

**DANCING WITH NEIGHBOURS:  
CO-MOVEMENT BETWEEN SOUTH AFRICA AND SADC**

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**Abstract**

This paper uses a novel dynamic factor model *à la* Forni *et al.* (2001) to investigate the impact of increasing trade on the co-movement of the business cycle between South Africa and the Southern African Development Community (SADC) countries. The results show a moderate but increasing synchronization between South Africa and SADC countries, in contrast with the already existing high correlation between the South African business cycle with the G-7 countries and most emerging market countries. This is evidence of the increasing importance and spread of the forces of globalization, reflected in the increasing integration of goods and services through international trade. The striking result is that South Africa, justified by its geographical location and increased trade integration in the SADC, cannot isolate itself from its SADC neighbours, and that regional policy coordination is of the utmost importance.

**Keywords:** International business cycles, generalized dynamic factor model, co-movement, intra-regional integration

**JEL** subject classifications: C13, C32, E30, F02, F41

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## **1. Introduction**

The process of globalization had a large impact on the world economy over the past three decades. For developing countries, the forces of globalization became more pronounced from the late 1980s and early 1990s (see Loots, 2001). The forces of economic globalization are particularly evident in the breaking down of national economic boundaries, the liberalization of international trade, finance and production activities and the growing power of transnational corporations and international financial institutions (Khor, 2000:3). Economic globalization therefore manifests itself in the increasing integration of goods and services through international trade and the integration of financial markets.

While the international flows of goods, services and capital are significant, the existence of co-movements in economic variables for different countries became more evident. The extent to which globalization causes domestic economies to move with economies in the rest of the world or in their particular region, concerns policy-makers. When such co-movement is comprehensive, the influence of policy-makers on their respective domestic economies is significantly reduced.

South Africa is no exception to the rule. The country re-entered the international economy in the early 1990s when the forces of globalization, especially for developing countries, seemed to gain momentum. Evidence shows that approximately 98 per cent of the current growth performance in the country can be explained by the forces of globalization (Loots, 2003:239). This is further strengthened by the strong evidence in this study on the international co-movement between the world economic cycle and South Africa – a correlation of 76 per cent exists. Preliminary results by the authors of this paper also indicate a high correlation between the South African business cycle with both the G-7 and selected group of emerging market economies.

South Africa was admitted as a member of the Southern African Development Community (SADC) in 1994. Of the 14 member states, South Africa has by far the

largest and most developed economy in the region. The question that arises is the extent of the co-movement between the South African economy and the remaining 13 SADC economies. Although various studies<sup>2</sup> have focused on debates such as whether conversion or diversion is taking place within the SADC region, as well as the contagion effect of for instance the Zimbabwe crisis, an analysis on the synchronization or co-movement between South Africa and the remaining SADC countries as well as the common components that drive the growth process in the region has not to date been attempted.

This article investigates whether the fluctuations of key variables in a cross-section of SADC countries can be explained by a few common factors, as well as to what extent co-movement exists between South Africa and the remaining SADC economies. It is important to address these issues for two reasons. First, a better understanding of how key variables in SADC are co-moving can explain the extent to which economic crisis or benefits have the ability to spread across the region. Secondly, the extent of the co-movement of economic variables between South Africa and the SADC economies could have important implications for future regional policy coordination. The model to be used in the analysis is based on a novel dynamic factor model, as developed by Forni *et al.* (2001).

The article is structured as follows: the first part of the article will provide an overview of the economic dynamics of South Africa and the rest of the SADC member countries. This will be followed by a literature overview on the most prominent contributions of dynamic factor modelling as well as the methodology applied to this particular analysis. The fourth part shows the empirical results, and is followed by an explanation of possible factors underlying the co-movement. The article concludes with possible policy implications for South Africa and the rest of SADC.

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<sup>2</sup> See Jenkins and Thomas (1998) and Pretorius (2002).

This article is an important contribution to the existing literature on the co-movement of economic variables between countries by the application of a novel factor dynamic model. While previous studies focused predominantly on developed countries only or on a combination of developed and developing countries in their analysis, the application of a dynamic factor model to analyze the co-movement between SADC countries in particular is unique.

## **2. A general comparative analysis of South Africa and SADC economies**

The globalization of the world economy has added new impetus to regional integration. More and more countries around the world are collaborating within various forms of regional groupings in order to expand markets. The SADC is no exception to the rule. The Declaration, Treaty and Protocol establishing the SADC were signed by the Heads of State of the then 10 member countries in 1992. The aim was to promote cooperation between countries in the region by enabling them to address problems of national development and to cope more effectively with the challenges posed by a changing and increasingly complex regional and global environment (Delpont, 1999:54). Since 1992 the SADC member countries have expanded to 14 and include South Africa, Angola, Botswana, the Democratic Republic of the Congo (DRC), Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, Swaziland, Tanzania, Zambia and Zimbabwe.

South Africa is by far the strongest and most dominant country within the SADC.<sup>3</sup> In 2002 the GDP (at constant 1995 market prices) for the SADC was US\$ 239.7 billion, of which US\$ 182.2 billion or 76 percent was generated in South Africa. However, the market share is unequally distributed among the populations of the member countries. Of the total SADC population of 205.5 million people, only 22 percent are from South Africa.

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<sup>3</sup> The data for this part is from the World Bank's 2004 version of the African Development Indicators.

This economic dominance is further strengthened if the exports of SADC are taken into account. Approximately 64 percent of the total exports in SADC in the period 1993-2002 were from South Africa. The South African economy and those of Mauritius, Seychelles and Tanzania are also seen as having more diversified economic structures. This is in contrast with the lack of diversification in exports in other member countries. If the top three export commodities as percentage of merchandise exports are taken into account, a high dependence is evident in countries such as Angola (98 percent), DRC (82 percent), Malawi (78 percent), Namibia (78 percent) and Botswana (71 percent). The average dependence for SADC is 40 percent, in comparison with the 23 percent dependence of South Africa.

On the investment level the dominance of South Africa is even more pronounced. Approximately 71 percent of the average gross domestic investment over the past decade in SADC has taken place in South Africa. However, the investment-to-GDP ratio for ten SADC economies in 2002 outstripped the level in South Africa. The Economic Commission for Africa (2003:34) in its 2003 Economic Report on Africa emphasized that an investment-to-GDP ratio of 25 percent or more is needed to accelerate growth in Africa. If this 25 percent prerequisite is taken into account, the investment-to-GDP ratio in 2002 accelerated in countries such as Mozambique (41 percent), Lesotho (40 percent), Angola (32 percent) and Seychelles (30 percent). If this investment trend persists, it could lead to future sustainable growth in the region.

On the socio-economic front, wide disparities are also evident. The average GDP per capita (in US\$) for the period 1993-2002 in Seychelles (\$7 683), South Africa (\$3 902), Mauritius (\$3 817) and Botswana (\$3 535) also outstripped the average for the SADC, estimated to be \$1 134 (World Bank, 2004). This is in contrast with average per capita levels of between \$112 to \$603 in countries such as the DRC, Malawi, Mozambique, Tanzania, Zambia, Angola and Lesotho. The illiterate population as share of the population of 15 years and older for the SADC is 26 percent. This is in contrast with a low rate of illiteracy in Zimbabwe of 10 percent and in South Africa of 14 percent. The average life expectancy in the SADC is 46.5 years. This low life expectancy is due to the

high HIV/Aids prevalence in South Africa and other Southern African countries. The only SADC member countries that are exceptions are Seychelles and Mauritius, with life expectancies of 73 years and 72.5 years, respectively.

Regional economic integration tends to be more successful when member countries are more or less on the same level of development. This is not the case in the SADC, where wide disparities are still evident and South Africa still remains the most developed economy in the region. The question that arises is to what extent the South African economic leadership drives the co-movement in the region.

### **3. Literature review**

The most prominent study using a novel dynamic factor model is by Yang (2003). He applied a novel factor dynamic model to analyze the dynamics of co-movement of the real GDP, consumption and investment behaviour for a cross-section of 103 developed and developing countries. He concluded that world common shocks explain a substantial amount of international economic fluctuations. He also analyzed the effects of international common factors at different business cycle frequencies as well as the sensitivities of countries to these shocks. As regards the real GDP and consumption, he concludes that developed countries are less susceptible and sensitive to world common shocks. The sensitivity of investment to world common shocks depends on the particular country size, level of openness and its remoteness.

The study by Nyembwe and Kholodilin (2003) focused on the asymmetric relationship between the European Monetary Union and sub-Saharan African countries by testing whether evidence on business cycle convergence exists. By applying a linear dynamic factor model (also known as the Stock and Watson approach), they constructed a composite economic indicator to capture economic fluctuations in the European Monetary Union. The authors concluded that no evidence on the obvious transmission of European economic fluctuations to sub-Saharan Africa exists despite the fact that the EU is the main trading partner of the majority of African countries.

Brooks *et al.* (2003) summarized some important stylized facts on co-movement, based on the outcomes of a conference where research focused on the strength, nature and sources of co-movement in financial markets. The stylized facts are as follows: firstly, financial co-movements tend to be substantially larger than co-movements in the real economy. Secondly, financial co-movement has increased for financial markets in developed as well as in emerging market economies. Lastly, no clear evidence exists on the co-movement in the real economy. Brooks *et al.* (2003:4) concluded that, in contrast with clear and relatively consistent evidence on financial co-movement, evidence on real co-movement is “blurred and controversial”.

Forni *et al.* (2000) proposed a novel method, called generalized dynamic factor modelling, to analyze the possible co-movements of a large panel of macroeconomic variables in the European Monetary Union. Since economic activity in market economies is characterized by cyclical behaviour and co-movements in macroeconomic variables, Forni *et al.* (2001) constructed a coincident index for the European Union. Unlike vector autoregressive models or vector autoregressive moving average models, their model can accommodate a large number of cross-sectional units than the number of observations. They defined the constructed index as the *common component* of European real GDP.

#### **4. Methodology**

In the GDFM, each time series is assumed to be composed of two unobserved components: the common components, which are driven by a small number of shocks that are common to the entire panel, and the idiosyncratic components, which are specific to a particular variable and orthogonal with the common components. The notion behind the common component analysis is that only a small number of random variables determine the co-movement of business cycle. Since the second part plays a negligible role in the estimation of the business cycle, it is appropriate to eliminate it and focus fully on the first part.

Consider:

$$x_{nt} = B_n(L)f_t + \mathbf{x}_{nt} \quad (1)$$

where  $f_t = (f_{1t} \dots f_{nt})'$  is a vector of common factors,  $B_n(L)$  is a polynomial of order  $s$  in the lag operator  $L$ . Equation (1) can also be written as:

$$x_{nt} = \mathbf{c}_{nt} + \mathbf{x}_{nt} \quad (2)$$

where  $\mathbf{c}_{nt} = (\mathbf{c}_{1t} \dots \mathbf{c}_{nt})'$  is a vector of common components. The  $i^{th}$  common component is a function  $f_t$  such as:

$$c_{it} = b_{i1}(L)f_{1t} + b_{i2}(L)f_{2t} + \dots + b_{iq}(L)f_{qt} \quad (3)$$

In a dynamic factor model analysis the following assumptions are required for the identification of common components and the consistency of their estimates.

Let  $I_{xq}$ ,  $I_{cq}$ , and  $I_{xq}$  be dynamic eigenvalues of  $x_{nt}$ ,  $\mathbf{c}_{nt}$ , and  $\mathbf{x}_{nt}$ , respectively, and  $V_n$  be the eigenvector of  $I_{xq}$ .

- i) The factors  $f_t$  are mutually orthogonal stationary processes at any lead and lag.
- ii) The idiosyncratic components  $\mathbf{x}_{nt}$  are correlated both in the time dimension and in the cross-section dimension.
- iii)  $I_{xq}(\mathbf{q}) \rightarrow \infty$ , as  $n \rightarrow \infty$ , for any frequency  $\mathbf{q} \in [-\mathbf{p}, \mathbf{p}]$
- iv)  $I_{c_j}(\mathbf{q}) > I_{c_{j+1}}(\mathbf{q})$ , for any  $\mathbf{q} \in [-\mathbf{p}, \mathbf{p}]$ ; where  $j=1, \dots, q$ .
- v) There exists  $\mathbf{k}$ , such that  $I_{x_n}(\mathbf{q}) \leq \mathbf{k}$ , for any  $\mathbf{q} \in [-\mathbf{p}, \mathbf{p}]$ .

The model (2) differs from Stock and Watson (1989) in that the latter consider a fixed number of time series, while in equation 2  $n$  goes to infinity. It is similar to the dynamic

factor model of Sargent and Sims (1977) and Geweke (1977), except that in this model there is a possibility of autocorrelation between idiosyncratic components. Applying the law of a large number in equation 2, the idiosyncratic component – which is poorly correlated – vanishes. Hence, we are basically left with the common components only. Furthermore, the assumption of orthogonal idiosyncratic components made by Stock and Watson (1989) is highly unrealistic.

There is no formal statistical approach to determine the number of factors in a Generalized Dynamic Factor Model. Bai and Ng (2002) proposed some information criteria for the selection of number of factors in large dimensional panels. We prefer the principal components method, which suggests the selection of number of factors  $q$  based on the first eigenvalues of the spectral density matrix of  $x_{nt}$ . This approach consists of adding principal components until the increase in the explained variance is less than a specific value  $\mathbf{a} \in (0,1)$ . The criterion consists of choosing  $q$  such that

$$\frac{\mathbf{I}_{qn}}{\sum_{i=1}^n \mathbf{I}_{in}} > \mathbf{a} \quad \text{and} \quad \frac{\mathbf{I}_{q+1,n}}{\sum_{i=1}^n \mathbf{I}_{in}} < \mathbf{a} \quad (4)$$

Another equally important issue in dynamic factor modelling is the determination of the value of truncation point  $M$ . Forni *et al.* (2001) suggest that  $M = \text{round}\left(\frac{\sqrt{T}}{4}\right)$  performs well for a low order the moving average and autoregressive models. However, Kabundi (2004) and Yang (2003) find that in most cases this rule gives values that are not sufficient to describe the dynamics of economic variables.

## **5. Data transformation and empirical results**

### **5.1. Data and data transformation**

The data for SADC countries are annual real GDP data obtained from Global Development Indicators series of the World Bank. We have used real growth rate to analyze the co-movement between the South African business cycle and the SADC covering the period 1980–2002. It is more informative to study macroeconomic variables with high frequency data. However, this task is almost impossible with African countries as most African data is either inaccessible or only available on an annual basis. Of the 14 SADC members, we studied the co-movement of the business cycles of 13 countries (see Table 4). Tanzania was not included because of data restrictions. For the analysis of percentage share of South African trade with the rest of SADC countries, we used annual data obtained from South African Trade Map (Quantec).

To study the co-movement of South Africa with the rest of the world, we used quarterly data on the growth rate of real GDP of the G-7 and nine emerging market countries (see Table 2), covering the period 1995:1–2004:1. This data was obtained from International Financial Statistics.

In transforming the data various methods were applied. In the analysis of the co-movement of business cycles, we normalized all variables by subtracting the mean from each series and dividing them by the standard deviation. We performed unit root test to examine stationarity of each real GDP growth rate. The popular Augmented Dickey-Fuller test, for stationarity, has been criticized because of its low power. In this paper we use the generalized least-squares Dickey-Fuller test proposed by Elliott *et al.* (1996). The optimal length is obtained using the modified Akaike information criterion, and all variables are stationary at the 10 per cent level.

## 5.2 Empirical results

### 5.2.1 Co-movement between South Africa and the rest of the world

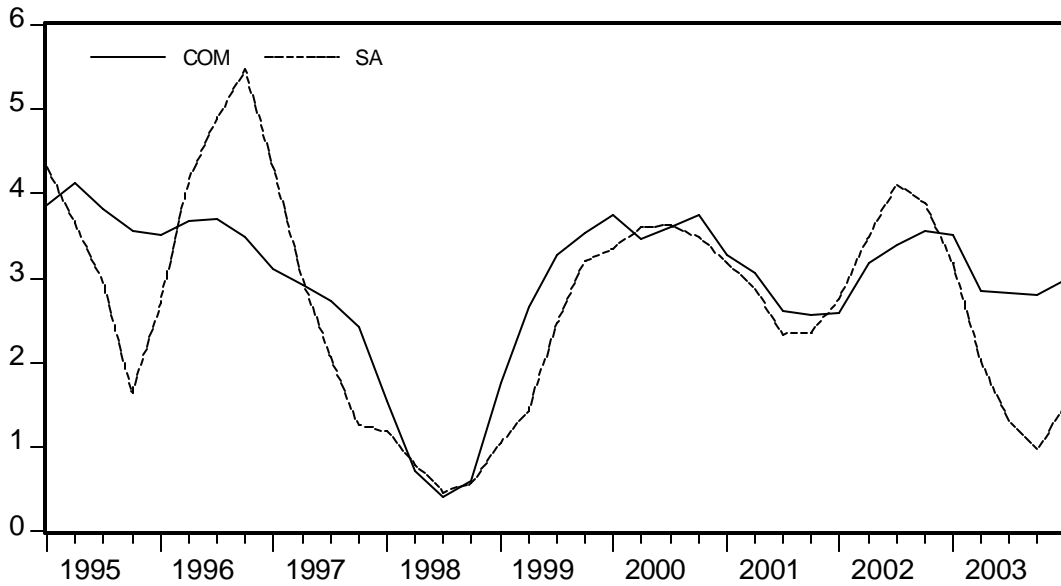
In this section we examine the co-movement between South Africa on one side and the G-7 and nine emerging countries, respectively, using the generalized dynamic factor model. The model is constructed as stated in section 4. We first determine the lag length, in this instance we choose a four period lag as the data used is quarterly. Furthermore, we determine the number of factors using the principal component approach. Table 1 indicates that three first principal components explain approximately 94.1 per cent total variation.

Table 1: Variance Explained by the 3 first Principal Components

	1	2	3
Variance	0.594735	0.257346	0.089138
Cumulative Variance	0.594735	0.852081	0.941219

The second step is to determine the co-movement and the subsequent degree of synchronization, as measured by the correlation coefficient. The world business cycle is constructed as the common component of the G-7 and the nine emerging market economies, respectively. Figure 1 depicts the co-movement between South Africa and the world business cycle. The figure shows the strong degree of co-movement from the late 1997 onwards.

Figure 1: Co-movement between South Africa and World component



The degree of synchronization is measured by the correlation coefficient between South Africa and the world cycle – see Table 2. The correlation between the world index and South African cycle is an estimated 76 per cent. This illustrates that the South Africa cycle is to a large extent dependent on the world cycle. Evidence on the correlation between South Africa and selected emerging market economies shows that a weak correlation exists between South Africa and Latin American emerging market economies, in contrast with the exceptionally strong correlation with Asian emerging economies. An explanation for the high level of co-movement is the fact that, apart from the developed country trading partners, the selected Asian countries constitute major trading partners of South Africa. The question that arises here is to what extent co-movement exists between South Africa and SADC countries.

Table 2: Correlation

	South Africa
Argentina	-0.15
Brazil	0.47
China ( Hong Kong)	0.78
Indonesia	0.96
Japan	0.59
S. Korea	0.90
Malaysia	0.91
Philippines	0.82
Singapore	0.57
Thailand	0.91
World Cycle	0.76

### 5.2.2 Co-movement between South Africa and SADC

In this section we use the generalized dynamic factor analysis to extract the common components between South Africa and SADC GDP growth rates. Similar to the previous section, the first step in dynamic factor analysis modelling is the estimation of lag length, followed by the selection of the number of factors that affect contemporaneously all the variables under investigation.

In the case of this analysis, it is appropriate to use one lag ( $s = 1$ ) since SADC growth rates are based on annual data. Table 3 shows that three first principal components explain 74 per cent of the total variation. These three principal components are determined by unobserved factors, for the identification of which no formal procedure has so far been developed in the factor analysis literature.

Table 3: Variance explained by the first 3 principal components

	1	2	3
Variance	0.35	0.24	0.15
Cumulative variance	0.35	0.58	0.74

Figure 2 shows the synchronization of the South African (SA) business cycle with the SADC cycle. The co-movement before 1991 follows a similar pattern, with the SA business cycle at a lower level. After 1991 the SADC business cycle tends to be more volatile than the SA one, where it tends to under-perform during downswing phases and overshoot during upswing phases. The exception is the period between 1996 and 1999 when the SA economy performed worse during the downswing phase than the SADC economies. During this period, South Africa was badly affected by the Asian crisis – as were most emerging-market economies. Most African countries were less affected as the contagion was facilitated by financial integration.

Figure 2: Co-movement between South Africa and the SADC



Table 4: Correlation

	South Africa
Mozambique	0.80
Angola	0.41
Zambia	0.40
Lesotho	0.30
Mauritius	0.29
Swaziland	0.27
DRC	0.25
Malawi	0.20
Zimbabwe	0.17
Seychelles	0.08
Namibia	0.08
Botswana	-0.08

The above table shows the co-movement between the South African common components and those in the 12 SADC countries. The strongest correlation for the entire period exists between SA and Mozambique, followed by weaker correlations between SA and Angola, Zambia, Lesotho, Mauritius and Swaziland. With the rest of the SADC economies, no evidence of co-movement exists. The correlation analysis is however constrained by the absence of more frequent data. However, the graphical analysis on the co-movement – see Appendix A1 – is quite revealing on the particular period of the co-movement between SA and the individual SADC countries. In the SACU<sup>4</sup> member countries strong evidence exists of co-movement from the early 1990s onwards. It is surprising that co-movement between SA and countries such as the DRC (before 1989), Malawi (before 1989) and Zambia (before 1992) exists while SA was still in its isolation phase. Strong co-movement is evident between SA and Zimbabwe until 1998. The strong co-movement can be explained by the strong trade relations between the two countries. But this correlation has since weakened as a result of the recent political turmoil. After 1998 Zimbabwe shows more of an idiosyncratic component in its growth rate than commonality with South Africa. The same idiosyncratic pattern is also present in the

<sup>4</sup> The SACU – South African Customs Union – comprises South Africa, Botswana, Lesotho, Namibia and Swaziland.

pattern between SA and the DRC since the early 1990s. This is evidence of the fact that a political crisis has a very important economic effect on synchronization in the region.

## **6. Factors of co-movement**

The above analysis highlights the fact that, in total, co-movement exists between SA and the remaining SADC countries. However, when studying individual evidence of co-movement, the results are blurred and controversial. It is crucial to find possible factors underlining business cycle co-movement within the region.

Sources or factors of co-movement in developing countries remain an open topic of research. Imbs (1999) and Brooks *et al.* (2003) identified several determinants of synchronizations of business cycles across nations, such as trade, the world business cycle, geographical proximity, membership to international trade agreement and financial market integration. As a result of the lack of sophistication and general development of the broader SADC financial markets, financial market synchronization is currently not a significant force in co-movement.<sup>5</sup> For the purpose of this article we therefore identify the following three factors as possible sources of synchronization of business cycles within the SADC region:

- Intra-regional trade
- European Union as a major trading partner
- World business cycle

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<sup>5</sup> The absence of a fully functioning financial market is delaying the process of regional integration. In this regard, South Africa can play a leadership role within the region by integrating the financial market by providing its service. There is, indeed, a necessity for a systematic monitoring of harmonization of financial activities within the region to avoid potential malpractice that would be conducive to financial crisis.

## 6.1 Intra-regional trade

SA has increased its role as the region's largest trading partner recently with the change of policy since 1994. The SADC has increased in importance as a destination for South African exports. SA exports to the SADC represented on average 3.3 per cent of total exports during the period 1997-1999, while in 2000-2002 this increased to 13.8 per cent. This rise is a result of recent shift in SA exports from developed countries to developing countries. Similarly, for the same period, SA imports from the SADC increased from 0.7 per cent to 6.5 per cent.

Table 5: Imports from South Africa, as % of total imports, 1997-2002\*

	<b>Angola</b>	<b>DRC</b>	<b>Malawi</b>	<b>Mauritius</b>	<b>Mozambique</b>	<b>Zimbabwe</b>	<b>Tanzania</b>	<b>Zambia</b>
1997	8.16	22.74	53.93	10.97	53.20	50.75	8.67	60.86
1998	9.92	23.56	50.66	10.28	50.99	50.20	10.44	58.38
1999	9.83	28.38	56.28	11.51	55.07	53.97	13.98	64.71
2000	10.42	24.67	52.32	16.75	58.08	52.17	16.22	63.28
2001	9.91	25.22	60.36	14.88	61.42	56.63	15.46	65.65
2002	12.16	23.07	40.41	16.49	42.03	63.62	14.03	49.62

Source: World Trade Tables, Quantec

\*No imports data available for the SACU member countries. These figures are included in the SA figures.

Table 6: Exports from SADC countries to South Africa, as % of total exports, 1997-2002

	<b>Angola</b>	<b>DRC</b>	<b>Malawi</b>	<b>Mauritius</b>	<b>Mozambique</b>	<b>Zimbabwe</b>	<b>Tanzania</b>	<b>Zambia</b>
1997	0.10	6.98	16.04	0.34	14.03	9.90	0.70	5.34
1998	0.08	0.37	15.81	0.30	14.36	10.51	0.63	7.25
1999	0.72	0.22	15.39	0.52	18.70	10.52	0.72	5.96
2000	0.12	0.12	10.02	0.42	12.45	10.78	0.57	7.65
2001	0.02	0.45	8.95	1.16	4.08	9.68	0.83	9.25
2002	0.17	0.12	10.94	0.54	4.33	13.51	1.39	14.51

Source: World Trade Tables, Quantec

The above tables illustrate the intra-regional trade patterns within the SADC.<sup>6</sup> On the import side the countries most dependent on imports from SA are Zambia, which imports 60.4 per cent of its goods and services from within the region, followed by Zimbabwe (54.6 per cent), Mozambique (53.5 per cent) and Malawi (52 per cent). On the export side SADC countries tend to be less dependent on SA: 12.9 per cent of Malawi's exports are to SA, followed again by Mozambique (11.3 per cent), Zimbabwe (10.8 per cent) and Zambia (8.3 per cent).

From 1997 onwards, Malawi, Mozambique and Zambia have shown a relatively high co-movement with South Africa. The synchronization between SA and Zimbabwe started to deviate after 1998, when the political instability in the latter country became more pronounced. This conclusion is consistent with those of Arora and Vamvakidis (2005). They infer that when the SA economy experiences high growth, exports increase, which in turn encourages economic activities in the recipient country. Hence, South African growth affects, specifically, SADC members' growth through trade.

There are several factors that can explain the still limited extent of intraregional trade within the SADC. Firstly, poor infrastructure in most member countries prohibits South African businesses from exploring untapped African markets. Apart from the closest South African neighbours, there is a lack of communication networks between countries. Related to infrastructure is the high cost of transportation, especially for landlocked countries. This makes it difficult to travel from one port to another. For example, it is far easier to transport goods from South Africa to Botswana than to carry them to DRC.

Secondly, tariffs within the SADC are still very high. High tariffs on imported goods make a sizeable portion of an individual country's fiscal revenue. Thus, lowering or eliminating these tariffs will amount to a massive loss of revenue for many states in the

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<sup>6</sup> Between the period 1997 and 2002, SA imported mainly agricultural and mineral products from other SADC members, while its exports to the SADC comprised manufactured products.

region. Consequently, countries seem somewhat reluctant to push for a rapid free trade agreement (FTA). It was only in March 2004 that the SADC set a timetable for the implementation of a common external tariff in 2010.

Thirdly, and most importantly, SADC member countries export and import similar products, which illustrates a lack of diversification and specialization. They all predominantly export natural resources and import finished and manufactured goods. Under these conditions, it is hard to have a productive and mutually beneficial intraregional trade. As mentioned above, South Africa benefits from trading with its SADC partners because it exports manufactured goods, while it imports mainly agricultural and mineral products. In this regard, South Africa has, within the SADC, to compete with industrial countries which have already established long-term trading ties with Africa.

## 6.2 The European Union and the world business cycle as co-movement factors

Table 7: Exports to the EU as % of total exports

	Angola	DRC	Malawi	Mauritius	Mozambique	SA	Zimbabwe	Tanzania	Zambia
1997	14.74	60.17	43.02	76.06	48.02	39.76	47.09	43.98	34.90
1998	18.52	77.11	40.78	74.67	49.24	44.30	45.63	42.89	39.72
1999	18.29	77.12	42.70	73.88	43.73	43.31	43.39	35.89	33.27
2000	17.86	76.67	38.26	68.02	47.76	37.47	39.93	51.25	23.18
2001	28.73	45.58	39.06	70.53	73.18	35.08	38.85	38.76	24.20
2002	29.23	80.73	36.72	72.41	73.28	40.94	37.47	43.25	17.08

Source: SA Trade Map, Comtrade, Quantec

Table 8: Imports from the EU as % of total imports

	<b>Angola</b>	<b>DRC</b>	<b>Malawi</b>	<b>Mauritius</b>	<b>Mozambique</b>	<b>SA</b>	<b>Zimbabwe</b>	<b>Tanzania</b>	<b>Zambia</b>
1997	52.66	39.66	17.14	41.29	19.52	49.56	22.97	33.76	20.31
1998	53.38	40.39	14.71	36.96	22.52	49.98	22.56	26.87	20.65
1999	45.30	40.06	19.10	38.96	23.85	48.46	21.39	25.21	16.20
2000	49.09	47.58	13.11	32.32	15.34	44.37	17.02	24.35	11.51
2001	39.57	49.33	13.24	35.54	16.02	46.93	17.65	30.55	11.71
2002	49.69	37.42	11.73	38.36	20.18	49.92	15.36	24.89	9.39

Source: SA Trade Map, Comtrade, Quantec

Tables 7 and 8 above depict the import and export ratios between individual SADC member countries and the European Union (EU). It is evident that the EU is still the major trading partner of all SADC members. SADC members, including South Africa, export natural resources to the EU in exchange for semi-finished and finished products. For most of them, the EU has been a long-term major trading partner, and this has fostered the synchronization of their cycles with the EU cycle. Consequently, SADC members' cycles co-move, not necessarily because of the intraregional trade between members, but as a result of linkages with a common trading partner, in this case the EU.

The table below illustrates the co-movement of individual SADC countries and the world business cycle, proxied by the G7 common component, covering the period 1981-2001. A strong long-term correlation exists between the G7 business cycle and SA, Angola, Swaziland and the DRC, respectively. A moderate correlation exists between the G7 – extracted common component – and Botswana and Lesotho. However, on aggregate the SADC cycle – excluding SA – has a strong correlation (0.79), illustrating the strong combined co-movement over the long term between SADC member countries and the G7. These results deviate slightly from the results in the previous two tables, suggesting that the long- and short-term degree of co-movement might differ. An example is the case of Angola, which has a strong correlation with the G7 countries because of the increasing export of oil.

Table 9: Correlation between the G7 common component and SADC member countries<sup>7</sup>

	<b>G7</b>
SADC	0.79
South Africa	0.76
Angola	0.69
Swaziland	0.66
DRC	0.59
Botswana	0.49
Lesotho	0.49
Malawi	0.26
Zimbabwe	0.23
Seychelles	0.21
Zambia	0.13
Mauritius	0.13
Mozambique	0.08
Namibia	-0.04

Like South Africa, EU is the first major trading bloc for most SACU members.<sup>8</sup> Thus, a relatively high co-movement between these countries and the developed countries exists. This is a North-South relationship, where all of them export agricultural and mineral products to developed economies and import manufactured and finished products.

## 6. Conclusions and policy implications

The SADC is a diverse region with SA as the dominant economic force. Within this context the dynamic factor model used in the analysis allows us to study the co-movement of this diverse region in a unique way.

By using this model, SA as the regional leader shows strong co-movement with the world business cycle and with emerging market economies. However, the evidence on co-movement between SA and SADC countries proved to be blurred and controversial. The aggregate co-movement between SADC and SA before 1991 follows a similar pattern

<sup>7</sup> See the individual figures in Appendix AII.

<sup>8</sup> In this case Swaziland, Botswana, and Lesotho are to some extent correlated with the G7 growth rate.

with the SA business cycle, but at a lower level. After 1991 the aggregate SADC business cycle tends to be more volatile than the SA one, where it tends to under-perform during downswing phases and overshoot during upswing phases. The exception is the period between 1996 and 1999 when the SA economy performed worse during the downswing phase than the SADC economies. During this period, South Africa (like most emerging market economies) was badly affected by the Asian crisis. This was in contrast with most African countries, which were less affected as the contagion was facilitated by financial integration.

The disaggregated co-movement between the South African common components and those in the SADC indicates that the strongest correlation for the entire period exists between SA and Mozambique, followed by weaker correlations between SA and Angola, Zambia, Lesotho, Mauritius and Swaziland. With the rest of the SADC economies, no evidence of co-movement exists. However, the graphical analysis on the co-movement is quite revealing on the particular period of the co-movement between SA and the individual SADC countries. In the SACU member countries strong evidence exists of co-movement from the early 1990s onwards. It is surprising that co-movement between SA and countries such as the DRC, Malawi and Zambia existed while SA was still in its isolation phase. Strong co-movement was evident between SA and Zimbabwe until 1998. This can be explained by the strong trade relations between the two countries, which have since weakened due to the recent political turmoil. Since 1998 Zimbabwe has shown more of an idiosyncratic component in its growth rate than commonality with South Africa. The same idiosyncratic pattern is also present in the pattern between SA and the DRC since the early 1990s. This is evidence of the fact that a political crisis has a very important economic effect on synchronization in the region.

For the purpose of this article we have identified three factors as possible sources of synchronization of business cycles within the SADC region, namely intra-regional trade, the European Union as a major trading partner and the world business cycle. The intra-regional trade pattern shows that the dominant countries are Zambia, Zimbabwe, Mozambique and Malawi. However, on the export side, SADC countries tend to be less

dependent on SA. On the EU as a factor of synchronization, it is evident that the EU is still the major trading partner of all SADC members. Consequently, SADC members cycle co-move, not necessarily because of the intraregional trade between members, but as a result of linkages with a common trading partner, in this case the EU.

The aggregate SADC business cycle – excluding SA – has a strong correlation with the G7 business cycle. However, the analysis also reveals that the long- and short-term degree of co-movement differs, possibly due to continuous political and economic instability in the region.

The study concludes that, although co-movement in the region exists, it is weaker than expected and mainly driven by so-called “outside forces” such as the trade with the EU. The dependence of SADC countries on these markets is still the dominant feature on the region. The region has not fully utilized its geographic proximity and the intra-regional benefits this can hold for the SADC. Most of the SADC countries are currently not benefiting from the strength and diversifying nature of the South African economy.

The policy implications of this study reveal that political stability is of the utmost importance for the region. South Africa possesses stable institutions, respect of rule of law, and a stable political environment. In contrast, some SADC countries are characterized by the occurrence of tribal and ethnic conflict leading to wars. Angola is just emerging from a long civil war, the DRC has been ravaged by nearly a decade of civil war, and Zimbabwe is suffering from political instability. This causes instability for the region as a whole.

The improvement of intra-regional trade could also be enhanced by improvements in infrastructure – especially the transport and communication infrastructure – as well as tariff liberalization within the region. Furthermore, the overlapping memberships between different regional organizations remain a considerable obstacle to achieving the goal of regional integration (Arora and Vamvakidis, 2005). The majority of the non-SACU members belong to different regional organizations, such as EAC (East African

Community) and COMESA (Common Market for Eastern and Southern Africa). These organizations have different agendas concerning the sequencing of integration. Unless there is a harmonization of objectives, it will be difficult to achieve the market integration of these organizations. Arora and Vamvakidis (2005) suggest a change in membership to solve the overlapping membership issue. Hence, South Africa – with its entrenched bond with the SACU – will remain a member of the SADC; which in turn excludes DRC, Tanzania, Malawi, Mauritius, Zambia, and Zimbabwe.

The lack of financial sophistication in the region is indirectly hampering trade. South Africa could fulfill an important role in facilitating this development in the SADC.

## References

- Arora, V. and Vamvakidis, A., 2005, The Implications of South Africa Economic Growth for the Rest of Africa, IMF Working Paper 05/58.
- Bai, J. and Ng, S., 2002, "Determining the number of factors in approximate factor models", *Econometrica*, 51, 1281-1304.
- Brooks, R., Forbes, K., Mody, A., 2003, "How strong are global linkages?", manuscript, <http://www.imf.org/external/np/res/seminars/2003/global/pdf/over.pdf>.
- Elliott, G., Rothenberg, T.J., and Stock, J.H., 1996, "Efficient Tests for Autoregressive Unit Root", *Econometrica*, 64:4, 813-36.
- Forni, M. and Lippi, M., 2001, "The generalized dynamic factor model: representation theory", *Econometric Theory* 17, 1113-11141.
- Geweke, J., 1977, "The Dynamic Factor Analysis of Economic Time Series", in (D.J. Aigner and A.S. Golberger, eds.) *Latent Variables in Socio-Economic Models*, Amsterdam, North-Holland, Ch. 19.
- Imbs, J., 1999, "Co-Fluctuations", CEPR Working Paper No. 2267.
- Kabundi, A., 2004, "Estimation of Economic Growth Rate in France Using Business Surveys Data", International Monetary Fund Working Paper WP/04/69.
- Kose, M. A. and Riezman, R., 1999, "Trade Shocks and Macroeconomic Fluctuations in Africa", *Jorunal of Development Economics*, Vol. 65(1), 55-80.

Kose, M. A., Otrok, C., and Whiteman, C. H., 2003, "International business cycles: World, region, and country specific factors", *American Economic Review*, Vol. No. 93(4), 1216-1239.

Lumsdain, R. and Prasad, E., 2003, "Identifying the common component in international economic fluctuations", *Economic Journal*, Vol. No. 173(127), 101-127

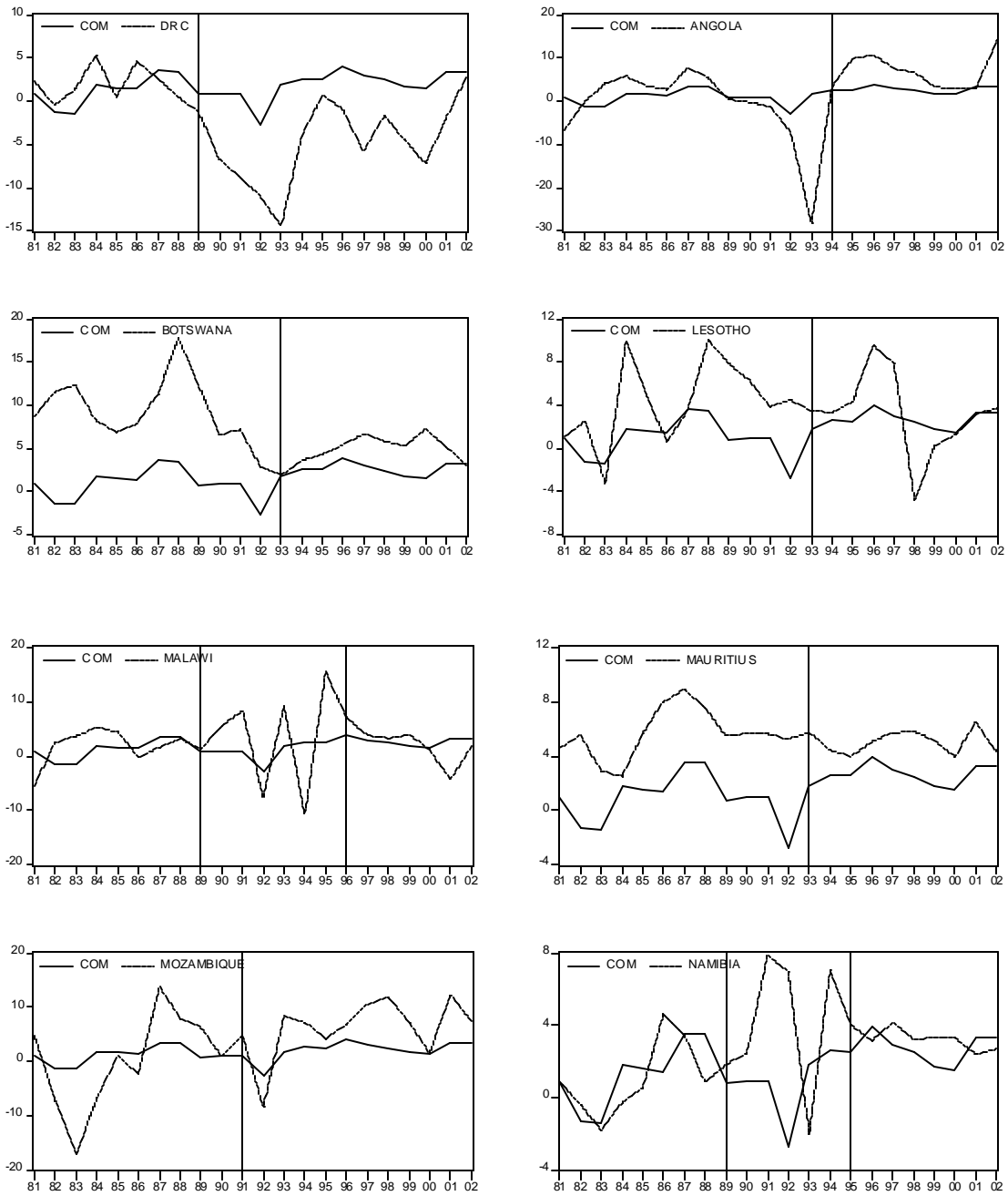
Nyembwe, A. and Kholodilin, K.; M., 2004, "North-South Asymmetric Relations: Does Business Cycle Convergence in EMU Affect Small African Economies?", RES, Université Catholique de Louvain. Mimeo.

Sargent, T.J. and Sims, C.A., 1977, "Business cycle modelling without pretending to have too much a priori economic theory", in (C.A. Sims ed.) *New Methods in Business Research*, Mineapolis: Federal Reserve Bank of Mineapolis.

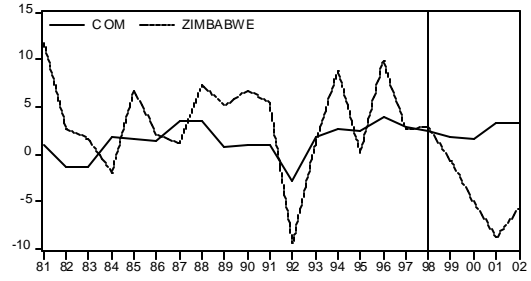
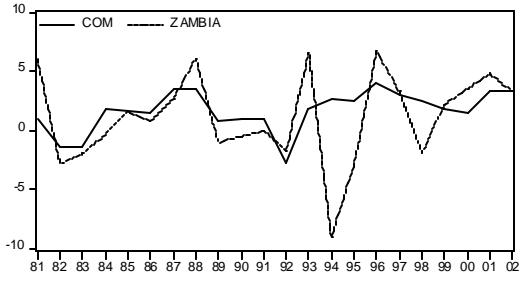
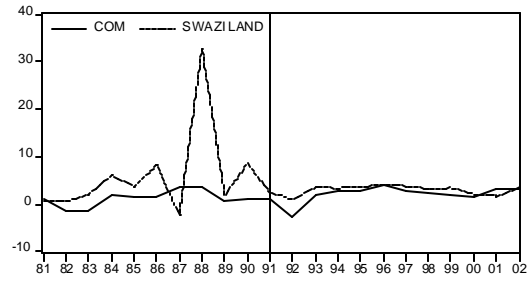
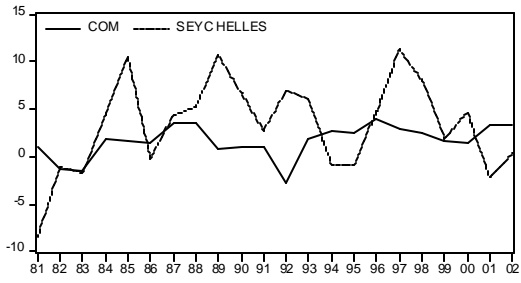
Stock, J.H. and Watson, M.H., 1989, "New Indexes of Coincident and Leading Economic Indicators", *NBER Macroeconomic Annual 1989*, pp 351-94.

Yang, X., 2003, "The Role of World Common Shocks in International Economic Fluctuations", Washington and Lee University, Working Paper.

### Appendix AI: Co-movement between South Africa and individual SADC countries<sup>9</sup>



<sup>9</sup> The vertical line indicates the end or starting period of co-movement between South African common component and SADC members



### Appendix AII: Co-movement between the G7 and individual SADC countries

