integration in Southern Africa. It includes all members of the CMA as well as Botswana. SACU was initialised in 1910 when South Africa, Botswana, Lesotho and Swaziland entered into the first formal agreement. On reaching their independence, Botswana, Lesotho and Swaziland renegotiated the agreement for implementation in 1960. South Africa administered Namibia as part of the customs union until its independence in 1990. Namibia's membership was then formalised in 1990 and thereafter SACU comprised of South Africa and the smaller four countries known as the BLNS (Holden, 199, 4). SACU adopted a common external tariff structure and free movement of goods among SACU members with neither duties nor quantitative restrictions between the members. Excise taxes are harmonised between members and together with import tariffs form part of the common revenue pool. The pool is administered by the South African Reserve Bank and allocated to members according to a formula that enhances the revenue share going to the smaller countries by 42%. The enhancement factor compensates the smaller members for the disadvantage of forming a customs union with South Africa which include loss of fiscal discretion, increased prices which arose from quantitative restrictions and polarisation of economic activities (Holden, 199, 5).

2.3.4 The Common Market for Eastern and Southern Africa (COMESA)

Formerly known as the Preferential Trade Area (PTA) for Eastern and Southern Africa, COMESA aims to achieve a free trade area by the year 2000 with free movement of capital and finance in the region and common investment procedures to promote cross-border, domestic and foreign investment. COMESA also aims to eventually become a monetary union. COMESA came into force on the 8th of December 1994. COMESA currently has 23 members who are: Angola, Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zaire, Zambia and Zimbabwe.

There are four obstacles which stand on the way of achieving the above stated objectives of the region (The Economist intelligence Unit, 1996-97). Those obstacles are:

2.3.4.1 The nature of the relationship between COMESA and SADC is unclear. There is high overlap of membership between SADC and COMESA. SADC members proposed that COMESA be divided into two, with SADC members forming the Southern part of COMESA. The other members in COMESA did not welcome the proposal; as a result, the relationship between SADC and the COMESA has since become very sour. A joint summit has been proposed to work on the overlap between SADC and COMESA.

2.3.4.2 Civil strifes in Burundi, Rwanda, Somalia and Sudan deferred regional integration. Also, the commitment to COMESA by the member states is fragile since very little has been contributed by members. Total membership contributions amounted to \$4.6 million for the first half of 1994 (Economist Intelligence Unit, 1996-97).

2.3.4.3 The strict “rules of origin” in COMESA are another constraint to full integration in the region. There have been very strong arguments against the “rules of origin” which stipulate that preferential treatment is given only to goods produced by companies from member countries that have 51% of their equity held by citizens of the member states. Those at the forefront of the arguments are Kenya and Zimbabwe. Also, many members have not complied with the tariff reductions of the PTA.

2.3.4.4 The Trade and Development Bank of the region has been charged with mismanagement to the extent that international auditors called for reform in the Bank. The Bank was established in 1986 and became operational in 1986. The Bank is responsible for administering the PTA’s monetary unit of account (UAPTA) traveller’s cheques. The UAPTA is equivalent to the Special Drawing Rights (SDR). The UAPTA is used by the members to settle debts between themselves in every two months with the balance payable in dollars (EIU, 1996-97).

South Africa and Botswana are not members of COMESA even though South Africa was invited to join in 1995. COMESA covers eight SADC members who are Angola, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Swaziland, Tanzania, Zambia and Zimbabwe.

It is evident from the above description and in the table below that there exist co-membership in SADC and other groups. The objectives of these regional groups may act a stumbling blocks to the establishment of more solid co-operation in SADC rather than as a building bloc for economic co-operation and development. These arrangements create the potential for complicating the control of goods across national boundaries. In the table, Namibia and Swaziland are the two countries that are members to all five regional groups. They therefore pose a threat to the control of the movement of goods across national boundaries since they are members of SACU, CMA and COMESA that comprise slightly different membership conditions and each regional group does not adopt the same common external tariffs to non-members.

Table 2.1 Membership of regional groupings

Country	SACU	CMA	CBI	COMESA	SADC
Angola				X	X
Botswana	X				X
Burundi			X	X	
Congo					X
Comoros			X	X	
Djibouti				X	
Eritrea				X	
Ethiopia				X	
Kenya			X	X	
Lesotho	X	X		X	X
Madagascar			X	X	
Malawi			X	X	X
Mauritius			X	X	X
Mozambique				X	X
Namibia	X	X	X	X	X
Rwanda			X	X	
Seychelles			X	X	X
Somalia				X	
Sudan				X	
South Africa	X	X			X
Swaziland	X	X	X	X	X
Tanzania			X	X	X
Uganda			X	X	
Zaire				X	
Zambia			X	X	X
Zimbabwe			X	X	X

Whether these regional groups are harmful or not to the economies of the member countries is another story and extends beyond the scope of this research. At the crux of their formation is the objective of improving the well being, economic development and growth of their members. As most of them are moving towards being free trade zones, especially COMESA that aims to achieve free trade between members by the year 2000, the effects of free trade zones to the well being of member countries should be scrutinised. Krugman (1991) as referred to by Wyoming (1991, xix) stated that free trade zones are bad in theory but are good in practice. They are bad in theory since they potentially divert trade from low-cost to high-cost suppliers, therefore harming non-member countries by reducing the demand for their exports and reducing the relative prices of their exports. Free trade zones then reduce non-member country welfare. However, in practice free trade zones are good since they increase the size of the markets. Larger markets result in greater productive efficiency and competitiveness (Wyoming, 1991, xix). Free trade zones may be good in practice especially where countries trade more with their neighbours than with distant countries because transporting goods and services and communicating over long distances is costly. This argument would favour the formation of a free trade zone in SACU, CMA, COMESA and SADC since member countries in these regions are geographically close to each other. In contrast to Krugman's idea of free trade zones being good in practice and bad in theory, Fred Bergsten (1991) as cited in Wyoming (1991, xx) is of the view that free trade zones are bad in both theory and practice. He argues that free trade zones should not be viewed as a replacement for globalism. If they are to happen, they should move in the context of an effective and credible global trade system by expanding GATT (which is now the World Trade Organisation (WTO)). With technological advancement, transportation and communication costs are now no longer central to trading partners (Wyoming, 1991, xx), and therefore the benefits brought by these are not that huge suggesting that Bergsten's view is more likely to prevail. In SADC, however transportation and communication costs are still fairly central and the improvement in these is thus expected to bring some benefits to the region.

2.4 Convergence in SADC, SACU and the CMA

Africa has a problem of setting up regional initiatives with sufficient benefits for members and penalties for non-compliance to ensure continuing co-operation. SACU and the CMA regional groups have proved to be successful in ensuring a workable regional framework compared to SADC. SACU and CMA countries are, for one, geographically closer to each other. There has been observed convergence of GDP per capita among SACU members than among SADC members. Jenkins and Thomas (1998) show that there is no evidence of convergence between SADC members in the period 1960 to 1990. In terms of macroeconomic indicators such as inflation and GDP per capita, there has been convergence of policy between Namibia, South Africa, Swaziland, Botswana, Lesotho and Mauritius as shown in the table below:

Table 2.2 Economic Characteristics

Country	Population in 1995 mill	GDP in mill of US \$ in 1995	GDP per capita in US \$	Inflation for 1994	Inflation for 1995
Angola	10.3	7800	600	972	N/A
Botswana	1.46	4519.984	3095.88	8.2	10.5
Lesotho	2.05	851.5091	415.3703	8.3	9.3
Malawi	9.79	1470.338	150.1877	22.8	83.3
Mauritius	1.09	3392.097	3112.016	7.3	6
Mozambique	17.42	1499.285	86.06689	52.5	54.4
Namibia	1.54	3380.672	2195.241	10.7	10
Seychelles	0.07	509.1978	7274.255	1.8	-0.3
South Africa	41.24	133609.6	3239.806	9.0	8.6
Swaziland	0.91	1186.813	1304.19	14.3	14.7
Tanzania	30.34	5255.235	173.2114	34.1	29.8
Zambia	9.37	3297.015	351.8692	52.3	34.2
Zimbabwe	11.53	7643.906	662.958	22.2	22.6

Source: International Financial Statistics

For SADC as a whole there is little or no convergence. Convergence in macroeconomic policy is one of the most important determinants of the potential for a region to form a monetary union. This issue is taken further in the following chapter where the theory on monetary unions is presented and

thereafter, SADC is assessed as to whether it forms an optimum currency area or not.

This chapter has given the evidence of the multiple membership of SADC members. Multiple membership may conflict with or complement the policies that SADC implements. The move towards a free trade area has brought about an intense discussion on the rules of origin. This proves that multiple membership is a problem. Though theory highlights the economies of scale and the trade-creation effects as the benefits of regionally integrating, it is another exercise to determine whether these are still dominant or not when members of a region are members in other regions which have different policies and objectives. The CBI, for an example, is converging its external tariff structure. The implications of this move to SADC are unknown and determining such implications extends beyond the scope of this project.

3. Theory of monetary unions

The most significant development in monetary unions recently has been the formation of the European Union. The collapse of the Bretton Woods fixed exchange rate system saw a movement towards more flexible exchange rate arrangements in many countries. Though not going back to the Bretton Woods system of fixed exchange rates, the European Unions' Economic and Monetary Union (EMU) has formed the Euro as a new currency to which the union's member countries currencies should be pegged. The story of the EMU started in February 1992, when the European council⁵ signed the Maastricht Treaty. This Treaty serves as a benchmark in the evolution of global trade and investment activities since it involve the creation of an Economic Monetary Union (EMU) with one currency (the EURO); a common European Central Bank (ECB); common monetary policy by the Year 1999; and officially changed the European Economic Community (EEC) to the European Community (EC) (Rehman, 1998, 51-52).

The Euro was introduced at the beginning of 1999 on a non-cash basis. Between 1999 and 2002, the Euro will function as the 16th parallel EU currency. The Euro will replace national currencies of the EU member countries by July 2002. The EMU is one example of a monetary union as described in chapter 2. In this chapter, more emphasis is given on elaborating what monetary unions imply, their costs and benefits and the factors determining the formation of monetary unions.

3.1 Theoretical background on monetary unions

A monetary union is a form of regional economic integration as in an area with a single currency controlled by a single central bank (Corden, 1994, 125). It is full monetary integration of an area imposing a fixed relationship between currencies and leads to a permanent absence of exchange controls

⁵ The European Council consisted of heads of the states of 12 nations.

with respect to both current and capital account transactions within the area (Lundahl and Peterson, 271, 1991). A monetary union leads to the unification of certain economic policy instruments, especially monetary policy where, usually, a dominant country in the union with a strong currency sets monetary policy for the union as a whole like, for example, Germany in the EMU. Regional economic integration, as in a monetary union, does not necessarily offer green pastures to the countries involved in the region but both benefits and losses exist from participating in such arrangements. Consensus in research has not yet been reached on the conditions under which policy coordination may be optimal for a group of countries (Jenkins and Thomas, 1998). Most of the research on monetary unions has been based on developed countries rather than developing countries because there hasn't been any significant unification of monetary policy among members of the regions formed in developing countries. Therefore, more research still has to be done for developing countries on regional economic integration and monetary integration. Hallwood and Macdonald (1994, 276-279) give the following as benefits and costs to forming a currency area, with the emphasis on the European monetary system:

3.1.1 Benefits of monetary unions:

Firstly, the formation of a currency area reduces and eliminates exchange risk. Since the currencies of the member countries are pegged to a single currency or a basket of currencies, investors are no longer exposed to the risk of being caught up in possession of a currency that has depreciated against other currencies in the union. Subsequently, trade and investment is stimulated between the members of the union (i.e. trade creation between members). Also, in a fixed exchange rate regime (and in a pegged rate regime), the excessive volatility which characterises flexible exchange rates is eliminated (see Frankel and Meese, 1987, 117).

Secondly, because of a fall in uncertainty about the exchange rate, risk-adjusted interest rates fall and lead to increased capital formation, increased investment and more employment in the economies. Dynamic welfare gains are then realised by the economies participating in a monetary union.

✓ Thirdly, adoption of a common currency eliminates overshooting of the exchange rate and promotes economic stability. Exchange rate overshooting has characterised floating exchange rates since 1973. Proving whether exchange rate variability harms the economy in a formal setting has, however, been difficult (Neumeyer, 1998, 246). Exchange rate overshooting promotes instability and insecurity which may harm the credibility of the currency of an economy.

✓ Fourthly, intra-area current account deficits can be financed with local currencies as they are pegged to a single currency rather than financing in another currency like the US dollar as it used to be in most of the European economies. In that case, payments surpluses with the US had to be accumulated first before currencies could be earned to finance deficits.

Fifthly, transaction costs of exchanging one currency of a member country against another are eliminated. It, therefore become less expensive to transit and makes it easier for the economies concerned to trade.

✓ The sixth benefit involves the fact that there is belief that some less credible members of a union may gain monetary credibility as a result of allowing their monetary policy to be governed by a credible and independent body (like the Euro-fed in the European Union). Counter to this is the question whether greater independence of a nation's existing central bank would not achieve the same end. However, for countries that are members of a monetary union the uncertainty over the policy path that a member might take is eliminated since monetary as well as fiscal policy are co-ordinated in a monetary union.

The seventh benefit is that opaqueness of pricing in different currencies gets eliminated and as a result trade is promoted.

Lastly, if prices are sensitive to movements in the exchange rates, adoption of a common currency reduces variability in relative prices. This would lead to more stability in the goods and factor markets especially if they are highly sensitive to changes in the prices of goods and services.

3.1.2 Costs of monetary unions:

Firstly, the exchange rate can no longer be used as a macroeconomic tool to offset demand or supply shocks in the economy. Nor can it be used to reduce pressure on the foreign exchange reserves by depreciating in the event of capital flight; the event of increased demand for foreign goods and services; a fall in exports; or a fall in productivity in the traded goods sector, etc.

Secondly, a country with a very high level of inflation may have to undergo a period of deflation with high real interest rates, unemployment and lower economic growth when entering a monetary union.

Inflation is usually caused by demand expanding policies that increase output and reduce unemployment in the economy. However inflation can also be caused by the magnification of the budget deficits directly or indirectly by intentionally or unintentionally spending more than revenue resulting in continuous monetary expansion, an increase in aggregate demand and a rise in the general level of prices in the economy. Authorities receive revenue from the inflation tax referred to as seignorage by doing this exercise. This is because monetary expansion results in more revenue to the government through tax since tax is a percentage of the amount of money accruing to individual stakeholders in the economy that are taxed. The ability of an economy to earn seignorage is lost in a monetary union since the economy cannot independently manipulate fiscal and monetary policy. For example,

South Africa pays compensation to CMA members and these are Lesotho Swaziland and Namibia for their loss of seignorage.

Thirdly, low-income countries may attract mainly low value added/ or low wage direct foreign investment whereas high-income countries will attract high value added/ or high wage investments in a monetary union. This comes from the theory of the center and the periphery. The high-income country is the center and the low-income country is the periphery. As a result, there may have to be compensatory payments made by the center to the periphery.

Fourthly, monetary policy in the union may not suit all members and fiscal policy of member countries is constrained. This point will be taken further later in the paper.

Lastly, a currency union or a fixed exchange rate makes the real payoffs of assets denominated in different currencies equivalent while reducing, also, the number of financial instruments with which economic agents can share risks (Neumeyer, 1998, 247).

Forming a monetary union involves assessing the trade-off between the benefits of reducing "excessive" exchange rate risk and the costs of reducing the number of assets in the economy (Neumeyer, 1998, 246). Countries are characterised differently and therefore face different kinds of constraints and benefits from entering a monetary union. There is, however, consensus in theory that wage and price flexibility; capital mobility between sectors of the economies in the region and openness of the economies in the region all contribute positively to the co-ordination of exchange rate policy.

One would question whether co-ordination of exchange rate policy in SADC will be wise. This is in the light of the fact that most of the members experience low degrees of capital mobility between the traded goods sector and the non-traded goods sector; economies of the members are not yet very open and still use a lot of trade barriers; and prices and wages are not flexible enough since a fall in wages may not be politically favourable in these

countries. There is consensus in economic theory that fixed exchange rates are less appropriate for countries which are dependent on the inflation tax; without factor mobility; and subject to rigidities mainly in the factor markets so that shocks take years to work through the economy; and where shocks for core and peripheral countries are asymmetric (Jenkins and Thomas, 1996).

By participating in a monetary union, countries peg their currencies to either a basket of currencies, as in the EMU's Euro, or to a single currency. In the former, each country is assigned a weight in a basket of currencies. The Deutchmark has the highest weight in the Euro. Deciding whether to join or not to join a union is a decision to be based mainly on what is optimal for the economies concerned.

Given the above, we can now isolate the factors that are the critical in determining whether to peg an exchange rate or to float. These factors are considered next.

3.2 Factors that determine the formation of a monetary union.

The decision whether to peg or float the exchange rate and subsequently to join or not to join a monetary union is based on what is optimal for that economy as indicated above. For an example, England did not join the EMU since it had inflation problems and it was therefore not optimal for the country to peg its currency to the EURO by joining the monetary union. Holden, Holden and Suss (1979) in their study of annual data from 1974 to 1975 give six factors that affect the choice of exchange rate policy. These factors are: the openness of an economy (OI); capital mobility (CM); the diversification of the external sector (PC); the geographical concentration of trade (GC); the degree of economic development (PCGDP); and the divergence between rates of inflation (ID). These factors are discussed below.

3.2.1 Openness of the economy

In an open economy, i.e. an economy that trades a lot with other countries, it is best to have a pegged or fixed exchange rate. The country can be a member of a monetary union in this regard. Openness here is measured by the contribution of the foreign sector to the country's GDP. The higher the contribution of exports and imports to GDP, the higher the level of openness. The intuition behind this is that the more open an economy, the lesser the exchange rate illusion and given that a trade-off between inflation and unemployment exists, the trade-off will exist more between domestic unemployment and the rate of change of prices expressed in foreign currency (Holden et al, 1979). Openness is negatively related to exchange rate flexibility. Mckinnon (1963, as cited in Hallwood and MacDonald, 1994) suggests that in an open economy, changes in the exchange rate would not alter the ratio of prices between traded (P_T) and non-traded goods (P_{NT}), i.e. $d(P_T/P_{NT})/dS = 0$ where S is the exchange rate. The exchange rate in an open economy may as well be fixed, and therefore the country becoming a member of a currency area or a monetary union.

Given the size and degree of diversification of the economy, it has been shown that as openness increases, the greater must be the change in the exchange rate to produce the changes in the balance of trade that are likely to be desired (Tower & Willet, 1976, 40 as cited by Holden et.al. 1979).

It is worthwhile for an economy to encourage more trade with its most important trading partners. Openness of an economy to its trading partners is a necessary but not sufficient condition for co-ordinating exchange rate policy. Intensified trade between trading partners results when they form a monetary union because the co-ordination of exchange rate policy results in benefits in the form of the elimination of transaction costs, exchange rate risk and opaqueness in the prices of goods.

3.2.2 Capital Mobility

It is difficult to generalise about the effect of capital mobility on a fixed against a flexible exchange rate indicated by Holden et al. (1979). Mundell and Fleming (1963, as cited in Hallwood and MacDonald, 1994) gave a model of fixed versus floating exchange rates and introduced capital mobility into the model. The model showed that if capital is highly mobile under flexible rates, the trade account will have to adjust to capital flows, causing domestic resource allocation costs. Under fixed exchange rates on the other hand, high capital mobility eliminates domestic monetary independence (Holden, Holden and Suss, 1979). When the level of capital outflow from an economy is significantly high, the reserves are drained, in a fixed exchange rate regime. When the level of capital outflow is high in a flexible exchange rate regime, the currency depreciates. Capital mobility is an important determinant for the success of a monetary union. Krause (1973) argues that high levels of capital mobility within a region improves economic welfare, and is essential for effective economic and monetary union. There are a number of factors that determine the mobility of capital between countries. In general, capital mobility is shaped by the rate of return and the risk attached to the investment, as is evident from the writings of Folkerts-Landau (1991), Lizondo (1991), Rojao-Suarez (1991), Goldstein, Matheison and Lane (1991), Meltzer and Brunner (1986) and Kasekende, Kitabire and Martin (1998).

3.2.3 Diversification of the external sector (PC)

For a given degree of economic openness, the more diversified the external sector, the more are the external disturbances likely to cancel out (Holden, Holden and Suss, 1979). The external sector is diversified when a country's total exports are not concentrated on a single export. The external sector is concentrated when a large proportion of exports is accounted for by a single export. Therefore, a country with a diversified external sector can adopt a

fixed exchange rate and a country with a concentrated external sector will be at a disadvantage with a fixed exchange rate and thus should adopt a flexible exchange rate. Product diversification of exports is negatively related, therefore, to exchange rate flexibility while product concentration (PC) is positively related to exchange rate flexibility since the external disturbances cannot cancel each other out.

3.2.4 Geographical concentration of trade (GC)

Countries usually peg their currency against their largest trading partner. Empirical evidence points to the fact that many developing countries do peg to a currency of their important trading partner or peg to a basket of currencies for countries with which most trade is done. Geographic concentration of trade would therefore be expected to be negatively related to exchange rate flexibility, implying that these countries would operate under pegged exchange rate policy.

3.2.5 Degree of economic development (PCGDP)

In order for an economy to develop, it needs to grow. Economic growth is, therefore the main criterion for development. Economic growth is measured by the growth of total output or total income. In order to transfer growth into development, one considers the total product of an economy given the level of population in that economy (Cypher and Dietz, 1997). Generally less developed economies with less developed goods and factor markets rely more on imports. This is because import demand elasticities for these economies are low since domestic substitutes of imports are not available (Holden, Holden and Suss). Less developed countries tend to peg, therefore against developed countries (i.e. the countries they trade the most with). The degree of economic development would be expected to be positively related to exchange rate flexibility and negatively related to exchange rate fixation.

3.2.6 Divergence between rates of inflation (ID)

There is strong belief that countries that have significantly different inflation rates from their trading partners need to adjust their exchange rates frequently. However, the direction of causality between the flexibility of the exchange rate and the inflation differential may also run in the opposite direction so that adopting a flexible exchange rate policy provide the policy makers with the option of continuously inflating the domestic currency (Holden, Holden and Suss, 1979). The core of the argument is that the greater the difference between inflation rates of two countries, the wiser is the decision not to peg their currencies against each other.

3.3 Macroeconomic policy implications

Some economists argue that price stability is the appropriate goal of monetary policy, and fiscal discipline is the appropriate goal of fiscal policy. There is consensus in Europe and other places that only by achieving price stability can other goals of macroeconomic policy such as, high employment and economic growth, be achieved over the long run (Wyoming, 1991, xxvii).

In transiting to a currency zone, Frenkel and Goldstein (1991) as mentioned by Wyoming (1991, xxix) recommend that countries adopt a two-speed approach where one sub-group of countries takes a fast approach, while the other sub-group take a slow approach. Countries that take a fast approach are those that have achieved low inflation rates and share other economic characteristics and can move more quickly towards a currency zone. Countries to take a slow-approach are those with disparate economic performance and would move slowly toward a currency zone. The two-speed approach would, therefore, preserve a momentum in the move to a currency zone.

Corden (1994) on the other hand analyses four ways of moving from a flexible exchange rate regime to a monetary union. The first one is what he calls *an all at once or step-by-step* approach. In this approach, all countries enter a monetary union at once with no gradual movements towards it. The second approach is the *gradual but concerted step-by-step* approach. Countries concerned move slowly together at a slow pace towards a monetary union. The problem with this approach is that any country can drag the process and the whole thing could take years. The third approach is the *gradual* approach. In this approach, countries join when they are ready, whether politically or economically. Therefore, a core group of countries that are ready enter before others. The last approach is the parallel currency approach. In this approach, a new currency is established in addition to existing currencies but without fixed parities. The currency would maintain either constant purchasing power or not be devalued relative to any other currency. This approach was proposed in the 1970's by a group of academics and by Britain in the 1990's as an alternative to the EMU. This was dismissed by all the EC countries but Britain (Corden, 1994).

Frankel and Goldstein's two-speed approach and Corden's gradual approach are more realistic. Countries that are ready should enter first and gradually, other countries enter too when their inflation rates and other macroeconomic criteria such as their debt to GDP ratios, budget deficits, openness and capital mobility are checked.

3.3.1 Fiscal policy in a monetary union.

In a monetary union, since the exchange rate and the monetary instruments of the economy are no longer available (which is given as one of the costs of participating in a union above), there is often an increased need to use fiscal policy. The use of fiscal policy is however restricted in a monetary union. Hallwood and MacDonald (1994) give two arguments supporting these restrictions with the focus on the European Community (EC). The first

argument is the Maastricht Treaty. The treaty set fiscal targets of budgetary policy and therefore places restrictions on fiscal policy (Eichengreen, 1998). The target is that the government debt to GDP ratio must be less than 60% and the budget deficit must not be greater than 3% of GDP. The government debt to GDP ratio tends to the following level (MacDonald, 1994):

$$\frac{\text{Government debt}}{\text{GDP}} = \frac{\text{budget deficit/GDP}}{\text{GDP growth rate}}$$

Appendix A shows the GDP growth levels as annual percentages in SADC. It is clear from the appendix that growth rates in SADC from 1994 to 1997 have on average been higher than 3%. Most SADC members have GDP growth rates above 3%. This is good for development in the region. It is not, however assumed here that since the above equality is a precondition for joining the European Union it should also be a precondition for forming a monetary union in SADC. SADC comprise countries with different characteristics and different levels of development than those in the European Community. The above equality serves just a guideline and an illustration of one of the conditions which could be used in assessing the eligibility of countries for a monetary union.

When GDP is growing at 3% per annum and government debt-GDP equals the maximum allowed 60%, the budget deficit will not be more than 1.8% of GDP. In 1991, only France and Luxembourg met this target. For there to be room for fiscal expansion, the government debt-GDP ratio must be less than 60%.

Before the EMU became operational, the Maastricht requirements stated above, aiming at achieving budgetary discipline were not utilised. Governments increased expenditure instead of cutting it and they raised taxes too (Melloan, 1997). However, the EMU members at present were able to meet the criteria for joining the monetary union.

The second argument is the increasing integration of commodity markets within the EC. The EC laws on public sector tendering aim to prevent governments from favouring their domestic contractors so that a rise in government spending will not necessarily be on domestic goods and labour. As a result, fiscal policy is effective only through (a) the direct use of additional local labour on public works or (b) the ability to affect the level of aggregate demand in the EC as a whole. The latter is ruled out by the Maastricht Treaty (Hallwood and MacDonald, 1994, 295).

The Maastricht Treaty provided for the establishment of a European Central Bank (ECB). It became operational on 1 January 1999. The Bundesbank, i.e. the Central Bank in Germany retreated and become part of the European System of Central Banks (ESCB). Monetary policy decisions in the EMU are determined in the ECB in Frankfurt. However, the Bundesbank remains responsible for implementing monetary policy decisions in Germany, which are taken by the ECB. European banknotes and coins will start to circulate by 1 January 2002 and the Euro will become the sole legal tender in the EMU (Bekx, 1998).

It has been noted that the formation of the EMU will result in certain trade creation and trade diversion effects. The trade creation effects would result from the positive impact on the economic growth of the members of the EU resulting from forming the union. The trade diversion effects would result from increased competitiveness of the Euro area countries, the overall impact on exports of non-EU countries being positive (Bekx, 1998).

Frenkel and Goldstein (1991), as cited by Wyoming (1991) give several mechanisms for ensuring fiscal discipline in a currency zone: 1) the market place itself. Excessive deficits by member countries that are not finance through money creation will result in deficit premium on government debt. The government will then be forced to improve fiscal policies in the face of rising cost of government borrowing and reduced credit availability; 2) the enactment of fiscal policy rules which will place an upper limit on the size of

budget deficits and government debt relative to the Gross National Product; (3) peer-group multilateral surveillance. Constraints on national fiscal policies would have to be more flexibly applied to discourage irresponsible fiscal policies of member countries (Wyoming, 1991, xxix).

A combination of market discipline and peer-group surveillance will be powerful in ensuring that members keep fiscal policies sound because of market discipline and that countries are encouraged to solve pre-existing fiscal problems especially before they enter currency zones because of peer-group surveillance (Wyoming, 1991, xxix).

Other than the government debt to GDP ratio and the government deficit, the Maastricht Treaty also set out two other convergence criteria to determine whether a member state of the European Union is eligible for the EMU. These two criteria are extracted from Corden (1994):

- Firstly, for two years before entry, the country's exchange rate must have stayed within the normal band of 2.25 percent and it must not have devalued its bilateral central rate against any other member state's currency for the same period.
- Secondly, its average rate of consumer price inflation must not have exceeded by more than 1.5 percentage points the rate observed in the three member countries with the best inflation performance over the year before. Also, as an indicator of inflation convergence, the average long-term interest rate shall not have exceeded by more than 2 percentage points those of the same three best performing member states.

A monetary union, therefore, places constraints on both monetary and fiscal policy. Countries that consider forming a monetary union must be well placed with the above factors that have been found to determine the sustainability and success of a monetary union.

Jenkins and Thomas (1998) give 3 factors that are critical in scrutinising the readiness of a group of countries for macroeconomic policy co-ordination or the formation of a monetary union. These factors are:

3.3.2 Spill over effects

As countries become more open to the world economy, monetary and fiscal policy adopted in one country will spill over to other countries. The result, then, is sub-optimal equilibria when a policy adopted by one government in maximising domestic objectives ignores externalities on other countries (Jenkins and Thomas, 1998). Domestic fiscal policy changes, according to Persson and Tabellini (1995, as referenced by Jenkins and Thomas, 1998) are transferred to other countries (1) through changes in the terms of trade; (2) where capital is internationally mobile, through differences in the after-tax return on international capital (3) and through changes in the demand for imports. Monetary policy changes on the other hand are transmitted through changes in interest rates and changes in the real exchange rate. These externalities or inefficiencies decrease when countries co-operate (Jenkins and Thomas, 1996). The above support the earlier finding that the more countries become open to the world economy or to other countries, the more they should co-operate on macroeconomic policy by forming an optimum currency area.

3.3.3 Beggar-thy-neighbour devaluations

There is a desire to avoid beggar-thy-neighbour devaluations in pursuit of high employment. Beggar-thy-neighbour devaluations refer to a situation where a country intentionally devalues its currency in order to gain competitiveness so as to improve the level of exports and as a result, improve employment levels in the economy. In a pegged exchange rate this tool is no longer available to policy makers in an economy. A country has to consider

the costs and benefits of a fixed exchange rate or, at the extreme, a currency union.

3.4 Convergence in macroeconomic indicators

There is the theoretical prediction that poorer countries should catch up with or converge to rich ones in terms of GDP per capita because, for example, they can take advantage of existing technology without developing it. This prediction is weakly supported in groups of countries that are co-operating (Jenkins and Thomas, 1998). There is mixed evidence as to whether convergence in GDP per capita or convergence in macroeconomic stability indicators between rich and poor countries is really occurring. It is also apparent from the previous chapter that GDP per capita among SADC members has not converged. For example, there is lack of consensus on whether or not exchange rate co-ordination has helped in fostering convergence in macroeconomic stability indicators among EU members and lack of consensus on whether or not monetary integration in Europe is good or bad (Jenkins and Thomas, 1998).

Deciding whether to join or not to join a monetary union is a very tough decision, let alone trying to meet the criteria for joining. There is also a puzzle in choosing the right time and stage that is suitable for a country to join a currency union. There is consensus in theory that trade liberalisation has to be achieved first so that economies can be open first. One, therefore, wonders if it is not premature for SADC members to form an optimum currency area and co-ordinate macroeconomic policy. Another critical aspect is whether or not it is correct to compare developed country studies of Europe to the developing countries of Southern Africa.

3.5 Will the formation of an optimum currency area by SADC members be premature?

Giving an answer to this question is not easy. A lot of factors are at stake here regarding the well being of SADC member countries. It has to be emphasised that in a currency union, countries cannot devalue or revalue on their own and they cannot control the quantity of money on their own. There are constraints on monetary and fiscal policy. Many researchers have, therefore suggested that formation of a monetary union by SADC members will be premature and disastrous. For example, Jenkins and Thomas (1998) say that there is no a priori expectation of convergence among SADC members in terms of forming an optimum currency area because these countries are agricultural and mineral exporters; respond asymmetrically to external price shocks, so that these countries cannot survive under single monetary and fiscal policy; and their debt levels are very high. Reducing the debt levels will not only reduce the debt to GDP ratio but will, most importantly, save lives of many Africans. The following table is an extract from a table given by Jenkins and Thomas (1998) on SADC performance and policy stance.

Table 3.1 SADC's performance and policy stance.

Variable	SADC average (1990-94)	SADC range (1994)
Average GDP growth rates (%)	+2.5	-10.7 to +17.5
Average inflation rates (%)	28.8	7.3 to 52.5
Average debt to GDP (1993, %)	121.8	13.4 to 450.3
Average investment to GDP (%)	31.2	9.2 to 85.8
Average savings to GDP (%)	11.4	-13.7 to +44.4
Aid greater than 20% of imports	Five	1.2 to 113.4%
Aid withheld for non-compliance	Three	-
Aid withheld for political pressure	Three	-
Cautious fiscal stance (no slippages)	eight	-
Under pressure from IMF/World Bank on fiscal policy	seven	-
Average deficit-to GDP ratio (1990-93, %)	-6.1	-22.2 to -0.2
Monetary stance: tight	six	-
Monetary stance: loose/inactive	six	-
Average lending rates positive (1993)	eight	-26.2 to +8.7
Central bank operational independence on monetary policy	three	-
Dominant external influence IMF/World B on monetary policy	six	-
Official exchange rate market determined	eleven	-
Regular over-valuation occurs	four	-
Exchange control regime free	two	-
Exchange control regime liberal	nine	-
Degree of financial liberalisation: modest-high	five	-
Government ownership of commercial banks	seven	-
Openness: exports + imports/GDP (%)	96.1	45.5 to 155.3

Table 3.1: Continued

Variable	SADC average (1990-94)	SADC range (1994)
Trade regime liberal	ten	-
Broadly politically democratic	four	-
Reports of corruption	eleven	-
Corruption against which action taken	two	-
Potential for political instability	six	-
Potential for economic instability in the medium term	four	-

Source: Jenkins and Thomas (1998, 18).

The study by Jenkins and Thomas (1998) was conducted for the period of 1990 to 1994. The SADC countries are some of the highly indebted countries in the world as is shown by the average debt to GDP ratio in the table above. One of the potentially effective remedies for reducing the debt levels is for the debt to be written off. As De Sarker (1998) writes, according to the United Nations Development Programme (UNDP) if debt is written off today, it could free up the potential of African children and save lives such that 21 million children could be saved before year 2000 in Africa's most indebted nations.

Economists, however, do not yet have a fully satisfactory theory of debt finance (Hart and Moore, 1998, 1), therefore the actual economic implications of different types of debt remedies are not obvious (see Roe (1992), Zhakata (1992), DuZaire (1992), Yemidale (1992), M'Bet (1992), Seck (1992) and The Central Bank of Nigeria (1992)).

One of the factors that exacerbate the debt problem is that average investment in SADC as a whole is greater than savings. The implications of this can be explained using the following accounting identity from Hallwood and MacDonald (1994):

$$(X-M)-R_F = (S-I) + (T-G)$$

Where X is exports, M are imports ($X-M$ is the trade account), R_F is the net interest paid abroad, S is savings, I is investment, T is taxes and G is government spending. Anything that causes I to rise relative to S , G relative to T , M relative to X or R_F to increase can cause net foreign indebtedness to increase. Where net foreign indebtedness is the current account deficit that has to be financed by borrowing from abroad (Hallwood and MacDonald, 1994). Most SADC countries have a debt to GDP ratio that is above the 60% which is the maximum allowed debt-GDP ratio for countries in the European Community to join the union. Debt, therefore still remains a burden for SADC countries.

Krugman (1995) argues that 'debt overhang' is one of the problems which make it difficult for the developing countries to repay their debts. Debt overhang is described as a situation where a country's expected present value of potential future resource transfers is less than its debt. An exhaustive model of debt overhang can be found in Krugman (1995).

Krugman (1995) scrutinises ways in which the debt overhang can be dealt with.

Southern Africa is not the only region that has been severely affected by the debt burden. Southern Africa, when compared to other developing countries like Bolivia, Chile and Brazil have better debt levels. The following table compares the indebtedness of the developing world's most indebted nations in the 1980's.

Table 3.2: Comparative indebtedness, 1985 (interest on external debt as a ratio of exports).

Southern and Eastern Africa	Interest/export	Developing Countries	Interest/export
1. Somalia	25%	1. Bolivia	43%
2. Madagascar	24%	2. Chile	43%
3. Tanzania	16%	3. Brazil	38%
4. Zambia	15%	4. Mexico	34%
5. Malawi	12%	5. Argentina	25%
		6. Ecuador	25%
		7. Costa Rica	24%
		8. Uruguay	22%
		9. Ivory Coast	18%
		10. Colombia	16%

Source: Kwasa S.O., *The debt Problem of Eastern and Southern Africa*, 1989

The table shows that the external debt in Southern and Eastern Africa was less severe than that of the six top Latin American countries (Mayo, 1991). The picture hasn't changed much since the 1980's since the highly indebted developing countries have difficulties in servicing the debt. A number of countries have resorted to the following measures and/or actions because of debt (Kwasa, 1989, 439):

- Some debtor countries have sometimes decided not to repay their external debt not because they do not have the resources to pay for it but they just refuse to transfer foreign exchange to their creditors in the payment of the debt.
- Other debtors have been really unable to repay the external debt since they had insufficient foreign exchange to service it.
- Sometimes countries declared themselves unable to meet debt obligations by reason of bankruptcy.
- Lastly, some countries repudiate old debtors when a new government

comes into power through strong nationalist pressures which emanated from economic crises (Kwasa, 1989, 441).

Latin America utilised the last two types of remedies and the first two were utilised in Europe (Kwasa, 1989, 441). There are a number of other remedies taken by creditor nations and financial institutions to remedy or to reduce the debt problems of the African nations. These remedies include utilising 1) the Multi-Year Rescheduling Agreement (MYRA's) where the debt payment date is rescheduled to a later period when the debtor country will be in a better position to repay the debt; 2) Debt- Equity swaps; 3) and many commercial banks have made provisions against bad debts. The American Bank, Citicorp, was the first to make provision against non payment of US\$2.5billion by Latin American States in May 1987. The bank acknowledged that a quarter of its Latin American debts of US\$15billion was never going to be paid. Another bank to provide against non-payment was a U.S. bank called Manufacturers Hanover. The bank provided against non-payment of US\$1.7billion. Another bank was the Bank of England that made bad debt provisions by 30% of total bad debts owed to it (Parfitt and Riley, 1989, 163). The provision against bad debts does not necessarily mean the writing-off of the debt, but it only makes a provision against the debt. This indicates that there is awareness amongst creditors that much of the debt owed by developing countries is unlikely to be paid (Parfitt and Riley, 1989, 164).

3.6 What is the source of Southern African debt?

In order to remedy the external debt one has to look at the sources of the problem. The debt problem of the Southern African economies emanates from the economic crisis in the 1980's. Domestic food production in the African states have been declining and food imports rising because there have been a lot of disasters such as drought and famine. Also, recessions in the western countries in the 1980's that mainly emanated from the oil price shocks of the 1970's led to a decline in the demand for the primary product

exports from Africa. Values of primary exports have decreased over the years making it difficult for most African countries to gain enough foreign exchange to pay for imports, leading to a fall in GDP and the inability to replace the infrastructure (Parfitt and Riley, 1989, 18-19).

Three decades ago, the underdeveloped countries of Asia, Africa and Latin America were considered as "Third World" countries, but today the city states of Hong-Kong and Singapore are already classified as high-income countries and if current growth rates persist, per capita income levels in Taiwan could overtake those in Belgium, Italy and elsewhere in Europe by the end of the century (Lindauer and Roemer, 1994, 1). In their post independence, most African countries (including SADC members) have experienced external shocks, poor policy responses and ineffective development strategies that brought about stagnation (Lindauer and Roemer, 1994, 1-2 and The World Bank, 1989). The table above illustrates that eleven SADC countries in 1990 to 1994 had reports of corruption and in such an environment, policy co-ordination is not possible. Additionally, Angola and Mozambique do not yet have liberal trade regimes. Also, some of SADC member countries rely heavily on foreign aid and most members are under pressure from the International Monetary Fund (IMF) and the World Bank (WB) regarding their monetary and fiscal policies. The African continent is par excellence one of extreme vulnerability to foreign interference (Amin, 1990, 115). Some economists believe that availability of external finance decrease the chances of radical stabilisation (Treisman, 1998, 242).

There are rigidities in prices and wages and these rigidities are biased upwards. Additionally, capital is immobile between the traded and the non-traded goods sectors in most SADC countries. SADC members are also in the process of reforming trade between themselves and opening their economies to world trade. Until most of the above factors are addressed, there is no expectation of convergence of exchange rate policy among SADC members. It has been shown in the trade literature that most fixed exchange

rates can break down because of adverse macroeconomic shocks and self-fulfilling speculation (Jeane, 1997, 265).

If the above is addressed and a currency union formed in SADC, there will still remain the n^{th} currency problem that which currency should be used as a numeraire against which others will peg (Hallwood and MacDonald, 1994, 281). Possibly the South African Rand since it is a numeraire in the CMA against which other CMA members peg, or else another country's stronger currency or a currency basket as in the Euro. It is not possible to say, at the moment, which numeraire will be best for the region. This area remains a good avenue for further research.

This chapter has analysed the motivations for monetary unions, their effects and the factors that determine their success. SADC was then scrutinised and will continue to be scrutinised further in the next chapter against the factors that determine the success of a monetary union.

4. The Model

In order to ascertain whether SADC forms an optimum currency area, the model developed by Holden, Holden and Suss (from now on referred to as Holden et.al. (1979)) is adapted to this purpose. The model tests whether openness, capital mobility, the diversification of the external sector, geographical concentration of trade, the degree of economic development and the divergence between inflation rates do explain the fixation of an exchange rate or not. Holden et. al. run their model for a sample of 75 countries, for the period 1974-1975. The model produced very good results, which will be given later in this chapter. These results will then be compared with the results retrieved from running the same model, but for the later periods, i.e. 1984/85 and 1994/95. This study concentrates mainly on the later periods.

4.1 The hypothesis

The testable hypothesis is that members of SADC form an optimum currency area in terms of the exchange rate arrangements between them. This will determine whether SADC should form a monetary union or not, or whether the characteristics demonstrated by the SADC countries suggest the existence of a monetary union. The model developed by Holden, et.al is used to test this hypothesis. The model is given below.

4.2 The Model

The present study runs the Holden, et. al model for a sample of 75 countries, chosen by the availability of data, for two different periods, i.e. 1984-1985 and 1994-1995. Therefore a 10-year period has been allowed between the 3 different periods. This allows for comparisons between the three different time periods, especially the two time periods that this study focuses on. The model compares SADC and the EMU. The aim is to use the model to

establish the significance of an optimum currency area in SADC and the EMU. One would expect the EMU to form an optimum currency area in the 1990's since it is during this period (1994/1995) that the EC members were close to full monetary integration, with the Euro circulating parallel to the member countries' currencies.

Drawing from optimum currency area literature, the following model is used to test the above hypothesis:

$$F_i = \beta_1 + \beta_2 OI + \beta_3 PC + \beta_4 ID + \beta_5 PCGDP + \beta_6 GC + \beta_7 CM$$

Where:

F_i = The flexibility index

OI = Openness

PC = Product concentration

ID = Inflation differential

PCGDP = Degree of Economic Development

GC = Geographical Concentration of Trade

CM = Capital Mobility

This is the model extracted from Holden, et.al. In the present study, this model is run for the two time periods individually, i.e. for the 80's and the 90's periods. The individual regressions incorporate the dummy variables for SADC and the EMU. Therefore, the model that is run for the time periods is:

$$F_i = \beta_1 + \beta_2 OI + \beta_3 PC + \beta_4 ID + \beta_5 PCGDP + \beta_6 GC + \beta_7 CM + \beta_8 SADC + \beta_9 EMU$$

Therefore, in addition to the original variables in the model the dummies are:

SADC = A dummy variable for SADC countries.

EMC = A dummy variable for the European Monetary Union countries.

A thorough explanation of the dependent and explanatory variables in the model and their expected signs is given below.

4.2.1 F_i : The flexibility index: the dependent variable.

F_i is the flexibility index. This is the ratio of the sum of the absolute value of end-of-month percentage changes in the trade-weighted exchange rate to the sum of absolute changes in official holdings of foreign exchange. Holdings of foreign exchange would be the total reserve holdings of the country minus the Special Drawing Rights (SDR) holdings and the reserve position in the International Monetary Fund (IMF). The Flexibility Index is therefore calculated as:

$$F_i = \frac{\sum_{k=0}^{23} \left[\frac{|E_{(t-k)} - E_{(t-k)-1}|}{E_{(t-k)-1}} \right]}{\sum_{K=0}^{23} \left[\frac{|R_{(t-k)} - R_{(t-k)-1}|}{\sum_{J=0}^{11} (X_{(t-k)-j} + I_{(t-k)-j})} \right]}$$

Where

$i = 1 \dots n$ represents country numbers.

E_t = an index of the trade-weighted exchange rate of country i at time t ,

R_t = U.S. dollar value of country i 's holdings of foreign exchange at time t ,

X_t = U.S. dollar value of exports of country i in month t , and

I_t = U.S. dollar value of imports of country i in month t .

$\sum_{J=0}^{11}$ = This is the sum of monthly values over 11 months since January is used as the base month.

$\sum_{k=0}^{23}$ = The sum of monthly values over a period of two years. This is over 23 months since January of the first year is used as the base month.

This index indicates the flexibility of exchange rate policy. It reflects reserve and exchange rate movements. Exchange rate movements are in the

numerator and reserve changes in the denominator. The calculation used a 24-month sum to eliminate the effects of short-run fluctuations in either reserves or exchange rates that do not reflect long run exchange rate policy accurately. Months are the shortest period for which data can be found. The index is dimensionless because the denominator is the ratio between reserve changes and trade. The flexibility index, therefore assume values ranging from infinity (for an intervention free exchange rate policy) to zero (a pegged rate) (Holden, Holden and Suss, 1979). Infinity would mean that there has been no change in the reserves of a country. The country adopts a highly flexible exchange rate policy without intervention by the authorities in the movements of the exchange rate. The determination of the exchange rate is, therefore left to the market forces. The flexibility index indicates that if the absolute value changes in reserves ($|\Delta RI|$) are high in relation to the absolute value changes in the trade weighted exchange rate, the authorities are intervening heavily to offset market forces (Holden et al. 1979, 328). A high F_i figure indicates that there is less intervention in the exchange rate market by the authorities. A low F_i figure would then indicate that intervention in the exchange rate market by the authorities in great. Absolute values are used in the index in order to capture the sum of the changes in reserves and the exchange rate. This would, in the case of the changes in reserves, indicate the amount of intervention in the exchange rate market by the authorities.

The flexibility index is calculated for a sample of countries that appear in the appendix for 24 months in the two time periods, i.e. 1984-85 and 1994-95.

4.2.2 OI: Openness of the economy: Explanatory variable

This is the ratio of imports and exports to gross domestic product. This is calculated as:

$$OI = \frac{X_i + M_i}{GDP_i}$$

X_i represents the exports of country i . The i refers to all the countries in the sample. M_i represents the import of country i . GDP_i is the Gross Domestic Product for each country in the sample. This formula is carried out for each country in the sample in turn. It was performed for two-time periods i.e. 1984/85 and 1994/95 and averaged out over the two years in each period.

Openness is negatively related to exchange rate flexibility. Therefore the more open an economy the less flexible is its exchange rate policy. This means that more open economies tend to intervene more in the exchange rate market since a great deal of trade is undertaken outside the country.

4.2.3 CM: Capital mobility: Explanatory variable

This is the ratio of gross private capital flows to gross domestic product. This is calculated as:

$$CM = \frac{GPCF_i}{GDP_i}$$

$GPCF_i$ are the gross private capital flows of country i . The calculation was performed for each country and averaged over two years in each of the two time periods in the study.

The best measure of capital mobility would be the ratio of gross international capital flows to internal financial flows. However data on internal financial flows is not available since it is considered an impossible task to record such data and is therefore not recorded in financial statistics. GDP is, therefore, used as a proxy although it is indicated by Holden et al. (1979, 329) that “the use of GDP may produce a downward bias in capital market openness for developing countries and an upward bias for developed countries” (Holden, Holden and Suss, 1979). This is because GDP is higher for developed countries and lower for developing countries. GDP overshadows the capital flows that occur within the country. The data on the internal financial flows is not available since it is difficult to determine. CM may, therefore be negatively

or positively related to the flexibility index. When it is positively related, it suggests that countries, whose capital is highly mobile, have tended to adopt flexible exchange rates. When it is negative, it suggests that countries whose capital is highly mobile have tended to adopt less flexible exchange rates. It was stated earlier in chapter 3 that under fixed exchange rates, high capital mobility leads to a drain of the reserves since the authorities want to maintain the value of the currency or the peg in other cases. In a flexible exchange rate regime, high capital mobility contributes towards the depreciation of the currency and less of a drain on the reserves. Therefore the sign of the CM variable will indicate which of the above two scenarios have been dominant.

4.2.4 PC: Diversification of the external sector: Explanatory variable

This is the average annual percentage of total exports accounted for by the largest export in terms of the two-digits SITC (Standard International Trade Classification) This in true fact is product concentration, an indirect measure of the degree of diversification. The use of product concentration is suggested by Adelman and Morris (1967) as noted in Holden, et.al (1979). This variable is calculated as:

$$PD = \frac{LX_i}{\sum X_i} * 100$$

LX_i is the value of the largest export of country i in terms of the Standard International Trade Classification. $\sum X_i$ is the value of total exports of country i .

4.2.5 GC: Geographical concentration of trade: Explanatory variable

This is the percentage of total exports accounted for by exports to the largest market annually.

$$GC = \frac{XL_i}{\sum X_{ij}} * 100 \quad j \neq i$$

XL_i is the value of exports of country i going to its largest market (or trading partner). X_{ij} is the total value of exports of country i which occur with country j . The j refers to all the trading partners of country i . Countries whose trade is concentrated in one or a few countries tend to peg to currencies of their most important trading partners. These countries would intervene in the exchange rate market to offset market forces in order to maintain the peg. Changes in reserves for these countries tend to be high and their F_i would therefore be very low.

4.2.6 PCGDP: Degree of economic development: Explanatory variable

This is calculated as the average annual per capita gross domestic product.

$$PCGDP = \frac{GDP_i}{Population_i}$$

GDP_i is as explained above. This calculation was performed for all the countries in the sample and averaged over a period of two years for each of the two time periods in the sample. Less developed countries tend to have high population levels and low GDP levels. This results in a low value of PCGDP for a less developed economy and high PCGDP value for a developed economy.

4.2.7 ID: Divergence between rates of inflation: Explanatory variable

The inflation differential (ID) is calculated as the average annual percentage increases in consumer prices. Holden et.al. (1994) measure the ID in the following manner:

$$ID = \Delta P_i - \sum_{j \neq i} a_{ij} \Delta P_j$$

Where ΔP_i is the inflation rate of country i ; ΔP_j is the inflation rate of country j and a_{ij} is the proportion of country i 's total trade that occurs with country j . The i refers to all the countries in the sample of the study and the j refers to all the trading partners of each of the countries in the sample of the study. This is how the inflation differential is determined in this study.

4.2.8 SADC: A dummy variable.

This variable takes the values of 1 for SADC member countries and 0 for non-members. If this variable is significant and negative, it suggests that SADC member countries intervene in the exchange rate market. If the variable is significant and positive, it suggests that SADC intervenes less in the exchange rate market. If it is significant and positive, SADC members do not form an optimum currency area.

4.2.9 European Monetary Union: A dummy variable.

It takes the value of 1 for EMU member countries and 0 for non-members. If this variable is significant and negative, it suggests that EC member countries form an optimum currency area. If it is significant and positive, EC members do not form an optimum currency area.

4.2.10 YEAR: A dummy variable.

This dummy variable is there to control for the effect of time in the model. It is there to control for the changes related to time for the periods of 1984 to 1985 against the period of 1994 to 1995.

4.3 Preliminary data examination

The raw data was calculated such that it is in constant millions of US dollars (1995=100) to make it compatible. Data is extracted from the following sources:

- The International Financial Statistics (IFS). Data extracted from this source is data on exports and imports, the GDP, private capital flows, population, and the inflation rates. This data is used to calculate the OI, CM, PCGDP and the ID variables.
- The Direction of Trade Statistics (DOTS). Data extracted from this source is data on the percentage of total exports accounted for by exports to the largest market. This data is used to calculate the GC and the ID variables. Calculating the ID variable involved the exercise of extracting data from the DOTS manually and transferring it into a spreadsheet. The exercise involved taking data on imports and exports of all the trading partners for the countries in the sample, and then determining the proportion of trade that each country does with each of its trading partners.
- The Yearbook of International Trade Statistics. Data extracted from this source is data on exports accounted for by the largest export in terms of the two-digit SITC classification. This data is used to calculate the PD variable.

The following problems were encountered with the data:

4.3.1 Not all data is readily available from the IFS and other sources for all the countries in the sample. The nominal effective exchange rate (NEER) used to calculate the flexibility index is not available for some countries in the sample. These countries are: Argentina, Barbados, Botswana, Chad, Egypt, India, Indonesia, Jamaica, Kenya, Korea, Madagascar, Mali, Mauritius, Mexico, Mozambique, Namibia, Nepal, Peru, Seychelles, Sri Lanka, Swaziland, Tanzania, Thailand and Zimbabwe.

The NEER for the above countries is calculated using the formula below extracted from Holden and Holden (1985):

$$E_{(t-k)} = \left(\frac{\sum_{i=1}^n a_{ij} N_{ij(t-k)}}{\sum_{i=1}^n a_{ij} N_{ij(t)}} \right) \times 100 \quad \text{where } i \neq j$$

Above:

- $E_{(t-k)}$ is the index of the trade-weighted exchange rate of a country (NEER).
- a_{ij} is the proportion of country i 's total trade that occurs with country j . These are the weights. They are calculated for the base year which is 1995 in the sample, the same base year as with the NEER's for other countries that were readily available.
- N_{ij} is the exchange rate between country i and its trading partner country j .

Therefore, at time t , the first month of the period, the index is set to 100. In the second month, the index is determined as:

$$E_{(t-1)} = \left(\frac{\sum_{i=1}^n a_{ij} N_{ij(t-1)}}{\sum_{i=1}^n a_{ij} N_{ij(t)}} \right) \times 100 \quad \text{where } i \neq j$$

This formula is performed for each month of the data of each country until the last month. The results are then transferred to the F_i calculation. Therefore, calculating the NEER involves determining the trading partners of each country in the sample and the proportion of trade between the country in question and its trading partners. This serves as the weights in the calculation. The weights are then multiplied by the exchange rate, i.e. the country in question's currency relative to each of its trading partners, then dividing this by the values determined for the base month, where the base month is:

$$E_{jt} = \frac{\sum_{i=1}^n a_{ij} N_{ij(t)}}{\text{Set to 100}}$$

4.3.2 The data for SACU members is not available at the individual country level from the DOTS and the Yearbook of International Trade Statistics in order to calculate the ID and PD variables respectively. The data is available only at the regional level. Therefore, another source was consulted, i.e. the Country Reports from the Economist Intelligence Unit (EIU).

4.4 Problems to be treated

There are two main econometric problems that have to be tested in the data set. These are the endogeneity problem and the heteroscedasticity problem since the data set used is cross-sectional in nature.

4.4.1 The endogeneity problem:

Endogeneity occurs when an explanatory variable is correlated with the residual. In this case the ID variable is the potential candidate. With the problem of endogeneity, ordinary least squares is not suitable. An alternative method of estimation is the method of instrumental variables (IV). An instrumental variable is a variable that is correlated with the explanatory variable (ID) but not with the residual in the model. Finding an instrumental variable for the inflation differential has proved to be very difficult. It is difficult to find a variable that will be correlated to the inflation differential variable without being correlated to the residual.

However, with thorough analysis of economic literature, it has been found that the change in the money supply does determine the level of inflation in an economy. The change in the level of money supply is found to be highly correlated to the inflation differential. This will be illustrated in the next few sections.

4.4.2 Heteroscedasticity:

The sample data in this study is cross-sectional in nature, there is, therefore likely to be heteroscedasticity. Heteroscedasticity is when the variance of the disturbance term (residual) is not constant. OLS estimation in the presence of heteroscedasticity produces linear, unbiased, but inefficient coefficient estimators. Inefficiency implies that there is no minimum variance in the estimators.

It will be clear when the results are analysed that heteroscedasticity exists in the sample data of this study.

Therefore, the two main problems that have to be treated regarding the sample data are the problems of endogeneity and heteroscedasticity.

4.5 Data Analysis

This section presents the main inferences from the data by looking at the values of the variables in the model. This section looks at the minimum and maximum values of the variables that have been calculated for the model, in order for us to confirm the theory underlying the variables in the model.

From the data as a whole the following minimum and maximum values were found for the variables in the model:

Table 4.1 Minimum and maximum values calculated for the variables in the model

VARIABLE	MINIMUM VALUE FOR THE VARIABLE	MAXIMUM VALUE FOR THE VARIABLE	MINIMUM VALUE FOR THE VARIABLE	MAXIMUM VALUE FOR THE VARIABLE
	1984/85		1994/95	
Fi	0 (Namibia)	3114.69 (Argentina)	0 (Cameroon)	2559.01 (Argentina)
OI	0.003 (Uganda)	2.791 (Singapore)	0.0206 (Congo)	4.7591 (Lesotho)
CM	-0.0006 (Mauritius)	147.6888 (Congo)	0 (Denmark, Greece, Portugal and Saudi Arabia)	-4.13722 (Japan)
PC	2.1 (Mauritius)	92.47 (Congo)	0.8 (Kenya)	88.03 (Zambia)
GC	7.71 (Hungary)	74.33 (Canada)	6.43 (Uruguay)	84.36 (Mexico)
PCGDP	91.93 (Mozambique)	41124.01 (Switzerland)	111.49 (Mozambique)	43700 (Switzerland)
ID	-52.06 (Uruguay)	547.9 (Argentina)	-1.02 (Indonesia)	23754.93 (Congo)

Source: Estimates.

It can be seen from the table above that Namibia had a pegged rate in the period 1984/85, meaning that the authorities interfered in the exchange rate market. Namibia is a member of the CMA where member's currencies are pegged to the Rand. Therefore, the Namibian Dollar was pegged to the

Rand. In the period 1994/95, Cameroon had a pegged exchange rate regime where the authorities interfered in the exchange rate market. On the other hand, Argentina has the highest value of the Flexibility Index in both time periods. This means that during the two periods, the Argentinean authorities did not intervene in the exchange rate market.

Uganda was the least open economy in the 1984/85 period and Congo in the later period. These countries have not engaged in much trade. These countries are mainly natural resource producers. On the other hand, Singapore in the earlier period and Lesotho in the later period are the most open economies in the sample. Singapore trades with many economies in goods and services and Lesotho trades mostly with South Africa. Lesotho is a land-locked country, surrounded by South Africa. Moreover, Lesotho and South Africa are members of SACU. When looking at the level of diversification in the economy, Lesotho was relatively externally diversified with a value of 47.8 in the earlier period, but became one of the least diversified economies in the later period with a value of 74.47.

In both time periods, the most externally diversified economies are Mauritius and Kenya. Congo and Zambia are the least diversified economies in the sample.

The least geographically concentrated economies are Hungary and Uruguay. The most concentrated ones are Canada and Mexico, who both trade largely with the United States. In the earlier period, 72% of total trade in Canada was with the United States and 74% in the later period. 59% of total trade in Mexico in the earlier period was with the US and 78% in the later period.

Mozambique is the least developed country in both time periods. Mozambique is one of the poor countries in the world. GDP per capita is very small in the economy. Switzerland is the opposite. It is the one of the richest economies in the world. GDP per capita is very high.

Divergent inflation rates were experienced mainly in Argentina and Congo (the Democratic Republic) in the earlier and later periods respectively. In these periods Argentina experienced high levels of inflation, i.e. hyperinflation levels. This is the main reason for a high value of ID in Argentina. The Congo, too reached hyperinflation levels in the later period as high as 23773%. Uruguay and Indonesia on the other hand have experienced lower inflation levels.

Table 4.2 Minimum and maximum values calculated for the variables in the model in SADC.

VARIABLE	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
	VALUE FOR THE VARIABLE	VALUE FOR THE VARIABLE	VALUE FOR THE VARIABLE	VALUE FOR THE VARIABLE
	1984/85		1994/95	
Fi	0 (Namibia)	1010.63 (South Africa)	7.52 (Lesotho)	406.81 (Malawi)
OI	0.252 (Mozambique)	2.600 (Lesotho)	0.3194 (Botswana)	4.7591 (Lesotho)
CM	-0.0006 (Mauritius)	0.0911 (Seychelles)	0.00004 (South Africa)	0.08676 (Seychelles)
PD	2.10 (Mauritius)	81.34 (South Africa)	15.17 (Mozambique)	88.03 (Zambia)
GC	12.58 (Mozambique)	70.00 (Namibia)	13.12 (Zambia)	80.00 (Namibia)
PCGDP	91.93 (Mozambique)	4900 (Seychelles)	111.49 (Mozambique)	7278.57 (Seychelles)
ID	-0.58 (Mauritius)	49.66 (Mozambique)	1.61 (Mauritius)	599.45 (Zambia)

Source: Estimates.

In SADC, Namibia had the lowest Fi in the earlier period as explained above. However, the situation reversed in the later period when Namibia had a higher Fi value of 123.17. South Africa on the other hand had the highest Fi in the region in the earlier period. In the later period, Malawi had the highest Fi value. In the earlier period, Lesotho, who pegged to the South African Rand, had a very low Fi value. In this period, Lesotho had a value of 1.20 which is very close to a completely pegged exchange rate. Swaziland who

also pegged to the Rand on the other hand, had a relatively high F_i value in both periods. Authorities intervened greatly in the foreign exchange market.

The least developed and least open economy in SADC is Mozambique. The most developed economy is Seychelles with the highest level of capital mobility. The most open economy is Lesotho. As stated earlier on, Lesotho trades a lot with South Africa, while South Africa trades a lot with the highly developed economies, i.e. the United States, Japan, Germany, Australia and the United Kingdom.

One can conclude that in SADC as a whole or on average, exchange rates have become less flexible; economies more open; capital less mobile; external trade not well diversified but still highly concentrated; the level of development still low but rising in the Seychelles, Mauritius and Botswana; and the inflation differential although moderate, but still high in Zambia and Zimbabwe. The above table and the tables in the appendix reveal this.

In each of the time periods in the study, i.e. the period 1984/85 and 1994/95, three regressions have been performed. The main difference between these regressions emanated from the dummy variable for the European Community (EC) countries. In the first regression of each of the time periods, this dummy variable includes only those EC members who are members of the EMU. These countries are: Austria, Belgium, Netherlands, Finland, France, Germany, Ireland, Italy, Luxembourg, Portugal, and Spain. The second regression includes as one of the dummies all the EC countries. These are all the members of the EMU and additionally, the United Kingdom, Greece, Denmark and Sweden. The third regression includes as one of the dummies those EMU members who had met the criteria for joining the EMU by 1996. These countries are Austria, Belgium, France, Germany and Netherlands.

4.6 The two main problems: Endogeneity and Heteroscedasticity

4.6.1 Heteroscedasticity. It is found that heteroscedasticity is present in the data. It is present mainly in one of the 1994/95 data set. The extent of the presence of heteroscedasticity in the data is shown in the table below.

Table 4.3: The extent of the presence of Heteroscedasticity in the data depending on the dummy variables used in the regressions

Type of dummy variable	1984/85 and 1994/95 (Pooled regression) ¹		1984/85		1994/95	
	Chi-square ²	Probability	Chi-square ²	Probability	Chi-square ²	Probability
No dummies	43.54	0.0000	1.15	0.2835	0.73	<u>0.3936</u>
EMU & SADC	58.54	0.0000	1.69	0.1932	1.75	<u>0.1863</u>
EC & SADC	74.53	0.0000	1.80	0.1795	1.73	<u>0.1880</u>
EMUmetcr & SADC	43.03	0.0000	1.24	0.2649	5.07	<u>0.0243</u>

Notes: 1. The Chow test below shows that there is no structural stability between the models of the two time periods. Therefore the data for the two time periods should not be pooled.
2. There is 1 degree of freedom

It is clear from the above table that heteroscedasticity is highly present in the pooled regression. However, the Chow test below reveals that this regression is not very useful in this study since there is structural instability between the two time periods studied here. Therefore, combining the two time periods into one regression is not reasonable. The results of the pooled regression are given in the appendix only for comparison purposes. In the other regressions, heteroscedasticity is mainly present at the 20% level of significance. It is highly present in the regression including the EMU countries that had met the

criteria for joining the EMU by 1996 and the SADC countries at the 5% level of significance.

In order to treat heteroscedasticity, one can use weighted least squares (WLS) or Robust standard errors. In this study, we estimate the model with robust standard errors.

4.6.2 Endogeneity. The ID variable is endogenous in the model. One way to treat endogeneity is to find an instrumental variable. OLS estimation in the presence of endogeneity results in inconsistent estimators of the coefficients. Therefore one cannot rely on the t-statistics and the standard errors estimated. The method of instrumental variables ensures that the estimates are consistent.

A variable found to be a good instrument for the ID is the changes in the money supply. Changes in the money supply are highly correlated to the ID variable but not to the F_i variable. The correlation coefficient between F_i and changes in money supply in the pooled model was 0.08, in the 1984/85 model it was 0.01 and 0.02 in the later model. The changes in the money supply do affect the level of inflation in an economy. Conventional economic theory suggests that an increase in the money supply leads to an increase in the inflation rate. Therefore, there should be a positive and strong relationship between money supply and the inflation rate, and therefore the inflation differential. This is found to be true when the changes in the money supply are fitted against the ID. Correlation statistics between the inflation differential and the changes in the money supply are given below for the different time periods for this study:

Table 4.4 Correlation between the inflation differential and changes in the money supply.

Variables	Correlation Coefficient (1984/85)	Correlation Coefficient (1994/95)
Inflation differential and changes in the money supply	0.9284	0.9636

It is clear from the above table that the ID and changes in the money supply are highly correlated. Also, the changes in the money supply are not correlated to the residuals in the model and therefore, less correlated with F_i .

4.7 The Chow Test

The Chow Test is used to compare regressions by testing for structural stability of regression models. This test is used to determine whether there has been a structural change between the period 1984/85 and 1994/95 or not. If there is a structural change, then it is not advisable that the two time periods be combined into one regression. The assumptions underlying the Chow test are:

- that the error terms (or the residuals) are normally distributed with the same variance; and
- that they are independently distributed.

Therefore the null hypothesis is that the regressions are the same, i.e. there is structural stability between the two regressions. To test this, the F-test is used in the following manner:

Step 1: Combine the observations from two regressions of the two time periods,

i.e. 1984/85 and 1994/95. Then run the regression and determine the residual sum of squares (RSS), say, S_1 with degrees of freedom as $n_1 + n_2 - k$. Where n_1 is the sample size for period 1 (the 1984/85 sample) and n_2 is the sample size for period 2 (the 1994/95 sample) and k is the number of parameters estimated including the constant.

Step 2: Then estimate the two time periods individually and obtain their RSS, say S_2 and S_3 , with degrees of freedom given as $n_1 - k$ and $n_2 - k$ respectively. Then add these two RSS and determine $S_4 = S_2 + S_3$ with degrees of freedom as $n_1 + n_2 - 2k$.

Step 3: Obtain $S_5 = S_1 - S_4$

Step 4: Then determine the F statistic given the assumptions of the Chow Test as:

$$F = \frac{S_5 / k}{S_4 / (n_1 + n_2 - 2k)}$$

If the F statistic computed above exceeds the critical F value at the chosen level of significance, the null hypothesis is rejected. This means that there is structural instability and the two time periods cannot be combined into one regression. The F statistic for the model is therefore:

$S_1 = 20258455.5$	-----	Combined regression
$S_2 = 3465235.94$	-----	1984/85
$S_3 = 2314824.89$	-----	1994/95
$S_4 = 5780059.83$	-----	$S_2 + S_3$
$S_5 = 15478395.67$	-----	$S_1 - S_4$
$k = 10$		

$$F = \frac{5478395.67 / 10}{5780059.83 / (70 + 70 - 2(10))}$$

$$= 32.13$$

The critical F statistic is 1.26. The above F statistic exceeds the critical F statistic. Therefore we reject the null hypothesis of structural stability. The

observations from the two time periods, i.e. 1984/85 and 1994/95 cannot be combined into one regression. Therefore, this study will concentrate mainly on the individual time period regressions.

4.8 Results

The results of the model are given in this section. The two time periods in this study have three regressions each. The first regression has a dummy variable for the EU countries and SADC countries with the rest of the explanatory variables in the model. The second regression has dummy variables for the EMU and SADC countries with the rest of the other variables. The last regression has dummy variables for EMU countries and SADC countries and the rest of the variables in the model. The EMU countries in the third regression are those who had met the criteria for entering the Monetary Union by 1996 as indicated earlier on. The results of the regressions are given in Tables 4.5 and 4.6. The *a-priori* expected signs of the coefficients of the variables are:

- OI - negative because there is an inverse relationship between exchange rate flexibility and openness of the economy as explained earlier.
- PC - negative because there is an inverse relationship between exchange rate flexibility and the diversification of the external sector as explained earlier.
- GC - negative because there is an inverse relationship between exchange rate flexibility and geographical concentration of trade.
- PCGDP - positive because there is a positive relationship between exchange rate flexibility and the degree of economic development as explained earlier.
- ID - positive because there is a positive relationship between exchange rate flexibility and the divergence between inflation rates as explained earlier.

- CM - it can be positive or negative, as explained earlier.
- SADC – a negative sign. SADC is expected to have a negative sign because of the hypothesis stated earlier on that SADC forms an optimum currency area. A negative sign on this variable will imply that SADC has tended to adopt a more fixed exchange rate policy and therefore forms an optimum currency area. If the sign is positive, we will then reject the hypothesis.
- EMU - a negative sign would indicate that these countries adopted less flexible exchange rates than other countries in the model. These countries are members of a monetary union at present. However in the period 1994/95, most of the members had not met the criteria for joining the monetary union. A positive sign would indicate that these countries adopted more flexible exchange rates than other countries in the model.
- EC – the sign can be positive or negative since certain countries do not form part of the EMU. Therefore, the sign will depend on whether flexibility of the exchange rate is more dominant or not.
- EMUmetcr – a negative sign is expected and will indicate that these countries adopt less flexible exchange rates. One would expect this to be highly prevalent in the 1994/95 period since these countries were closer to entering a monetary union than in the 1984/85 period.

The three models that were run are:

$$F_i = \beta_1 + \beta_2 ID + \beta_3 PC + \beta_4 GC + \beta_5 OI + \beta_6 CM + \beta_7 PCGDP + \beta_8 SADC + \beta_9 EMU \quad \text{Regression 1}$$

$$F_i = \beta_1 + \beta_2 ID + \beta_3 PC + \beta_4 GC + \beta_5 OI + \beta_6 CM + \beta_7 PCGDP + \beta_8 SADC + \beta_9 EU \quad \text{Regression 2}$$

$$F_i = \beta_1 + \beta_2 ID + \beta_3 PC + \beta_4 GC + \beta_5 OI + \beta_6 CM + \beta_7 PCGDP + \beta_8 SADC + \beta_9 EMUmetcr \quad \text{Regression 3}$$

Table 4.5 Regression results for the period of 1984/85.

Variable	Regression 1	Regression2	Regression 3
	Coefficient, Robust Standard Error and T- statistic	Coefficient, Robust Standard Error and T- statistic	Coefficient, Robust Standard Error and T- statistic
ID	5.033501 (0.331) (15.188)	5.02445 (0.339) (14.804)	5.070678 (0.320) (15.864)
PC	2.440953 (1.777) (1.374)	2.425025 (1.772) (1.368)	2.64061 (1.741) (1.517)
GC	2.326724 (1.751) (1.328)	2.203839 (1.670) (1.320)	2.575794 (1.807) (-1.599)
OI	-95.77743 (60.765) (-1.576)	-97.66537 (59.823) (-1.633)	-104.0697 (65.092) (-1.559)
CM	-1.236621 (0.810) (-1.526)	-10.183729 (0.851) (-1.392)	-1.282589 (0.808) (-1.588)
PCGDP	0.0085857 (0.006) (1.373)	0.0089394 (0.007) (1.267)	0.0078109 (0.006) (1.256)
SADC	61.70113 (115.0067) (0.537)	63.02094 (114.69) (0.550)	67.75182 (114.61) (0.591)
Europe dummy	-51.8653 (82.97006) (-0.625)	-50.67932 (109.301) (-0.464)	43.70046 (78.843) (0.581)
Constant	61.08378 (78.66615) (0.776)	66.0602 (77.31492) (0.854)	45.83181 (78.843) (0.581)
	F(8, 61) = 37.93 Prob. F = 0.0000 R-squared = 0.7124 Number of observations = 70	F(8, 61) = 38.14 Prob. F = 0.0000 R-squared = 0.7125 Number of observations = 70	F(8, 61) = 40.19 Prob. F = 0.0000 R-squared = 0.7114 Number of observations = 70

Notes: The values in parenthesis are the standard errors and t-statistics (the t-statistics are below the standard errors).

In table 4.5, the R-squared indicates that 71% of the inter-country variance of the flexibility index is explained by the variables included in all the regressions. The level of significance of the equations as measured by the F-statistic is very high meaning that all the regressions are jointly significant.

The estimated parameters are not all in accordance with a priori expectations. The ID is highly significant in the model. This means that the inflation rates were the ones driving the exchange rates in the 1984/85 period. The sign for this variable is positive and meets the *a-priori* expectations in all three regressions. Therefore, in this period, it was the differential inflation rates that drove exchange rate policy.

Other variables do not provide a significant level of explanation of the F_i in the model. Usually, when the fit of the model is very high (the value of the R-square) and the t-statistics are insignificant, multicollinearity is the problem. Multicollinearity is experienced when there is a perfect, or exact linear relationship among some or all explanatory variables of a regression model (Gujarati, 1995, 320). Multicollinearity has been tested for by regressing each variable in the model against each of the other variables in order to detect if any of them are highly correlated. None of them are correlated.

The variables that have the *a-priori* expected signs are OI, with a negative sign; PCGDP with a positive sign; and CM has a negative sign.

In regressions 1 and 2, the EMU and the EU dummies variable have negative signs respectively. In regression 1, this indicates that members of the EMU in the period 1984/85 adopted less flexible exchange rates than the rest of the countries in the model. The same applies to regression 2 for the EU countries. In regression 3, the EMUmetcr dummy has a positive sign. This signifies that countries captured by this variable adopted more flexible exchange rates. The authorities were intervening less in the exchange rate market.

The SADC dummy variable has a positive sign in all three regressions, signifying that SADC countries adopted more flexible exchange rates in the period 1984/85. In regression 3, the coefficients on the SADC and EMUmetcr dummy variables indicate that in this period, SADC members adopted more flexible exchange rates than the EMUmetcr members did.

Table 4.6 Regression results for the period of 1994/95.

Variable	Regression 1	Regression 2	Regression 3
	Coefficient, Robust Standard Error and T- statistic	Coefficient, Robust Standard Error and T- statistic	Coefficient, Robust Standard Error and T- statistic
ID	0.0345087 (0.005) (7.250)	0.0344766 (0.005) (7.047)	0.03362 (0.005) (6.915)
PC	-1.464804 (0.948) (-1.545)	-1.364491 (0.932) (-1.464)	-1.182784 (0.954) (-1.239)
GC	0.9780465 (1.358) (0.720)	1.098179 (1.328) (0.827)	0.8787622 (1.383) (0.635)
OI	-36.57334 (20.906) (-1.749)	-33.27864 (19.999) (-1.664)	-35.00397 (18.757) (-1.866)
CM	-58.85621 (29.376) (-2.004)	-64.12227 (30.805) (-2.082)	-59.0989 (23.559) (-2.509)
PCGDP	0.0017413 (0.003) (0.661)	0.0013425 (0.003) (0.475)	0.0008991 (0.002) (0.397)
SADC	21.18233 (60.985) (0.347)	17.89347 (61.092) (0.293)	9.561613 (72.768) (0.131)
Europe dummy	102.6632 (97.273) (1.055)	98.74545 (87.9883) (1.122)	230.5201 (100.104) (2.303)
Constant	203.2541 (53.047) (3.832)	195.1059 (50.603) (3.856)	204.5359
	F(8, 61) = 2.4 Prob. F = 0.0000 R-squared = 0.2712 Number of observations = 70	F(8, 61) = 13.18 Prob. F = 0.0000 R-squared = 0.2706 Number of observations = 70	F(8, 61) = 36.34 Prob. F = 0.0000 R-squared = 0.3108 Number of observations = 70

Notes: The values in parenthesis are the standard errors and t-statistics (the t-statistics are below the standard errors).

In Table 4.6, the R-squared indicates that 31% of the inter-country variance of the flexibility index is explained by the variables included in regression 3 and 27% is explained in the regression 1 and 2. As an indicator of the explanatory power of the equation, the R-squared indicates the explanatory power of the equation, although moderate, is not unusually low for a cross-

sectional study. The level of significance of the equations as measured by the F-statistic is very high meaning that the equations are highly significant.

The estimated parameters are not all in accordance with a priori expectations. As with the period 1984/85, the ID is highly significant in the model in the period 1994/95. This means that the inflation rates were also the ones driving the exchange rates in the 1994/95 period. The sign for this variable is positive and meets the *a-priori* expectations in all three regressions. However, if you compare this period and the earlier period, it is obvious from the coefficient of this variable that the role of the ID as a determinant of the movements in the exchange rates is more prevalent in the earlier period, i.e. 1984/85 than in the later period. This is because the coefficient of this variable in the earlier period is higher than in the later period.

Other variables that provide a significant level of explanation of the F_i are OI and CM in all three regressions. These variables also have the *a-priori* expected signs. This indicates that openness has significantly determined the type of exchange rate policy followed in most of the countries in the model. The significance of the CM variable on the other hand signifies that capital mobility has significantly determined the type of exchange rate adopted. The sign on this variable indicates that countries with high levels of capital mobility have been adopting less flexible exchange rates. The rest of the variables do not provide a significant level of explanation of the F_i in the model. Other variables that have the *a-priori* expected signs are PC, with a negative sign; and PCGDP with a positive sign.

In all regressions, the EMU, EU and the EMUmetcr dummy variables have positive signs. This signifies that countries captured by these dummy variables adopted more flexible exchange rates. It was noted earlier on that the EU countries had not met the criteria for joining the monetary union by 1997. One would expect, therefore that they would not have met the criteria even earlier than 1997, i.e. the period 1994/95 assessed in this study.

The SADC dummy variable has a positive sign in all three regressions, signifying that SADC countries adopted more flexible exchange rates in the period 1994/95, i.e. one would not expect SADC to have formed an optimum currency area in this period. In the regressions, the coefficients on the SADC and EMU, EU and EMUmetcr dummy variables indicate that in this period, SADC members adopted less flexible exchange rates than the countries captured by these other dummies. SADC adopted flexible exchange rates but less so than the EMU countries in this period.

4.9 The results of the 1979 study by Holden, et. al.

The model that was estimated is:

$$F_i = \beta_1 + \beta_2 OI + \beta_3 CM + \beta_4 PC + \beta_5 GC + \beta_6 PCGDP + \beta_7 ID$$

The model was estimated in linear form using ordinary least squares on the cross sectional data for 75 countries. It should, however be noted that a different sample was used from the one used in the present study. The reason for this is that firstly, the present study has to incorporate SADC members in the sample, which the Holden et.al (1979) study did not incorporate. Secondly, enough data for some countries which were incorporated in the sample for the Holden et.al (1979) study is not available in the periods analysed in this study.

The expected signs of the coefficients are as given earlier. The following results were retrieved from regressing the above model:

Table 4.7: Results from the Holden et.al regression (1974/75)

Variable coefficient	coefficient	standard error	t-statistic	beta
Constant	.19306	.0412	4.686	-
OI	-.03616	.0171	2.109	.1978
PC	-.00134	.5880	2.278	.2363
ID	.96875	.2529	3.830	.3676
PCGDP	.48489	.1346	3.581	.3687
GC	-.85573	.8007	1.068	.1029
CM	-.01066	.0279	0.382	.0357
R2= .4195; SEE= .1030; F(6, 68) = 8.189; F probe = .0000				

Source: Holden, Merle Holden, and Esther C. Suss, *The Determinants of Exchange Rate flexibility: An Empirical Investigation* (1979).

The R2 (R-squared) indicates that 42% of the inter-country variance of the flexibility index is explained by the variables included in the regression. The R2 indicates the explanatory power of the equation. The level of significance of the equation as measured by the F-statistic exceeded 99%. The estimated parameters on all variables were in accordance with a priori expectations. OI, PC, PCGDP and ID were significant at 5% level. One variable was, however, not significant and that is the CM variable. The beta coefficients ascertain the importance of each explanatory variable. The higher the beta coefficient, the higher the level of explanatory power a variable gives to the exchange rate flexibility. The inflation differential variable and the degree of economic development variable contribute the most to the explanation of the flexibility index. The importance of the inflation differential variable suggests that the more a country's inflation rate diverges from the world rate, the more appropriate a flexible exchange rate is. Also, the importance of the degree of economic development variable suggests that countries with relatively developed goods markets are prepared to follow a flexible exchange rate. What is surprising is the low significance of the openness variable given the importance that this variable is usually accorded to by optimum currency area literature.

4.9 Comparisons between the Holden et.al model and the present model

Regressions of the model without the dummy variables are given in the appendix. These regressions make it easier for one to compare the results from the period 1974/75 and the periods analysed in this study. In the period 1984/85, the fit of the model as given by the R-squared is very high because it is 71%. In the period 1994/95, the fit is relatively low at 25%. However, the F- statistic is highly significant implying that the model is significant in both periods analysed by the present study.

In both periods of the present study, i.e. 1984/85 and 1994/95, it can be seen that the ID plays the major role in explaining the movements in the exchange rates. The ID positively determines the Flexibility of an exchange rate. This variable is highly significant in both periods of the present study. In the 1974/75 study however, the ID did not play such a major role, but still, it was the second most significant variable in the model. Inflation rates have therefore affected the exchange rates in past decades. They have positively determined the flexibility of the exchange rate.

In the period 1994/95, the PC and PCGDP variables were significant at the 10% level of significance. This means that in this period, the level of diversification of the external sector strongly determined exchange rate flexibility. PC is negative, refuting *a-priori* expectations. However, in the earlier period, PC has a positive coefficient suggesting that highly concentrated economies tended to adopt more flexible exchange rates. Although this was not an expected result, these results are insignificant.

In the earlier period, the other significant variable in the model is CM. CM is significant at the 5% level of significance and therefore it is highly significant. The sign on this variable is negative, suggesting that economies where capital is highly mobile had tended to adopt less flexible exchange rates.

Now the question is: what do the above results suggest about the hypothesis posed earlier on in the chapter? The SADC dummy variable in the above models is not significant. This suggests that there has not been harmonisation on the exchange rate markets between the members of SADC. The results also suggest that SADC would have been more of an optimum currency area in the earlier period, i.e. 1984/85 than in the later period, i.e. 1994/95. This is because the coefficient on this variable in all the regressions performed is higher in the earlier period than the later period. The results also suggest that SADC would have been more of an optimum currency area in the earlier period than the European countries in all the categories, since the SADC dummy had higher coefficients than all three Europe dummies in this period. However in the later period it's the vice versa. One can therefore conclude that SADC does not form an optimum currency area.

5. Conclusion

SADC has as one of its wider objectives the formation of a monetary union in the future, given that the European Monetary Union has paved the way for the coordination of monetary and fiscal policy. As is revealed in this study, SADC does not form an optimum currency area. If a region forms an optimum currency area, it indicates that the coordination of exchange rate policy, monetary policy and fiscal policy is optimal. The coordination of these policies implies that the countries concerned can form a monetary union. SADC does not conform to the criteria for forming an optimum currency area. The main criteria used in this study are the criteria determined by Holden, et.al in 1979. They developed a model for determining the flexibility or fixation of the exchange rate. This model has been used in this study to determine if SADC does form an optimum currency area or not. The criteria include:

5.1 Opening up the economies. This is revealed by the ratio of imports and exports to GDP. SADC economies are relatively open, but not mostly towards each other. Trade between SADC members is not very high, however these countries tend to trade a lot with the highly developed countries such as the US, Japan, Germany, etc. The Trade Protocol that aims to improve trade within SADC may be the right step towards improving trade in SADC. It has to be emphasised that this study is limited to the period 1994/95. It would be interesting to see how SADC has improved since 1995 regarding openness and other assessment criteria for forming an optimum currency area. The main problem which may, perhaps inhibit such an analysis would be the availability of the data, since the most recent data is not yet fully available for one to be able to perform a full study as has been done in this one.

5.2 The level of economic development. There are huge gaps between the members of SADC regarding the level of economic development. Development levels have not converged in SADC. The level of economic

development is measured here by the GDP per capita. On the one extreme, Seychelles is the most developed economy in SADC. Seychelles has a GDP per capita of \$7278.57. This is for the period 1994/95. Mozambique is on the other extreme with a GDP per capita of only \$111.49. This would inhibit any attempts towards the harmonisation of exchange rate policy in the region.

- 5.3 The diversification of the external sector.** A number of SADC members are still highly concentrated. Zambia, Botswana, Lesotho, Malawi and Mauritius have concentration levels of 88%, 75%, 74%, 64% and 53% respectively. This is measured by the percentage contribution of the highest export to total exports according to the two digits SITC. On the other hand, countries such as Mozambique, South Africa, Namibia and Zimbabwe are more diversified with the values of 15%, 26%, 27% and 30% respectively.
- 5.4 Geographical concentration of trade.** There is divergence also on the geographical concentration of trade in SADC. Namibia's trade is the most concentrated in SADC. Up to 80% of total trade is done with South Africa. On the other extreme, Zambia is the least concentrated with a value of 13% of total trade.
- 5.5 Capital mobility.** Capital is not highly mobile in SADC. There is not much movement of capital within SADC. However there are measures in place to improve the movement of capital in SADC. This is one of the goals that SADC aims to achieve in the next few years as mentioned in the first chapter of this study.
- 5.6 Differences in inflation rates.** There is a lot of divergence in the inflation differential of the SADC members. Zambia and Zimbabwe are on one extreme with the inflation differentials of -599.45 and -107.15 respectively. On the other extreme, Seychelles and Mauritius have inflation differential values of -1.24 and 1.61 respectively. Low inflation differentials are one of the conditions for optimum currency area formation. Therefore, the divergence in SADC on this variable inhibits the region in terms of optimum currency area formation.

The above criteria reveal that SADC is not ready for an optimum currency area. SADC has, therefore not converged on the basic criteria for forming a monetary union. Also, it was revealed in the earlier chapters that SADC has high debt levels. The levels of debt to GDP were one of the criteria determining whether a country can join the EMU. The debt to GDP ratio had to be at least 60%, economies had to have been growing at least at 3% per annum and the budget deficit should not have been more than 1.8% of GDP. It has been shown that not all SADC members are growing at above 3% per annum, but on average, SADC is growing at above 3% per annum (see Appendix A).

Other arguments working against SADC forming a monetary union are the rigidities found in prices and wages. Prices are biased upwards in SADC. Also, capital is highly immobile between the traded and the non-traded goods sectors in most SADC member countries. Unless the above factors are addressed, SADC cannot form an optimum currency area.

APPENDICES

Appendix A: GDP growth (annual %) in SADC

Appendix B: Pooled regression estimates

Appendix C: Estimation without dummy variables

Appendix D: External public and publicly guaranteed debt outstanding and
Disbursed

Appendix E: Total debt service (% of GNP)

APPENDIX A

GDP growth (annual %) in SADC								
Year	Lesotho	Namibia	Swaziland	South Africa	Botswana	Zambia	Zimbabwe	Angola
1980	-3		11	8	14	3	14	
1981	1	1	2	7	10	6	13	
1982	4	-1	1	-2	7	-3	3	
1983	-9	-2	2	-3	16	-2	2	
1984	3	0	6	6	12	0	-2	
1985	9	-1	4	-3	7	2	7	
1986	2	5	12	0	7	1	2	3
1987	5	4	15	3	9	3	1	8
1988	13	0	7	4	15	6	8	6
1989	13	2	9	2	13	-1	5	0
1990	4	-1	9	0	6	0	7	0
1991	1	10	2	-1	9	0	6	1
1992	4	6	1	-2	6	-2	-9	-5
1993	4	-2	3	1	0	7	1	-24
1994	13	7	3	3	4	-3	7	1
1995	9	3	3	3	3	-2	-1	11
1996	13	3	4	3	7	6	7	12
1997	8	2	4	2	7	3	3	8

GDP growth (annual %) --continued							
Year	Malawi	Mauritius	Mozambique	Seychelles	Tanzania	Congo, Dem. Rep.	SADC Average
1980	0	-10			-4	2	4
1981	-5	6	5		-8	2	3
1982	3	5	-7		-1	0	1
1983	4	0	-16		-2	1	-1
1984	5	5	-6		8	6	4
1985	5	7	1		10	0	4
1986	0	10	-2		1	5	4
1987	2	9	15		4	3	6
1988	3	7	8		4	0	6
1989	1	4	7		10	4	5
1990	6	7	1		9	5	3
1991	9	4	5		3	4	3
1992	-7	6	-8		7	-9	-2
1993	10	5	9		6	12	1
1994	-10	4	8		-1	1	2
1995	15	5	4		-1	3	4
1996	11	5	7		5	4	6
1997	5	5	12		4	4	4

APPENDIX B – Pooled Regression Estimates

Variable	Pooled Regression 1 Coefficient, Robust Standard Error and T- statistic	Pooled Regression2 Coefficient, Robust Standard Error and T- statistic	Pooled Regression 3 Coefficient, Robust Standard Error and T- statistic
ID	0.7458428 (0.761) (0.980)	0.7287515 (0.755) (0.966)	0.7628624 (0.770) (0.991)
PD	0.2696968 (1.411) (0.191)	0.109222 (1.542) (0.071)	0.5613383 (1.381) (0.407)
GC	-0.9242532 (2.286) (-0.404)	-1.336471 (2.420) (-0.552)	-0.6508057 (2.242) (-0.290)
OI	-116.4376 (42.319) (-2.751)	-121.7658 (43.032) (-2.830)	-121.153 (44.715) (-2.709)
CM	0.1066774 (1.004) (0.106)	0.4240862 (1.023) (0.415)	-0.0226316 (0.988) (-0.023)
PCGDP	0.0079242 (0.004) (1.836)	0.0099854 (0.005) (1.921)	0.0057686 (0.004) (1.447)
SADC	40.11539 (63.736) (0.629)	42.21575 (64.44316) (0.655)	41.30464 (63.460) (0.651)
Europe dummy	-109.333 (94.890) (-1.152)	-164.924 (120.39) (-1.370)	25.54791 (68.991) (0.369)
Year	31.73243 (68.104) (0.466)	31.73243 (68.104) (0.466)	27.3476 (68.991) (0.396)
Constant	283.0724 (138.589) (2.043)	319.1387 (129.69) (2.461)	269.6355 (136.17) (1.980)
	F(9, 128) = 5.00 Prob. F = 0.0000 R-squared = 0.0143 Number of observations = 138	F(9, 128) = 5.22 Prob. F = 0.0000 R-squared = 0.0259 Number of observations = 138	F(9, 128) = 4.90 Prob. F = 0.0000 R-squared = 0.0032 Number of observations = 138

Notes: The values in parenthesis are the standard errors and t- statistics (the t-statistics are below the standard errors).
Source: estimates.

APPENDIX C – Estimation without the dummy variables

Variable	1984/85	1994/95	Pooled Regression
	Coefficient, Robust Standard Error and T- statistic	Coefficient, Robust Standard Error and T- statistic	Coefficient, Robust Standard Error and T- statistic
ID	5.046634 (0.327) (15.445)	0.0343649 (0.004) (8.013)	0.7598249 (0.762) (0.997)
PD	2.66106 (1789) (01.487)	-1.542265 (0.882) (-1.749)	0.638856 (1.389) (0.460)
GC	2.647599 (1.800) (1.471)	0.8159304 (1.225) (0.666)	-0.5859197 (2.175) (-0.269)
OI	-84.68962 (51.012) (-1.660)	-31.14205 (18.342) (-1.698)	-112.6009 (39.937) (-2.819)
CM	-1.555808 (1.741) (-2.101)	-48.90513 (34.346) (-1.424)	-0.1907203 (0.918) (-0.208)
PCGDP	0.0074423 (0.005) (1.389)	0.0031221 (0.003) (1.099)	0.0056779 (0.003) (1.703)
Constant	48.4884 (77.834) (0.623)	212.916 (51.032) (4.172)	269.5657 (134.541) (2.004)
	F(6, 63) = 50.20 Prob. F = 0.0000 R-squared = 0.7084 Number of observations = 70	F(6, 63) = 17.79 Prob. F = 0.0000 R-squared = 0.2495 Number of observations = 70	F(7, 130) = 5.93 Prob. F = 0.0000 R-squared = 0.0026 Number of observations = 138

Notes: The values in parenthesis are the standard errors and t- statistics (the t-statistics are below the standard errors).

Source: estimates

APPENDIX D: External Public and Publicly Guaranteed debt outstanding and disbursed (US \$ millions)

	Official Sources			Private Sources			Total			Debt service		
	1970	1980	1988	1970	1980	1988	1970	1980	1988	1970	1980	1988
Angola	-	80.0	-	-	478.0 _a	-	-	558.0 _a	-	-	141.0 _a	-
Botswana	14.2	146.7	466.1	3.2	4.9	27.8	17.4	151.6	493.9	0.6	12.6	73.7
Lesotho	7.6	45.2	225.6	0.5	11.4	22.0	8.1	56.5	270.2	0.5	4.8	22.4
Malawi	103.0	433.0	1,141.0	20.0	192.0	49.0	122.0	625.0	1,190.0	6.0	68.0	58.0
Mozambique	-	356.0 _a	3,054.0	-	229.0 _a	746.0	-	58.5 _a	3,800.0	-	94.4 _a	20.0
Swaziland	20.9	160.9	245.3	16.1	24.2	10.1	37.0	185.1	255.4	3.4	16.5	34.8
Tanzania	153.0	1,554.0	3,824.0	97.0	455.0	267.0	250.0	2,009.0	4,091.0	17.0	74.0	85.0
Zambia	120.0	1,501.0	3,671.0	503.0	644.0	523.0	623.0	2,145.0	4,194.0	64.0	287.0	176.0
Zimbabwe	85.6	101.0	1,220.0	145.0	595.0	1,010.0	230.0	696.0	2,230.0	9.0	50.0	447.9

Source: Kisanga, 1991, 147

APPENDIX E: Total debt service (% of GNP)

Years	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Angola	3.5	3.4	4.0	3.9	7.0	4.7	13.3	20.1	20.3	19.2
Botswana	3.6	2.7	3.2	2.2	2.4	2.0	2.3	2.0	3.1	2.1
Congo, Dem. Rep.	4.8	7.3	4.1	2.1	0.9	0.3	0.2	0.5	0.9	0.2
Lesotho	3.0	2.6	2.3	2.7	3.1	3.0	2.6	3.2	2.9	3.6
Malawi	8.2	6.5	7.5	6.0	6.1	3.9	7.0	8.4	4.0	3.1
Mauritius	9.6	6.7	6.0	6.1	5.7	4.0	4.6	5.7	4.6	6.5
Mozambique	4.4	4.7	4.2	4.4	5.9	8.0	7.5	9.3	6.6	4.1
Namibia	..	..	..	..	..	..	..	..	..	..
Seychelles	6.7	8.1	6.1	5.1	4.3	4.0	3.6	4.8	3.1	2.8
South Africa	..	..	..	..	..	..	2.4	2.6	3.4	3.8
Swaziland	5.4	5.0	5.1	3.0	2.3	2.3	2.5	1.6	2.5	2.2
Tanzania	3.3	3.9	4.5	4.8	5.0	4.9	4.5	4.4	4.1	2.2
Zambia	5.7	5.7	6.7	20.0	12.3	12.1	12.0	80.3	8.2	7.3
Zimbabwe	7.0	5.4	5.5	5.5	9.2	9.8	9.1	9.5	8.1	8.0
AVERAGE	5.4	5.2	4.9	5.5	5.4	4.9	5.5	11.7	5.5	5.0

Source: World Development Indicators, World Bank, Washington, USA.

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