Assessing the Financial Stability in the SADC\(^1\) Region

Research Department

Banco Nacional de Angola\(^2\)

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\(^1\) SADC Member States are the following 15 countries: Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

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Abstract

In the aftermath of the global financial crisis, it has become important to understand the relationship between macroeconomic dynamics and the financial system. Therefore, by means of an interdisciplinary approach, this study deals with the topic of assessing financial stability in the Southern African Development Community (SADC) region. Firstly, it builds an econometric model based on panel data, of which the dependent variable is a stability index of the financial sector created for the test in question. Dynamic effects and persistence are modelled at the level of heterogeneity of the main variables by way of appropriate methodologies, in particular through the estimation of a Blundell and Bond Model. The econometric side is complemented by a cluster approach, which aims to identify similarities and differences among SADC Member States. The document expands the analysis by way of a diagram that aims to capture the (inter)dependency between the members in the SADC region and other international economies. Some relevant recommendations related to economic policies are drawn from this study.

Keywords: financial stability; SADC economies; Blundell and Bond Model; clusters; international exposure.

JEL codes: C23; C43; F40; G21.
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The views expressed in this research paper are those of the author and do not necessarily represent those of the members of the Committee of Central Bank Governors (CCBG) in the Southern African Development Community (SADC). While every precaution is taken to ensure accuracy of information, the CCBG shall not be liable to any person or entity for inaccurate information or conclusions contained herein. For any information concerning this paper please contact:

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1. Introduction

The stability of the financial system is critical to an economy that aims to achieve the objectives of sustained growth and low inflation. If a financial system is stable it will also be resilient and will be able to withstand normal fluctuations in asset prices that result from dynamic demand and supply conditions as well as substantial increases in uncertainty. By contrast, financial instability can impede economic activity and reduce economic welfare.

Conversely, economic and monetary policy shocks can trigger financial instability and compromise the effectiveness of the monetary policy transmission mechanism. Because of the interdependency between the financial system, the state of the economy and monetary policy, monitoring financial markets and appropriately assessing their stability are tasks of great importance to policymakers.

It is highly relevant to understand the risks of the banking systems in the SADC region. In fact, this proposal made by the SADC Macroeconomic Subcommittee and approved at the Committee of Central Bank Governors (CCBG) meeting in September 2013 was the result of the current situation and the importance of the financial system.

This initiative resulted from the recent consensus that the aspects associated with the production and distribution of goods and services of an economy are constantly and intimately linked to their financial counterparts. Therefore, the stability of a given sector is intrinsically associated with another sector. This was evidenced by the recent crisis of the United States (US) financial sector, where it was concluded that macroeconomic stability does not necessarily ensure financial stability, and that the importance of financial development within the macroeconomic dynamic was more significant than expected. This new understanding of the macro-financial dynamic warranted the need to better understand the link between the financial sector and the macro economy which, overall, leads to the acceptance of a macroprudential approach to the financial system.

Since then, in order to analyse the underlying risks of interlinking the various macroeconomic and financial dimensions, the economics and financial supervision
departments of central banks have faced an ongoing and lengthy challenge in an attempt to grasp the stability conditions of their financial sector by creating various sector-evaluating indicators, models and criteria. This issue is normally studied through the experiences of developed economies and emerging markets, the majority of which are structurally different from most economies in the SADC region and which have less developed financial systems.

This study proposes a philosophy of macroprudential analysis for the financial systems of the countries in the SADC region. Therefore, it starts to contextualise the landscapes that characterise the performance of the region’s financial institutions through an analysis of the economic environment, the financial structure, and other structural and regulatory features that may destabilise the banking systems in the region.³

The intention is to ascertain the extent to which a set of variables, common to all the countries and unique characteristics of each economy, influences the financial stability. To this end, an empirically based panel data econometric study will be undertaken. The idea is to build a financial sector stability index (IESF), which will be the dependent variable in the econometric analysis. The IESF, which contains a variety of information on the conditions of the sector’s soundness, seeks to capture the level of vulnerability in the banking sector of each SADC Member States.

In addition, the SADC region is divided in terms of a cluster analysis to identify homogenous groups of the SADC banking systems and to understand the interdependence and interconnection between the Member States. In order to capture these dynamics with the world system, a network analysis will be undertaken, taking into account international experiences, since the sample extends beyond SADC, by considering other world financial centres. Finally, a comparative index between countries, which aggregates a set of indicators to compare the countries’ economic and financial stability, will be created.

³ Some examples of these features follow the banking systems’ competitive level, the financial activities’ level of diversification, the weight of foreign institutions’ participation, the connections to the remaining sectors of the countries’ economic activity (notably with their financial markets), and the level of financial deepening or financial inclusion.
The research questions are formulated as follows:

1. How do the economic indicators influence the stability of the banking sector?
2. Is there stability in the SADC financial systems?
3. How are the SADC financial systems grouped into clusters with regard to the similarities relating to the indicators that characterise them?
4. What are the main focuses of spreading intra- and inter-SADC financial stability?

The rest of the paper is organised as follows: Section 2 contextualises the problem and reviews the literature on the determinants of banking-sector stability. Section 3 gives an overview of SADC financial systems by discussing the main similarities and differences among the countries in the region. Section 4 is highly empirical and deals with the econometric model that seeks to study the determinants of the IESF. In Section 5 the econometric approach is complemented by an analysis of the individual vulnerabilities of each country and the bilateral financial relationships. Finally, the last section provides a conclusion and makes policy recommendations.

2. Overview of financial systems in SADC

It is important to mention that the economic and banking systems in SADC Member States are highly heterogeneous, as shown in the differences in terms of their performance of macroeconomic convergence indicators and their levels of financial development. This section provides a brief general overview of the macroeconomic and banking conditions of the SADC countries.

2.1 Financial sector

In terms of financial-sector development in the SADC countries, most of the countries demonstrate slow growth in relative terms. The banking sectors reflect the majority of assets and dominate financial-sector activity. It should be noted that the degree of financial intermediation and access to financial products and services in the SADC region are, in general, relatively smaller when compared with other developing regions. This somewhat reflects the low income levels, the regions’ small banking sector and a financial infrastructure which is seen as somewhat weak.
Cihak et al. (2012) conclude that sub-Saharan Africa is the developing region with the lowest levels of financial deepening and least efficient financial institutions due to the high cost of the activities undertaken by the region’s banks. As a result, the interest rate spreads show considerably high levels. Figure 1 shows the high interest rate spread, especially for 2013, when Madagascar and Malawi showed spreads close to 50 per cent and 30 per cent respectively.

Figure 1: Interest rates spread (percentage)

Source: World Bank and SADC central banks
Note: The average for 2006–2009 in Zimbabwe was not considered due to the extremely high spread values implemented by the system before.

In relation to credit to the private sector, the SADC region shows annual averages of 32,4 per cent of gross domestic product (GDP) for 2006–2009 and 36,3 per cent of GDP for 2010–2013. Of all the countries, South Africa stands out with annual average rates of 157,6 per cent and 151,6 per cent for the periods 2006–2009 and 2010–2013 respectively. By contrast, the Democratic Republic of Congo (DRC) reflects average rates of credit granted to the private sector for the said periods of 3,8 per cent and 4,8 per cent of GDP respectively. All the other countries are below the average threshold of 50 per cent of GDP, as can be seen in Figure 2. It should be noted that most of the banking systems in the region are relatively small in size, both in terms of credit as a percentage of GDP and deposits. Moreover, the countries in the region are characterised by low transformation rates and, indeed, a large part of the assets are held as public bonds or assets with immediate liquidity.

The credit to the private sector/GDP ratio is one of the indicators, in the opinion of some authors, which performs better in forecasting a banking crisis. The change in the
credit/GDP rate specifically, in view of its long-term trend, shows that it is a better signal of the need to accumulate capital within a period of systemic risk accumulation.\textsuperscript{4} In this context, it is clear (in Figure 2) that, during the pre-crisis period of 2006–2009, South Africa showed a significantly high annual average ratio, much higher than the upper threshold recommended by the Bank for International Settlements (BIS) (2010)\textsuperscript{5} of around 2.5 per cent; it is even the highest in the region. In 2013, Lesotho and Mauritius also saw this indicator exceed the upper recommended threshold, reaching 3.0 per cent in the former case and 5.3 per cent in the latter. The SADC region as a whole shows average levels close to zero for this indicator in the two periods under review. However, it is important to note that this indicator’s relevance for the economies depends on the development stage as well as the regulatory framework in place for each banking system.

As for the financial deepening indicator, measured through the ratio of M2 in relation to the GDP of each country in Figure 3, surprisingly Mauritius performed better than the rest of the economies for both reference periods. South Africa should also be mentioned for showing averages of 81.2 per cent and 76.2 per cent for 2006–2009 and 2010–2013 respectively. On average, the SADC region showed an average financial deepening

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{credit.png}
\caption{Credit to the private sector (per cent of GDP) gap}
\end{figure}

Source: SADC central banks and World Bank. The calculations were done by the authors.

\textsuperscript{4} The Banco Nacional de Angola (2013) provides a useful literature review on the usefulness of this indicator in the Basel III agreement.

\textsuperscript{5} The Basel Committee on Banking Supervision (2010) provides a very useful document in the form of a guide to activate this rule and the analytical framework needed for its implementation/use. One of the contributions of that study is the requirement of capital in the form of shock absorbers, which should be placed in a buffer of 0 to 2.5 per cent above the minimum required by the legislation.
level of 40,9 per cent of GDP for 2006–2009 and of 43,8 per cent of GDP for 2010–2013.\(^6\)

**Figure 3: Financial deepening (M2 as a percentage of GDP)**

![Graph showing financial deepening](source: SADC central banks and World Bank)

SADC economies show different performance in terms of net credit to the central government. In two opposite extremes is Seychelles with a net credit to central government average level of 38,7 per cent of GDP for 2006–2009 and 16,5 per cent for 2010–2013, and Botswana with average values of -36,9 per cent and -19,5 per cent of GDP for 2006–2009 and 2010–2013 respectively.\(^7\) These results contributed to the SADC region as a whole showing a neutral position, which correspond to average values of -0,3 per cent of GDP for 2006–2009 and 1,4 per cent of GDP for 2010 and 2013. These average values exclude Zimbabwe due to the unavailability of data. Figure 4 shows net credit to the government for the SADC region over the two reference periods.

\(^6\) It should be noted that a study by Kasekende (2010) states that the implementation of reforms associated with this point in these countries implied a gradual increase in the deepening measures and degree of activity by the financial systems, measured according to M2 ratios and credit to the private sector in terms of the GDP until the time of the crisis. Since then, there has been a slowdown in M2 growth in relation to the GDP, and in some countries that ratio decreased.

\(^7\) A negative net credit to central government means that the deposits of government in the banking system are higher than the lending by banks to government.
Solvency (capital adequacy) of the financial system determines if own funds are sufficiently adequate to the main risks incurred by the banking institutions. Figure 5 shows that, of all the national banking systems in the region, Swaziland has the highest ratio, both for the pre-crisis period with 31.1 per cent (2006–2009) and the post-crisis period with 30.0 per cent (2010–2013). Zimbabwe stands out in terms of financial stability, where the average ratio decreased from 29.2 per cent in 2006–2009 to 13.1 per cent during 2010–2013, and Angola that underwent a deterioration of the average solvency ratio from 24.2 per cent to 17.4 per cent in the same period. However, it can be determined that the banks in the region are, in general, well capitalised.

As for credit risk, it is seen as the main risk underlying the banking activities and may be understood as the probability of losses, as quantified through the non-performing loans to total loans ratio (Figure 5a). It can be observed that this ratio rose strongly in most of the countries during the post-crisis period, with the exception of Namibia. By contrast, Angola, Madagascar and Malawi stand out as the countries with the highest credit risk.
When analysing the return on assets (ROA) with the aim of investigating in which way the use of resources in the banking system contributes to the increase in the institutions’ profits, it can be seen that it has stayed below the threshold of 6 per cent. This is with the exception of Zimbabwe which, in the period before the emergence of the world financial crisis, attained an average value very close to 16 per cent. In the following period, Zimbabwe witnessed a deterioration of the ratio to an average value of 1.0 per cent (Figure 6).

As for the return on equity (ROE), a downward trend in most of the countries has been observed. The biggest deteriorations were observed in Zimbabwe’s ROE, which went from an average value of 40.6 per cent to 5.4 per cent between the periods of 2006–2009 and 2010–2013, and Mozambique, when it went from 48.2 per cent to 15.7 per cent between the same periods (Figure 6a).
Lastly, based on Andrianaivo and Yartey (2009), Beck et al. (2009), and McDonald and Schumacher (2007), the paper shows other features of the banking systems in SADC, namely:

- the time structure of the credit supplied is essentially short term;
- a high percentage of total assets accounted for by the banks with bigger market share, which tends to restrict the strength of the competition;
- foreign banks play an important role in the region’s banking systems;
- concentration of agencies in a small number of urban centres;
- low levels of financial inclusion and financial literacy;
- less sophisticated financial services;
- informal sector of the economy with relevant importance;
- weak contractual frameworks for banking activities, including the rights of weak creditors and law enforcement mechanisms; and
- the occurrence of political risk.

This section reviews the trends of some relevant indicators for the SADC economies. As a result, it has been shown that the Member States display varied performances, reflective of the unique characteristics relating to the nature and stage of development of each country. The following section aims to present a strategy to model the different patterns mentioned which characterise the uniqueness of each of the SADC economies. Hereafter, the study will construct an index that matches and summarises information relating to the stability of the banking sector in the Member States and explains the main similarities and differences that such an index exposes in the various regions.
3. Theoretical and empirical literature

The literature on the determinants of banking-sector stability is vast and multifaceted. However, it deals mostly with the so-called ‘mature’ economies, with a higher degree of development. As a result, some studies focus on the creation of macroeconomic indicators that gather qualitative information, such as the probabilities of a crisis occurring and utilising binary variables. Mostly, those studies use binary response models and threshold sign approaches. Still, from this perspective, there are also studies that examine the creation of specific indicators that seek to identify the main determinants of the financial-sector stability. Demirgüç-Kunt and Detragiache (1998, 2005), who focused on the main banking crisis indicators for advanced economies and emerging markets, apply a multivariate logit approach to relate a set of explanatory variables with the probability of a crisis occurring. The results suggest that low real economic growth, high inflation rates and real interest rates have a significant impact on the probability of a banking crisis occurring.

Hardy and Pazarbasioglu (1999) examined panel data that comprises 50 emerging economies between 1977 and 1997, and argue that there is no empirical support for the macroeconomic factors that precede banking crises. Rather these authors maintain that the determinants of periods of financial fragility are specific to each country and can only be identified ex post their occurrence.

Borio and Lowe (2002) expanded on the approach applying early warning indicators that improve the provisional capacity of advanced economies and emerging markets, and conclude that credit extension as a ratio of GDP, gross fixed investment and property prices are the most relevant to anticipate financial crises.

Allen et al. (2009) carry out a general review of the present literature on national financial stability. However, as argued recently by Degryse et al. (2012), the existing literature refers to developed countries and emerging economies because not enough attention has been given to developing economies. The latter study analyses the determinants of financial stability at a regional level and concludes that the regional features of financial systems are essential to determine the level of financial stability.
and reduce the impact of spreading financial problems to another region. However, according to the authors’ conclusions, the referred regions are in the US, the eurozone, Asia and Latin America and do not include any region on the African continent.

From another perspective, various studies have already analysed the trends and implications of a progressive opening of the economies, especially in terms of their exposure to the world economy. For example, Peek and Rosengren (1997, 2000) show that the shocks that occurred in the Japanese banking sector may have been affected by the US’s real variables. Balakrishnan et al. (2011) built a financial stress index for the emerging economies and concluded that the periods of financial stress in the developed economies have a strong spreading effect on the emerging economies, depending strongly on the depth of financial and trade relationships between those economies.

Möbert and Weistroffer (2010) explore the BIS consolidated banking-sector statistics on the banks’ cross-border exposure. The approach used by these authors is useful in that it assists in understanding the contagion channels related to the actions of the countries in the international arena. This study aims to follow Möbert and Weistroffer to analyse the level of vulnerability of the financial system in SADC associated with its international exposure. The exercise focuses on the analysis of some determinants of financial system stability in the SADC region from a macroprudential perspective. The innovation rests in the fact that the literature deals with this topic mainly in developed economies whose financial systems are structurally different from those of the countries in the region, as well as in its multidisciplinary nature, thereby making it a more robust study. In effect, the research was done using panel data by considering a system of dynamic equations seeking to uncover heterogeneous standards and to model that heterogeneity in the countries, as well as to identify the main determinants of the region’s banking system stability.

In this paper an econometric component, which considers SADC countries exclusively, will be complemented in two distinct fronts. In the first instance, a cluster approach will be used for the 2004 period to try and understand the similarities and differences in the countries in terms of features of their banking systems. Here, Sorensen et al. (2006) was used as a reference since an analysis of hierarchical clusters to study the banking sector
in the eurozone for the year 1998–2004 was used. The authors will conclude that the European Union countries have become more homogeneous, and they identify the various groups within the region.

Furthermore, a network approach will be carried out with the view to understanding the degree to which situations of contagion occur in the economies being studied. New economies such as the US will be added to try and understand the dynamic of international exposure on the SADC economies. To this end, a map showing a network of bilateral financial flows among the countries in the region and between the countries in the region and the rest of the world was constructed and will be shown. The networks approach follows on the idea that a shock that initially affects a certain individual bank can, through external financial links, systematise and have consequences for the regional banking system and the real economy.

Therefore, this work aims to add to the scientific literature, seeing that it deals with a topic studied within the context of a group of complex and unequal economies that assert themselves, although heterogeneous, and are undergoing successive and rapid economic and financial transformation. The fundamental features of the countries in the region are shown in the next section.

4. Methodological framework

4.1 Financial sector stability index

By way of a set of indicators that will be discussed, a stability index for the banking sector of each Member State is defined. Then, the IESF for country $i$ is defined for a period of $t$ as $IESB_{it}$, and each indicator component of the $IESF_{it}$ by $X_{k,i,t} = [X_{1,i,t} \ldots X_{4,i,t}]$, in which the index $k = 1, 2, 3$ and 4 belongs respectively to the indicators capital adequacy, quality of the asset portfolio, asset profitability and capital profitability. These indicators rely on the choice of some of the IMF\(^8\) core financial stability indicators, a choice which deals specifically with the quality of assets, the

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\(^8\) Core IMF financial stability indicators
adequacy of capital, and the profitability of assets and of capital. From now on these indicators will be defined as $cap_{i,t}$, $pl_{i,t}$, $roa_{i,t}$ and $roe_{i,t}$ respectively.\(^9\)

### Table 1: Indicator and ratio used

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Ratio</th>
</tr>
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<tbody>
<tr>
<td>Capital adequacy</td>
<td>Regulatory capital/risk-adjusted assets</td>
</tr>
<tr>
<td>Asset quality</td>
<td>Non-performing loans/total loans</td>
</tr>
<tr>
<td>Asset profitability</td>
<td>ROA: asset profitability/net income</td>
</tr>
<tr>
<td>Capital profitability</td>
<td>ROE: return on capital/net income</td>
</tr>
</tbody>
</table>

With regard to IESF, the first step towards constructing the index is the standardisation of variables from each dimension. The standardised observation of the $k$ indicator for the country $i$ for the period $t$, $x_{k,i,t}$, is calculated on the basis of formula (1):

$$x_{k,i,t} = 100 \left[ \frac{X_{k,i,t} - \min(X_{k,i})}{\max(X_{k,i}) - \min(X_{k,i})} \right]$$  

where the reference rate $k = 1,\ldots,4$ represents, respectively, the indicators $D = (npl_{i,t}, cap_{i,t}, roa_{i,t}, roe_{i,t})$, $X_{k,i,t}$ and corresponds to the observation not transformed with a maximum $\max(X_{k,i})$ and minimum $\min(X_{k,i})$ in the sample used. The normalisation technique used is also known as empiric normalisation and has the accuracy of ensuring that $0 \leq x_{k,i,t} \leq 100$. In this way, within a four-dimensional Cartesian space, the points $O = (0,0,0,0)$ and $I = (100,100,100,100)$ represent, respectively, the point indicative of higher risk and higher stability for each country in relative terms with the country itself for a given sample.

Lastly, the $IESF_{it}$ is obtained by the inverse of the normalized Euclidean distance from point $D$ to the optimal point $I$. Formally, for the period $t$, the $IESF_{it}$ for country $i$ is calculated on the basis of this formula:

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\(^9\) The selection of these indicators was firstly based on the similarity of the statistical record of each indicator among the countries and then on the importance of its subjacent interpretation.
In equation (2), the numerator of the second component is the Euclidean distance from $D$ to point $I$, normalised by the denominator, so that the indicator stays between 0 and 100, and subtracting from 100. The aim is to provide the inverse of the normalised distance so that the higher the value for $IESF_{it}$, the higher will be the stability of the banking system in the respective country.

Finally, in order to assess the stability of the banks in the region as a whole, a global IESF was built. The index was built through a weighted average of the sample 15 countries’ IESF, i.e.:

$$IESF_t = \frac{1}{\sum_{i=1}^{15} \delta_i} \sum_{i=1}^{15} IESF_{it} \times \delta_i$$  \hspace{1cm} (3)$$

where $\delta_i$ is the country’s IESF and the weight $i$ represents a country’s share in GDP comparatively to the region’s global GDP.

4.2 Determinants of the financial stability of the SADC region

As mentioned previously, from country to country, the economic and financial indicators display varied performances.\[^{10}\] Therefore, the econometric model has to take into consideration the fact that fixed effects may exist in the countries. In other words, it will have to attend to the countries’ unobserved heterogeneity. Thus, the first step is to empirically test the presence of fixed effects underlying the performance of the variables in question.

By contrast, it is important to know if the process that drives the IESF is a persistent stochastic process. Efforts were made to examine the appropriateness of applying a dynamic model to the IESF, i.e., by applying the following model:

\[^{10}\] Due to the high number of time units (quarters), effects unchanged in time through the inclusion of temporary dummies were not considered. To that end, a deterministic linear trend was considered, but this proved useless due to the absence of statistical significance. Therefore, it can be concluded that there are no effects unchanged in time.
\[ IESF_{it} = \alpha + \delta IESF_{it-1} + x'_{it}\beta + u_{it} \]

where \( \alpha \) is a vector of constant terms, \( \delta \) is the persistence coefficient of the auto-regressive process of the dependent variable, \( x'_{it} \) is a vector of explicative variables (deterministic or stochastic) not necessarily all reported at the same period, \( \beta \) is a vector of the respective coefficients, \( \mu_t \) are the effects (random or fixed) of the country and \( v_{it} \) is a random variable with standardised normal distribution.

Therefore, the second step is to try and model probable dynamic effects on the dependent variable. If the best way to describe the IESF, from an econometric perspective, is the construction of a dynamic model, then there are, by construction, some endogeneity problems, namely:

1. endogeneity due to unobserved heterogeneity (in the countries and/or time); and
2. endogeneity of the lagged dependent variable.

To solve problem (1) there are two immediate options, namely:

a. to adjust a fixed effects model; or
b. to parameterise the model to the differences such as \( \Delta IESB_{it} = \delta \Delta IESB_{it-1} + \Delta x'_{it}\beta + \Delta u_{it} \), where: \( \Delta u_{it} = \Delta v_{it} \). With this parameterisation a robust model against non-stationarity was found.

Regarding problem (2), the solution is not quite as immediate. In fact, both the Pooled OLS (POLS) model as well as the fixed effects (FE) model or the random effects (RE) model are biased.\(^\text{11}\) By contrast, the model to the first differences cannot solve the endogeneity problem to the extent that they have, by construction \( \text{Cov}(\Delta IESB_{it-1}, \Delta v_{it}) \neq 0 \) (Baltagi 2008, Nickell 1981).

\(^{11}\) It can be proven that the bias of the auto-regressive parameter in the POLS is positive, overestimating the auto-regressive parameter, i.e. \( \text{Cov}(IESB_{it}, \mu_t) > 0 \), while in FE the opposite happens: there is a negative bias seeing that the auto-regressive parameter is underestimated, i.e. \( \text{Cov}(\Delta IESB_{it-1}, \Delta \hat{v}_{it}) < 0 \), where \( \hat{X} \) represents the transformation of fixed effects on \( X \), i.e., \( IESB_{it-1} = IESB_{it-1} - \frac{1}{T-1} (IESB_{i1} + \cdots + IESB_{i(t-1)} + \cdots + IESB_{iT}) \) and \( \hat{v}_{it} = v_{it} - \frac{1}{T-1} (v_{i2} + \cdots + v_{it-1} + \cdots + v_{iT}) \). Therefore, it is easy to see that \( \frac{\text{IESB}_{it-1}}{T-1} \) is correlated with \( v_{it} \) in a similar way to the one in which \( \frac{\text{IESB}_{it-1}}{T-1} \) is correlated with \( v_{it-1} \).
In short, in these circumstances of dynamic models there are two sources of persistence: the first, which is unobserved, results from the permanent effect on the time for the same individual and is caused by the heterogeneity term $\mu_i$. The second, which is observed, occurs from the structural dependency caused by the dependency of the dependent variable in relation to its past values (more serious the higher the value of the autoregressive parameter $\delta$).

If, as is shown here, the problems stemming from the first persistence source are easily solved through the estimate with fixed effects, the same cannot be said of the second, as none of the usual models guarantee the consistency of the estimates. In fact, the logical step relates to the parameterisation of the series to the first differences (with the objective of removing unobserved heterogeneity) in conjunction with the method of instrumental variables.\textsuperscript{12} Arellano and Bond ((AB), 1991) point out past levels of series ($IESB_{it-p}$ and eventually $x'_{it-p}$) as the best solution for instrumental variables. Thus, the AB model, which is regarded as the generalised method of moments (GMM), consists of parameterisation of first differences to remove the endogeneity occurring from the unobserved endogeneity in the countries where, to remove the endogeneity occurring from the temporary persistence, the instrumental variables are past levels of endogenous variables. However, there may be a problem with weak instrumentation with this approach, especially when the structural persistence in time is high. For example, one may consider, without any generality loss, a pure autoregressive model such as:\textsuperscript{13}

$$IESF_{it} - IESF_{it-1} = (\delta-1) IESF_{it-1} + \text{error}$$

If $\delta$ is close to 1 then $\delta - 1$ will be close to zero and, therefore, the correlation between $\Delta IESB_{it}$ and $IESB_{it-1}$ will also be close to zero. Consequently, the instruments contain in themselves little information on the instrumented variables; hence the consistency and efficiency the AB model is not guaranteed.

\textsuperscript{12} These variables have to conform to two fundamental criteria: (i) to be orthogonal to the error term $\Delta v_{it}$ and (ii) to have relevant information on the endogenous variables (instrumented), i.e., to be correlated.

\textsuperscript{13} Subtract $IESB_{it-1}$ on both sides of the equation: $IESB_{it} = \delta IESB_{it-1} + \text{error}$. 
A solution to this problem was proposed by Blundel and Bond (BB) (1998) who suggested that one should use more moment conditions through system estimation. With regard to the difference equation (as instrumented by past levels) such as the one in the AB model, the authors suggest the addition of one equation in levels where the instruments are the past differences of the series. In other words, the difference equation is:

$$\Delta IESF_{it} = \delta \Delta IESF_{it-1} + \Delta x'_{it} \beta + \Delta u_{it}$$
$$\Delta u_{it} = \Delta v_{it}$$

(4)

where the orthogonality conditions are:

$$E[IESF_{it-2} \Delta v_{it}] = 0$$
$$E[x'_{it-1} \Delta v_{it}] = 0$$

To which an equation is added in levels:

$$IESF_{it} = \alpha + \delta IESF_{it-1} + x'_{it} \beta + u_{it}$$
$$u_{it} = \mu_i + v_{it}$$

(5)

where the orthogonality conditions are:

$$E[\Delta IESF_{it-2} v_{it}] = 0$$
$$E[\Delta x'_{it-1} v_{it}] = 0$$

It should be noted that the equation has an over-identified model in the sense that it contains more instruments than endogenous variables. This is the ideal condition because if one enjoys more moment conditions, one significantly improves the results in terms of consistency and efficiency. Thus, one cannot exactly satisfy the orthogonality conditions in the sense that they are equalled to zero because the matrix which is the result of the product of the matrix of regressors by the matrix of instruments is not a square matrix, therefore it is not invertible. The intention of the GMM is to meet as many of the moment conditions as possible, therefore minimising the distance between the orthogonality conditions. This is the method that will be used in the estimation of the AB and BB models.
It is important to specify the variables that were tested to be used in the model, such as
the selected group of variables used, i.e., how vector $x_{it}'$ was built. In this regard, the
explanatory variables can be grouped in two distinct groups. In the first group – the
vector $x_{1it}'$ – there are variables that refer to the countries’ specific indicators; therefore,
they assume distinct values from country to country. This group is formed by the
variables $[m_{yi}, corr_{it}; \pi_{it}; res_{it}]$, where:

- $m_{yi}$, given by the ratio of M2 to nominal GDP, measuring the degree
  of monetisation of the economy, is an adequate means to assess the development, the
  depth and dimension of the financial sector (Outreville 1999);\(^{14}\)
- $corr_{it}$ is the current account balance to GDP ratio, providing a measure of
  external performance;\(^{15}\)
- $\pi_{it}$ is the year-on-year inflation rate given by a 12-month change in the CPI of each
  economy; and
- $res_{it}$ is the annual change of the international reserves. It is an indicator of the
  external solvency of each economy, i.e., of the capacity that each central bank has
to mitigate external shocks.

Control variables were inserted in the second group – vector $x_{2it}'$. One should note that
the variables related to the global macroeconomic environment that do not change
between countries. The selected variables were the annual change of the oil price, $p_{it}^{o}$,
and the GDP real growth of the G20\(^{16}\) ($gw_{t}$).

---

\(^{14}\) According to Carlin and Soskice (2006), M2 corresponds to M1 (the financial assets that perform the
function of immediate means of payment: currency in circulation, deposits on call and the like) and the
highly liquid financial assets which, although they are not immediate means of payment, adequately
comply with the remaining monetary functions (namely the store of value). By contrast, it is the only one
in respect of which there is available data for the period under review.

\(^{15}\) The use of this indicator, as it will be seen later, is very significant and it means another set of
indicators which could also have been relevant should be left out of this panel. Examples include the price
of international commodities with an evolution which may be relevant for external accounts, the use of
the exchange rate which may give an indication of the level of competitiveness, or the growth of the
economy in view of the fact that for the majority of the economies in the region the economic growth is
strongly linked to the export sector.

\(^{16}\) The G-20 group is formed by South Africa, Argentina, Brazil, Mexico, Canada, United States, China,
Japan, South Korea, India, Indonesia, Saudi Arabia, Turkey, European Union, Germany, France, Italy,
Russia, United Kingdom and Australia.
As for the model estimation, the starting point went through the recourse to standard methodologies, namely POLS, the FE model and the RE model. In relation to this point, some observations stand out, namely:

1. there are peculiar fixed effects in the countries;
2. there are dynamic effects;
3. theoretical results relating to the inconsistency of the above-mentioned appreciators are confirmed empirically: POLS tends to overestimate the autoregressive parameter, while the FE model tends to underestimate it; and
4. the estimate of the autoregressive parameter given by the BB methodology is lower than the one obtained by POLS, but is higher than the one obtained through the FE model. Such an occurrence is totally in accordance with what could be expected. In fact, as it was previously argued, insofar as a consistent estimate for the autoregressive parameter was limited by the estimates of POLS and the FE model. This circumstance is a characteristic of the consistent results that the BB model produces.

The estimate was carried out using Stata software and, in particular, with the help of the *xtabond2* package (Roodman 2009a). Due to the problem of the weakening of the Hansen tests in the presence of the proliferation of a number of orthogonality conditions, the instruments matrix was collapsed (Roodman 2009b).

In both the AB and BB models, the two-step GMM with bias was also considered (Windmeijer, 2005). There are some differences between the BB and AB estimates with respect to the autoregressive coefficient. Besides, this is an expected result given that methodology’s propensity for underestimating this parameter. This situation proves, once again, the quality of the BB model in the context addressed. Therefore, given the high persistence of IESF over time, the correlation between the differences and past levels is significantly reduced. As a result, the past levels of the series do not effectively fulfil their function of implementing the lagged dependent variable (which is endogenous by construction) because, as such, they have little information on the

---

17 Testing the presence of fixed effects on individuals, the null hypothesis of fixed effects’ redundancy was rejected at a level of nominal significance inferior to 1 per cent. To note that in this model, the temporal fixed effects were not considered. Neither temporal dummies nor trend terms (which impose the restriction of equality of temporal dummies) were certified as significant variables.

18 In practice, this situation is not always the case, following the idea that the theoretical and empirical results can sometimes be very divergent.
variable to be implemented and therefore there is a problem of weak instruments. The probability that, from the modulation skills, the same occurs with the remaining explanatory variables should be noted. Consequently, this is one more excellent indication of the system of Blundell and Bond.

Lastly, regarding diagnostic tests, it is important to mention two fundamental issues:

1. Arellano and Bond autocorrelation tests apply where the null hypothesis is one of the absences of autocorrelation of the first and second order:
   \[
   \begin{align*}
   H_0 &: E[\Delta u_{it}\Delta u_{it-1}] = 0 \\
   H_1 &: E[\Delta u_{it}\Delta u_{it-1}] \neq 0
   \end{align*}
   \]
   and
   \[
   \begin{align*}
   H_0 &: E[\Delta u_{it}\Delta u_{it-2}] = 0 \\
   H_1 &: E[\Delta u_{it}\Delta u_{it-2}] \neq 0
   \end{align*}
   \]

2. Hansen tests and Hansen differentials validate the instruments identified above. These tests aim to give
   (i) a global validity of the instruments, (ii) the validity of the instruments of the predetermined and/or endogenous variables and (iii) the validity of the instruments of the variables considered to be strictly exogenous which, in this case were a deterministic linear trend, the oil price and global growth.

5. Empirical estimation

5.1 Stability indicator

Based on the methodologies presented in the section above, Figure 7 shows the IESF obtained for each SADC Member State. The sample covers the period 2008–2014, except for Botswana, the DRC and Lesotho, which are covered until 2013 due to data availability.
Figure 7: Financial sector stability index

Note: Calculations made by the authors. The data were obtained from the region’s central banks and from the IMF.

A sample starting in 2008 was considered as this is the year that marks the beginning of the turmoil experienced in the global financial markets, followed by a slow global recovery in subsequent years. In this way, the indicators are able to capture an important sample, therefore becoming very informative.19

The study shows that there was a break in the soundness of the banks in most economies during 2009 and 2010, such as Angola, Botswana, DRC, Lesotho, Madagascar, South Africa, Tanzania and Zambia. For example, in Angola, 2010 was the

19 The information presented at the end of this chapter was supplied by the central banks of the SADC countries. For a more complete characterisation, please consult Annex 1.
year with the lowest point in financial stability due to high levels of non-performing loans (including write-offs) and low solvency levels.\textsuperscript{20}

Nevertheless, until 2013, it appears that the financial stability of Angola, Madagascar, Mauritius, Mozambique and Zimbabwe followed a downward trend. Therefore, the credit risk of the countries increased, mainly for Angola and Madagascar. At the same time, there were substantial declines in capital profitability, with the exception of Madagascar whose economy has been hit by an economic crisis since 2009.

Zimbabwe also merits special mention in that it had unfavourable developments in all dimensions of the constructed index. It should be noted that this country’s major difficulties are liquidity constraints, a low amount of new deposits, limited foreign lending facilities and the companies’ low economic viability. In addition, the rigidity of the microstructure, such as transitory deposits, and the absence of an active interbank market culminated in the gradual rise of overdue loans, liquidity, recapitalisation and low profitability in some banking institutions.

By contrast, in the group of countries that registered a stable position around the mean of their financial environment are DRC, Lesotho, South Africa and Seychelles,\textsuperscript{21} explained for the most part by the strength of their banking system regulatory and operational framework. In the case of Seychelles, despite the index drop in 2012, the sample showed a broadening of the banking sector accompanied by the introduction of new legislation to promote and support the stable development of this sector.\textsuperscript{22} In the specific case of South Africa, given its relevant international participation, there was also a review and alteration of the banking-sector legislative and regulatory framework to ensure a framework in compliance with international regulatory standards.\textsuperscript{23}

\textsuperscript{20} It is important to mention that 2010 is also associated with the significant increase in the central government’s net credit to, among others, comply with accumulated late payments to foreign capital institutions, thus creating a downstream chain of postponements and nonfulfillment of those state duties (Banco Nacional de Angola, 2013).

\textsuperscript{21} Due to the forced financial liberalisation of the 1980s and 1990s, serious macroeconomic imbalances were registered. However, a continuous improvement of the financial sector was witnessed, resulting from the reforms agenda of those two decades meant to reinforce the levels of solvency and risk management (Mlachila, Park and Yaraba, 2013).

\textsuperscript{22} The list of legislations introduced may be obtained at http://www.cbs.sc/Legislations/cbsact.jsp.

\textsuperscript{23} South Africa implemented Basel II, effective from 1 January 2008. The implementation implied among others, a radical change in disclosure methodology, reviewed regulatory returns and a better alignment of
By exploring the most recent year, there are some remarks to be made. On the positive side is the notable recovery of Madagascar, Namibia and Zambia. In 2014 the banking system of Madagascar, in spite of the lower capital adequacy ratio in the sample, showed high levels of profitability, whether assets or capital, which contributed positively to the improvement of the index. High profitability levels are also observed in the Namibian system, together with a favourable trend in the quality of the assets portfolio. In Zambia the solvency levels are historically high, and non-performing loans have also contributed favourably to financial stability. By contrast, the recent oil price decline has shown the relationship between the macro economy and the banking system in Angola. In 2014 bank profitability fell to historically low levels and overdue loans began to follow a stronger upward trend.

The built index for the SADC region may be seen in Figure 8, where the sample covers the period 2008–2013 based on data received from Member States, where 2008 was the first available data point for most countries and 2013 was the latest available data point. It is possible to see that the region’s banking-sector stability experienced a worse period in 2009 and 2010, clearly showing that the region’s banks showed less stable periods after the global financial crisis. A recovery of the ratios calculated from the bank balance sheets occurred in 2011 and 2012. Lastly, in the last year of the sample, there was another drop in the index and the year ended below the sample average. However, the index was still above the levels observed during the post-crisis period.

regulatory requirements with the International Financial Reporting Standards (IFRSs). In 2012, the focus changed to ensure that the regulatory and supervision frameworks were duly changed in time for the phased approach of higher capital requirements introduced as part of Basel III, which became effective on 1 January 2013.
5.2 Determinants

Table 2 shows the results relating to the POLS, EF, AB and BB models. The models used quarterly data for the period 2008–2013 for all SADC Member States with the exception Swaziland due to some data problems.

When interpreting the coefficients, it is important to mention that a negative relationship between the degree of financial deepening and the financial stability of the banking system is observed. This outcome is somewhat expected, as financial deepening implies a more sophisticated financial system or a more leveraged one, which can certainly increase the probability of risk materialising as the banks become more exposed to them. It is important to note that Dell’Ariccia (2006) showed empirical evidence of a trade-off between financial deepening and financial stability. However, there is another point to ponder: when discussing less developed financial systems such as those of most SADC economies, more financial deepening may indicate an environment that is more favourable to financial intermediation. This can result in the banks’ profitability and also an improvement in credit risk by virtue of it being easier to get resources to ensure compliance with debt servicing in deeper financial systems. But what was empirically established was that, taking into consideration the indicators that make up the IESF, the theoretical negative effects outweighed the theoretical positive effects.
Table 2: Results from estimates of the static and dynamic GMM models

<table>
<thead>
<tr>
<th></th>
<th>Pooled OLS</th>
<th>Fixed effect</th>
<th>Arellano and Bond</th>
<th>Blundell and Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of observations</td>
<td>315</td>
<td>315</td>
<td>301</td>
<td>315</td>
</tr>
<tr>
<td>No. of groups</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>No. of instruments</td>
<td>...</td>
<td>...</td>
<td>133</td>
<td>140</td>
</tr>
<tr>
<td>$F(9; 14)$</td>
<td>314.53***</td>
<td>1247.99***</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.7377</td>
<td>0.6971</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Wald $\chi^2 (9)$</td>
<td>...</td>
<td>...</td>
<td>617.70***</td>
<td>684.14***</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exogenous variables</th>
<th>Coefficient$^{1)}$</th>
<th>Coefficient$^{2)}$</th>
<th>Coefficient$^{1)}$</th>
<th>Coefficient$^{2)}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$IESF_{t-1}$</td>
<td>0.8306***</td>
<td>0.7384***</td>
<td>0.7392***</td>
<td>0.7850*</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(16.28)</td>
<td>(19.04)</td>
</tr>
<tr>
<td>$m_\gamma_t$</td>
<td>-0.0121</td>
<td>-0.0576</td>
<td>-0.1666</td>
<td>-0.1015*</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(-2.53)</td>
<td>(-2.05)</td>
</tr>
<tr>
<td>$ccorr_t$</td>
<td>0.0346</td>
<td>0.1766**</td>
<td>0.2569***</td>
<td>0.2420***</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(4.07)</td>
<td>(3.50)</td>
</tr>
<tr>
<td>$p_t^*$</td>
<td>-0.0383</td>
<td>-0.0381</td>
<td>-0.0521***</td>
<td>-0.0523***</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(-2.87)</td>
<td>(-2.34)</td>
</tr>
<tr>
<td>$\pi_t$</td>
<td>-0.2063*</td>
<td>-0.2167*</td>
<td>-0.1731*</td>
<td>-0.1939**</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(-1.90)</td>
<td>(-2.23)</td>
</tr>
<tr>
<td>$\pi_{t-1}$</td>
<td>0.2140***</td>
<td>0.1566*</td>
<td>0.1994***</td>
<td>0.2613***</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(2.21)</td>
<td>(2.32)</td>
</tr>
<tr>
<td>$res_t$</td>
<td>-0.0011</td>
<td>-0.0016</td>
<td>-0.0017</td>
<td>-0.00067</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(-1.1)</td>
<td>(-0.34)</td>
</tr>
<tr>
<td>$res_{t-1}$</td>
<td>0.0012*</td>
<td>0.0007</td>
<td>0.0003</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(0.18)</td>
<td>(0.48)</td>
</tr>
<tr>
<td>$gw_t$</td>
<td>0.3132</td>
<td>0.0704</td>
<td>0.3359</td>
<td>0.4402</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td>(1.01)</td>
<td>(1.30)</td>
</tr>
<tr>
<td>$C$</td>
<td>6.1063*</td>
<td>14.1406**</td>
<td>...</td>
<td>12.665***</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(16.28)</td>
<td></td>
<td>(3.41)</td>
</tr>
</tbody>
</table>

1) The $t$-statistic ratio is inside the brackets
2) The $z$-statistic ratio is inside the brackets

Note: The exponent * indicates statistically significant at 1 per cent, while ** indicates statistically significant at 5 per cent.

However, the variable current-account balance as a ratio of GDP is highly significant, which indicates that the better the external performance in explaining economic growth, the better the contribution towards stability of the banking sector. A possible explanation for this result could be attributed to the evidence that the exporting companies’ activity is supported by the banking sector. In this way, when there is a deterioration in the current account, the economy’s exporting sector is not sufficiently competitive to increase its revenue, and given the exposure of the banks to the sector, the profitability and credit risk may undermine the sector’s stability and resilience.24

24 It is important to mention that a big weight of the lending activity in most of the countries under review is aimed at the exporting companies instead of being directed to the households; hence the stability of the exporting sector can be seen as a cornerstone interlinking the macroeconomic environment and the financial sector.
As might be expected, inflation also has a negative effect on the stability of the banking sector. In order to maintain positive real profitability, the banks would have to raise interest rates, which may contribute positively to the banks’ profitability. But this may hamper the agents in complying with their contractual obligations, which would in turn create negative consequences for the capitalisation of the institutions. In addition, this result is consistent with the current-account result, because higher inflation makes the exporting companies lose their competitiveness and thus there is a deterioration in the current account.

In terms of the oil price, there is a negative causal link for financial stability. It should be noted that Angola is the only country considered to be a large oil exporter in SADC, while the remaining countries, despite some being oil exporters on a smaller scale, are clearly oil-importing countries. Because oil is an almost irreplaceable input in the production and logistics process, a rise in its price could have a negative impact on the profitability of companies and, consequently, create difficulties to the banks exposed to such companies. Proof of the robustness of the results obtained is to associate the oil coefficient with the inflation and current-account coefficients, i.e., an increase in the oil price can positively influence inflation and negatively influence the current account.

Lastly, it is important to mention the statistical and economic significance of the lagged dependent variable. In fact, the autoregressive parameter $\delta$ is statistically different from zero, which suggests the existence of structural persistence in financial stability. From the viewpoint of economic rationality, this circumstance implies that a period of (in)stability at present will tend to be followed by periods of (in)stability in the future. Consequently, the recommendations from the systemic risk analysis are of a forward-looking nature, i.e., it is not sufficient to evaluate the system when risks are materialising; instead, one should act to prevent them from materialising as financial stability may spiral out of control. Table 3 summarises the results of these diagnostic tests.
Table 3: Diagnostic of the Blundell and Bond model

<table>
<thead>
<tr>
<th>Arellano-Bond autocorrelation test for differential model</th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR(1): first order</td>
<td>-4.6***</td>
<td>0.000</td>
</tr>
<tr>
<td>AR(2): second order</td>
<td>-0.35</td>
<td>0.724</td>
</tr>
</tbody>
</table>

Validation of the over-identified moment conditions

<table>
<thead>
<tr>
<th>Hansen tests</th>
<th>Degrees of freedom: n</th>
<th>χ²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>130</td>
<td>135.20</td>
<td>0.360</td>
</tr>
</tbody>
</table>

Hansen differential tests for equations in levels and to the differences

| Predetermined and endogenous variables | 123 | 121.69 | 0.517 |
| Strictly exogenous variables          | 129 | 135.20 | 0.337 |

1) Exogeneity test of the instruments subgroup: GMM instruments for level series. The signs *, ** and *** indicate statistical significance at 10 per cent, 5 per cent and 1 per cent respectively.

Regarding Arellano and Bond’s autocorrelation tests, it should be mentioned that, by construction, the errors follow the AR(1) process. Algebraically, $\Delta u_{it} = (\mu_i + v_{it}) - (\mu_i + v_{it-1}) = v_{it} - v_{it-1} = \Delta v_{it}$. It follows that, not only is it normal, but that the first-order autocorrelation in the errors is also positive. More positive still is the fact that there is evidence of the absence of autocorrelation of the order larger or equal to 2, since it is the true test of autocorrelation.

The Hansen tests verify the validity of the over-identified moment conditions, i.e., if the instruments perform their function correctly and if the endogeneity problems are resolved. In fact, there is empirical evidence, not only of the validity of the equation’s variables in levels but also in first differences. Furthermore, $p_l^0$ and $g_{i,t}$ are seen as predetermined variables, while the remaining are endogenous variables. Such reckoning is correct, or at least in accordance with what is required, as long as the null hypothesis of the instruments’ invalidity cannot be rejected.

In short, the variables’ exogeneity nature was correctly specified. It should be noted that the choice of the variables’ nature is not given by the economic theory, but it emerges from the model itself, which derives from letting the data speak.

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25 It should be noted that an exogenous variable in the levels’ equation will be predetermined in the differences equation, that a predetermined level’s variable will be endogenous to the differences. Therefore there is a need to carry out predetermined variables.
6. Complementary analysis

During the course of this work, the paper debated the idea that the balances of the banks in SADC countries are mainly influenced by variables of a macroeconomic nature, and that those balances respond, in a heterogeneous manner, to shocks in macroeconomic aggregates. In fact, as it was verified throughout this work that the SADC economies display a heterogeneous behaviour due to the unique characteristics of each of the region’s Member States and, consequently, the same applies to the balances of each Member State.

It is in line with this idea that in this section three complementary analyses will be dealt with to support the cross-disciplinary of this attempt. In particular, countries will be dealt with individually for the purpose of: (i) analysing the bilateral financial relationships between the countries and the outside world; (ii) identifying clusters in the region’s financial systems; and (iii) performing a comparative analysis between countries, taking into account their economic and financial stability.

6.1 Cluster analysis

The aim of this sub-section is to identify similarities and differences among the countries in the SADC region by way of a cluster analysis. After having selected the indicators (see Table 4), they were standardised to present them in the same scales, which assists with the implementation of the cluster analysis methodology for ease of interpretation. The selection of the indicators took into consideration the theoretical and conceptual aspects relating to the financial systems’ generalities.

The indicators that seek to capture the structure of the region’s financial systems take into account:

i. macroeconomic factors that can affect the search for banking services and reduce the risks associated with their offer;
ii. ratios of the banks’ balances;
iii. indicators of financial inclusion;
iv. spread of the banks’ lending and deposits interest rates;
v. macroprudential indicators; and
vi. structural indicators related to the financial-sector structure.
Table 4: Indicators for use in the clusters

<table>
<thead>
<tr>
<th>Macroeconomic factors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year-on-year inflation</td>
<td></td>
</tr>
<tr>
<td>Real growth of GDP</td>
<td></td>
</tr>
<tr>
<td>Current account (per cent of GDP)</td>
<td></td>
</tr>
<tr>
<td>Exchange rate (year-on-year change)</td>
<td></td>
</tr>
<tr>
<td>Net foreign direct investment (per cent of GDP)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pricing indicators</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spread between lending and deposit interest rates</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial structure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit to the private sector (per cent of GDP)</td>
<td></td>
</tr>
<tr>
<td>M2 (per cent of GDP)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Macropрудential indicators</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M2/total reserves</td>
<td></td>
</tr>
<tr>
<td>Credit to private sector (per cent of GDP) gap</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial inclusion</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of banking branches per 100 000 adults</td>
<td></td>
</tr>
<tr>
<td>Number of ATMs per 100 000 adults</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Macropрудential indicators</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital adequacy</td>
<td></td>
</tr>
<tr>
<td>Performing loans</td>
<td></td>
</tr>
<tr>
<td>Return on assets</td>
<td></td>
</tr>
<tr>
<td>Return on equity</td>
<td></td>
</tr>
</tbody>
</table>

Furthermore, with regard to the methodology, after the definition of data matrix and its standardisation\(^{26}\) as a measure towards the distance between the systems in the regions, it was decided to use the squared Euclidean distance, as in the cluster building process, the distinction between them is made in accordance with the more heterogeneous financial systems. This approach is followed by Wolfson (2004) and Sorensen et al. (2006).

The cluster process selected was the hierarchical clustering algorithm because it allows the grouping of similar banking systems without specifying ex ante a pre-established

\(^{26}\) The standardisation method for this cluster exercise involves considering the deviations vis-à-vis the duly weighted averages by the standard deviation. This ensures that all the variables have a null average and unitary variation.
number of clusters. The algorithm’s underlying technique relies firstly on placing each system in a distinct group. Next, each system is incorporated into successfully bigger groups, as per the cluster method chosen. This exercise uses the complete linkage method which joins two clusters characterised by the greater distance between any two objects in the different groups, i.e., the further clusters.

In order to identify the clusters by way of the explained methodology, it was intuitive to use a dendrogram. Using this map, the heterogeneity already mentioned could be proven and various groups could be identified. Furthermore, this type of illustration also assists with the interpretation of the proximities between the countries given the indicators used. The dendrogram of this analysis is shown in Figure 9.

Interpreting the picture is easy and quite intuitive. For example, if the SADC region is divided into three groups/clusters, having as a reference the distance of 7, then the order would be, from right to left, South Africa, Mauritius, Swaziland, Seychelles, Namibia, Lesotho and Botswana in a group; Malawi alone in the middle group; and the rest of the countries would be in another cluster, more to the left.
However, if the links between the countries are deepened, using the distance of 5 as a reference, six distinct clusters can be identified and interpreted. One group is formed by the DRC, Zambia, Tanzania and Mozambique. Angola appears separately in the second cluster. Cluster 3 includes Madagascar and Zimbabwe. Malawi is alone in the fourth group. A fifth group is constituted by Namibia, Lesotho, Botswana, Swaziland and Seychelles. Lastly, there is a group comprising Mauritius and South Africa. The clusters identified are organised in Table 5.

Table 5: Identification of clusters for the homogeneity of the banking sector, 2013

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Frequency</th>
<th>Countries</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>Zambia, DRC, Tanzania, Mozambique</td>
<td>26.67</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Angola</td>
<td>6.67</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Madagascar, Zimbabwe</td>
<td>13.33</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Malawi</td>
<td>6.67</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Namibia, Botswana, Lesotho, Swaziland, Seychelles</td>
<td>33.33</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>South Africa, Mauritius</td>
<td>13.33</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>
Concerning the proximity of the countries’ financial systems and taking into account the indicators used, in first place is Tanzania and Zambia, followed by Lesotho and Botswana. It should be noted that inside the clusters identified with more than one country, the cluster comprising South Africa and Mauritius (cluster 1) is the group with the highest general homogeneity of the selected indicators among the countries, followed by cluster 2 which comprises the DRC, Zambia, Tanzania and Mozambique.

The proximity between Mauritius and South Africa is intuitive due to the structural factors of their financial systems. It is important to note that in Africa, both countries are reference countries when it comes to the role of financial intermediation and financial deepening of their economies.

With regard to the DRC, Zambia, Tanzania and Mozambique, one common characteristic is identifiable in those countries and has to do with the fact that in the region they are the richest countries in terms of natural resources. As argued by Cabello et al. (2013), this characteristic means that these banking systems have negative net external positions, partly due to the presence of large foreign extractive companies.

Mozambique is the least homogeneous country in this cluster, probably due to the economy’s relative net foreign direct investment (FDI).

Although Angola could also belong to cluster 1, due to its characteristic wealth of natural resources it was isolated due to the contribution that its first natural wealth (oil) has on the economy. Also, this country is the only country with a net lending position in the international investment.

With regard to Zimbabwe and Madagascar, in spite of their inclusion in the same cluster, the distance between their financial systems is relatively vast. This is due to the high level of non-performing loans and interest rate spreads that exist in Madagascar, which are the highest in the region. However, concerning the other indicators, the countries show some proximity which contributed to their integration into a single cluster.
Malawi’s banking system is the one that emerges as the least integrated in the region, which resulted in its isolation in a cluster. This is, understandably, due to the high inflation rates and exchange rate depreciation for the period under review.

Lastly, in relation to cluster 5, with the exception of Seychelles, all the countries, including Namibia, Lesotho, Botswana and Swaziland, are formally linked to South Africa. It should be mentioned that the countries that form part of the Common Monetary Area (CMA) are South Africa, Namibia, Lesotho and Swaziland. Furthermore, Botswana, together with the CMA countries, constitutes the Southern African Customs Union (SACU). The exclusion of South Africa from this cluster has to do with the financial system’s structural factors. The introduction of Seychelles into this cluster is due to the general homogeneity of the indicators used. Nevertheless, it is important to mention that this cluster can be divided into two sub-clusters, including in one first group Namibia, Botswana and Lesotho, and in the second group Swaziland and Seychelles.

6.3 Network approach

Both the econometric study and the clusters approach were limited to the SADC economies. It is important to understand the channels through which situations of contagion and transmission of the world system’s geopolitical instability occur in the SADC region. One of the more immediate approaches for monitoring banking-sector risk deals with observing the international exposure level. The networking perspective allows for this ensuring that it outlines the bilateral relations of lending among the countries under review. An indicator that measures bilateral financial exposure with another is given by the ratio between assets vis-à-vis a country in relation to the total assets portfolio.

Starting from a more inclusive sample, correspondences regarding the international exposure of the economies were selected in order to better understand the environment involved in the international exposure of the countries. For this purpose, the study used cross-sectional data for SADC countries for 2012. During map preparation, some
aspects regarding country selection and their respective interrelationships were taken into account, for example:

1. Data made available by the SADC central banks, especially regarding South Africa, Angola, Seychelles, Namibia and Zimbabwe.
2. When it was not possible to obtain the categorised data from some of the central banks, the study used the amount of liabilities from South Africa to obtain the bilateral relationship with this country.
3. For the economies outside the region data was sourced from the BIS database. For investment recipients only the exposures relevant for this specific map were considered. The introduction of Portugal is due to the strong exposure of Angola to this country, with more than 50 per cent of its international assets being destined to Portugal. The introduction of United Kingdom (UK), US and Germany is due to the exposures of the countries in the region to them. For example, more than 50 per cent of South Africa’s international assets are destined to the US and the UK. In Zimbabwe, approximately 70 per cent of the international assets originate in the US, while in the Seychelles around 80 per cent of the assets are in the UK.
4. Bilateral relations were also considered among the SADC countries whenever these were higher than 2 per cent. Figure 10 shows the networking built from the simplifications presented above.

**Figure 10: Internationalisation of the SADC banking systems from a network perspective**

Source: Central banks of the SADC countries; Bank for International Settlement; calculations carried out by the authors of the document. The exposure of Lesotho is calculated indirectly by way of the foreign originated liabilities, broken down by countries, from South Africa and from the total international assets supplied by Lesotho.

27 Database available at http://www.bis.org/statistics/conssstats.htm
Note: The thickness of the line corresponds to the concentration of the bilateral exposure in terms of the international assets of a banking system. The black dotted lines correspond to a bilateral exposure ratio between countries in the region, higher than 2 per cent and less than 9 per cent.

In general, inside this network, the US and UK are two financial centres whose developments should be followed closely by the SADC region. Furthermore, South Africa is the main destination of the investment from the countries in the intra-SADC region. Thus, an interpretation of this network shows that moments of bigger financial weakness in the US and UK may lead to:

1. an intensification of the weaknesses of those countries through their strong relationships;
2. a harmful contagion among other countries exposed internationally due to them being two financial centres of great importance worldwide.\(^{28}\) In the network example, Germany is exposed to both countries and is a destination with some weight regarding the investments from Zimbabwe and Angola;
3. problems in the SADC countries with a high direct exposure to those countries, for example, Zimbabwe, Namibia and Angola to the US; Seychelles to the UK; and South Africa to both; and
4. problems with countries in the region with high exposure to South Africa, for example, Lesotho or Namibia.

Due to the relatively low proportion of their international asset portfolio with the total assets, the banking systems in SADC do not appear dogged by solvency problems, even in a very pessimistic scenario. However, it is very probable that losses occur in the South African financial system associated with its international exposure due to the more developed features of its financial system.

It is important to mention that, although most of the financial systems in the SADC Member States are still at a less developed stage, some countries are particularly sensitive to events in South Africa. For example, due to the exchange rate parity, the developments of South Africa’s financial and foreign-exchange market may also affect

\(^{28}\) Another example that for reasons of simplification was not shown in the network has to do with the exposure of Portugal to Spain and of Spain to the US. Given the high exposure of Angola to Portugal, problems in the US would affect Angola, not only due to its direct exposure to the US, but also via its indirect exposure via Portugal. In the network another indirect exposure is also visible, via Germany.
the CMA countries. Furthermore, Botswana, which together with other CMA countries belongs to SACU, is also affected due to its strong trade relations with South Africa and the exchange rate regime of a crawling peg.

Apart from this, the rationale underlying the network analysis refers to the fact that the analysis cannot be static and direct. Thus, by accumulating a set of impacts from the various scenarios defined in points 1 to 4, the exposure of the SADC financial systems may weaken relative to the global scenario. In this way, prudential regulation directed at limiting the concentration of financial systems’ exposures in some countries could be a point to take into account in the SADC agenda. Some factors to consider within this topic could be linked to stipulating maximum direct and indirect limits of exposure to certain countries, or the obligation for banks to provide a threshold of the total of their international investments so that in a worst-case scenario any eventual future loss on their investments is already accounted for and will not impact the financial stability ratios.

6.3 Comparative analysis between countries

This section proposes a methodology to identify which countries have higher levels of economic and financial vulnerability. The methodology used is similar to the one used to calculate the IESF. However, instead of making a temporal analysis by country, the data was compiled by period between countries. In other words, the approach is similar to the one used by the United Nations Development Programme (UNDP) for the calculation of some development indexes.

The indicators associated with financial inclusion and the FDI are derived from the indicators used in the cluster, complementing them with the remaining macroeconomic convergence indicators used. Table 6 summarises the indicators used and the sign assigned to that indicator according to the theoretical positive or negative correlation with the risk.
The purpose of building the indicator was to identify the countries that, in 2013, had more vulnerable economic and financial situations. The difference between this new indicator and the IESF calculated in Section 4 is that the latter allows the comparison of the financial-sector stability level of a country for the historical sample used. By contrast, the indicator built in this subsection enables a comparison of the stability of the financial sector and economies of the countries in the sample for a certain period. For 2013, the countries’ indicator in terms of global stability, i.e., financial sector and macroeconomic stability, is shown in Figure 11.
What can be observed is that South Africa and Mauritius had the lowest levels of financial and economic stability for 2013. It is important to note that these two countries share the same cluster, mainly due to the high levels of financial deepening observed, much higher in general than the remaining economies. The variable financial and economic stability index was tested in the econometric model and was significant and negatively related to the stability of the IESF. Moreover, as the two financial systems are internationally dynamic, in particular South Africa, it can be concluded that this cluster should be further modernised. This study reinforces the arguments of Cabello et al. (2013) that suggest that cross-border supervision in the region is a topical issue. This author mentions some of the prominent banks in South Africa whose exposure to the rest of the African continent is seen as a warning, such as Standard Bank and Ecobank.

7. Final remarks and policy recommendations

This study aimed to discuss financial stability in SADC economies in an innovative and trans-disciplinary manner. The contribution to the literature includes the application of methodologies that are usually reserved for the so-called developed economies.

SADC financial stability was split into two major areas, namely macroeconomic stability and banking-sector stability. The study examined the extent to which a set of exogenous variables contribute to financial stability of the Member States in the region, particularly variables common to all and unique variables.
It was shown that the economic and financial indicators were proven to be quite heterogeneous from country to country, and that realisation took place in all the exercises carried out in the document.

An IESF was created and it grouped four ratios of the banks’ balance sheet, which were used as proxy to banking stability. Furthermore, the high persistence of the built index was revealed, which was shown in two manners: through the latent heterogeneity and a dynamic that characterised it. The first source of persistence was treated, including fixed effects in the sectional units and, in turn, the second source of persistence, the dynamic persistence, was modelled using an estimate system following the methodologies of Blundell and Bond.

The variables that contribute the most towards explaining the created index are the inertia factor of financial stability, the degree of financial deepening (ratio of M2/GDP), the current-account ratio of GDP, the inflation rate and the oil price.

Given the high statistical significance of the current-account balance, it is advisable to think of a programme structured to stimulate the competitiveness of the region’s economies. Such recommendation is encouraged in this case for stability in the banking sector and because it is in line with two criteria of SADC’s economic convergence, namely the inflation rate and economic growth.

An important factor to consider relates to the negative sign of the financial deepening coefficient. In fact, the characteristics of the region’s financial systems are reflected, in general and when compared with benchmarks from other regions, in a reduced banking level, a little diversified business model, a low degree of financial deepening and a well-capitalised system. Such characteristics may highlight the need for higher sophistication of the banking systems, and to strengthen the relationships of macroeconomics and the banking system to give weight to the banking system in order to be one of the engines of economic development in the countries, especially through the fundamental role that banking plays in monetary transmission mechanisms. Insofar as this has been incentivised in the Member States, particularly the incentive to lower risk aversion of
the banks and consequently higher credit granting to the economy, such as a more inclusive system in all dimensions, the results indicate that this should be done gradually and with prudence in order to discourage an environment conducive to practices that can lead to vulnerabilities in the financial system.

The financial stability revealed a persistent, therefore predictable, and variable pattern. If it is increasing, then the trend is to continue increasing, and if it is decreasing, then the trend is to continue decreasing. Such occurrence suggests that a forward-looking analysis should be taken into account in order to anticipate the risks that may occur in the financial sector.

The clusters approach revealed six large groups that show similarities in their banking sectors. The cluster more exposed to vulnerabilities, in line with the econometric results, is the one that includes Mauritius and South Africa due to the high level of financial deepening demonstrated by its members.

Taking into account that the idea is to financially integrate the countries in the region, the cluster analysis is important to evaluate to what extent the systems are becoming more homogenous or not. For example, when one thinks about the creation of institutional units of financial stability in the region, one can, from the clusters analysis, draw conclusions about the possibility of the countries in the region becoming more homogenous or not.

In the analysis of the exposure to international banking systems, it was found that the SADC region is particularly exposed, both directly and indirectly, to the US and the UK. Considering the region on its own, it is evident that South Africa is the main financial centre. Taking into account South Africa’s trade and financial relations with the other economies in the region, this should be taken into consideration by the supervisory bodies. Knowing the predominance of banks in South Africa, whose exposure to the rest of the African continent is considered an alert, this study enforces the idea of Cabello et al. (2013) that the cross-border supervision in the region is a topic which should be taken into account.
Lastly, an index was constructed to compare the financial and economic stability of countries in 2013. The majority of the indicators presented were aggregated in this study and one may conclude that South Africa and Mauritius are the countries in the region whose financial systems may find themselves more exposed to the materialisation of risks.

In conclusion, a recommendation to withdraw from this paper involves the creation of a unit whose institutional design embraces elements from the financial supervision and research departments of the central banks and is dedicated to the construction, monitoring and follow-up of macroprudential indicators, aiming to implement thresholds and targets for the core financial stability indicators. However, it is necessary to develop and implement measures that meet the needs of the progressive homogenisation of the SADC countries. In this way, one should consider the assimilation of ways of the SADC economies, not only in institutional terms, but also where it concerns the integration of the fiscal, monetary and financial areas. These issues will be debated in future work.
Bibliography


Annexure

A.1 Contributions of each SADC country to the financial sector stability index

Below is information relating to the evolution of the financial sector of the SADC countries, covering the period 2008 to 2013, from which it was possible to obtain such information.

➤ Angola

Taking into account that Angola’s financial crisis occurred in 2009 and that it took place at the macroeconomic level due to the effects of the oil sector on the external and fiscal sectors, the repercussions on the banking system occurred after the effects of the crisis were attenuated (beginning of 2010). The year 2010 was characterised mainly by a higher percentage of overdue credit (including bad credit) and by low levels of solvency in the system as a whole which is reflected in the high values of index evolution. It is important to mention that 2010 is also associated with the significant increase of the central government’s net credit to, among other things, make the accumulated overdue payments to external capital institutions, creating a downstream chain of postponements and nonfulfillment of those state duties. It can thus be concluded that the overdue payments were not enough to re-establish the stability scenario for the system, and the financing to that effect (banking credit and titles) had implications for credit concessions to the business sector that created difficulties for the companies’ conditions to meet debt servicing.

In fact, apart from the 2010 period being the period when the banking system ratios showed levels worse than those considered for this study, it was also the period when the credit meant for most of the economic activity sectors was contracted. As mentioned, it is probable that this contraction of credit was linked to the increase in state financing and, consequently, to the deterioration of some of the financing system’s financial indicators.

In 2013 Angola’s index shrank further, which was very probably associated with the profitability losses of the banks and increasing credit risk.
Madagascar

Madagascar’s banking system comprised 11 banks in 2013 compared to 9 banks in 2008. All banks are onshore and subsidiaries of foreign banks. They are allowed to hold assets in local and foreign currencies. Banking assets are largely composed of local currency.

Though the country has been struck by political crises impacting on the economic performance since 2009, the banking system has remained globally well capitalised and liquid. Liquid assets cover short-term liabilities within the range of 64.6 to 77.3 per cent during the period. It also shows a figure of relative profitability but the performance is not well shared between banks. Four big banks structurally drive the overall development of the banking system. Nevertheless, a national crisis hit the banks on the assets quality side. The ratio of non-performing loans to total advances went up from around 8 per cent in 2008 to around 15 per cent in 2013.

The impact of the economic recession on banks’ profits was mitigated by solid interest margins earned from multiple interest rate spreads between lending and deposit rates. Moreover, credit has slowed down, except for the credit to government through Treasury bonds. As credit to government offers lower risk, the situation contributed to maintaining banking performance by increasing financial margins.

Zimbabwe

The Zimbabwean banking system deteriorated in 2008 as result of worsening economic conditions which resulted in hyperinflation. Since the adoption of the multicurrency system in 2009, the banking sector has generally exhibited stability.

As at 1 January 2008 there were 28 banking institutions comprising 14 commercial banks, 5 merchant banks, 4 discount houses, 4 building societies, 1 finance house, as well as a savings bank (POSB). In addition, there were 17 asset management companies and 309 microfinance institutions.
With a view to consolidate gains in the multicurrency system, some banks merged while others upgraded from merchant banks to commercial banks. Reflecting the impact of the multicurrency system and the recent global trends of moving towards universal banking, most discount houses and merchant banks closed down during the period under review.

As at 31 December 2013 there were 22 operating banking institutions (including POSBs), comprising 16 commercial banks, 2 merchant banks, and 3 building societies. There were also 15 asset management companies and 146 microfinance institutions.

The overall financial condition of the banking sector in 2013 was satisfactory as the sector remained generally stable despite the various underlying macro- and microstructure-induced constraints which continue to militate against the sector’s ability to meaningfully perform its core function of financial intermediation.

The major challenges in the banking sector in 2013 were liquidity constraints, low and transitory deposits, limited foreign lines of credit and corporate viability challenges. In addition, microstructure rigidities such as transitory deposits and the absence of an active interbank market culminated in the gradual rise in non-performing loans, bank specific liquidity, recapitalisation and profitability challenges at a few banking institutions. Notwithstanding these challenges, however, the banking sector remained generally stable.

**Seychelles**

From 2008 to 2013 there was a deepening of the banking sector, with new legislations being introduced by the regulators to both promote and support the development of this sector. For instance, in 2012 the Central Bank of Seychelles (CBS) Regulations 2012 was introduced, which allows the central bank to administer a Credit Information System, which makes available credit information of clients of credit-granting institutions that fall under the supervisory ambit of the CBS and contributes to credit risk management. In 2013 the Financial Leasing Act was introduced. However, secondary legislations including those on licensing and prudential matters were yet to be issued. Accordingly, licensing of financial leasing institutions had not yet
commenced by the end of 2013. A list of other legislation introduced can be obtained at http://www.cbs.sc/Legislations/cbsact.jsp.

The changing regulatory environment fostered enhanced competition and provided a robust framework in which the banks could operate. This is evidenced partly through the supervisory portfolio of the central bank which increased from 7 banks, 9 bureaux de change and the Seychelles Credit Union in 2008 to 8 banks, 24 bureaux de change, the Seychelles Credit Union, the Development Bank of Seychelles and a Housing Finance Company by 2013. Furthermore, the banking sector observed an increase in the banking penetration by the introduction of additional banking facilities. Specifically, the number of bank branches had grown from 24 in 2008 to 28 in 2013. Similarly, the number of automated teller machines (ATMs) increased from 28 in 2008 to 45 in 2013 indicating that banks continued to expand the reach of their services to their clients. The number of point-of-sale (POS) devices as at 2013 was 1,890 compared to 954 in 2009, and the total number of debit cards issued in 2013 was about 60,965 compared to 36,685 in 2009. During 2013, five banks were offering internet banking facilities, but only two were offering fully fledged transaction-based Internet banking services. The others were view-based only. These trends indicate that the banking sector had adapted its strategy to cater for the evolving market. Furthermore, an increase in the number of employees working in the banking sector was observed, from 550 in 2008 to 672 in 2013.

The table below provides other key indicators to demonstrate the developments in the banking sector.
Table A.1: Key indicators of the Seychelles banking sector

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2013</th>
<th>Percentage change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets</td>
<td>SCR 13,5 billion</td>
<td>SCR 18,5 billion</td>
<td>37 per cent</td>
</tr>
<tr>
<td>Total liabilities</td>
<td>SCR 12,5 billion</td>
<td>SCR 17,0 billion</td>
<td>36 per cent</td>
</tr>
<tr>
<td>Total equity capital</td>
<td>SCR 1,0 billion</td>
<td>SCR 1,5 billion</td>
<td>50 per cent</td>
</tr>
<tr>
<td>External assets</td>
<td>SCR 5,83 billion</td>
<td>SCR 7,83 billion</td>
<td>43 per cent</td>
</tr>
<tr>
<td>Total deposits</td>
<td>SCR 10,9 billion</td>
<td>SCR 16,2 billion</td>
<td>49 per cent</td>
</tr>
<tr>
<td>Current deposits</td>
<td>SCR 5,28 billion</td>
<td>SCR 6,25 billion</td>
<td>18 per cent</td>
</tr>
<tr>
<td>Time deposits</td>
<td>SCR 4,39 billion</td>
<td>SCR 7,89 billion</td>
<td>80 per cent</td>
</tr>
<tr>
<td>Savings</td>
<td>SCR 1,23 billion</td>
<td>SCR 2,11 billion</td>
<td>72 per cent</td>
</tr>
<tr>
<td>Regulatory capital to risk-</td>
<td>12,5 per cent</td>
<td>26,1 per cent</td>
<td>13,6 per cent</td>
</tr>
<tr>
<td>weighted assets ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory tier 1 capital to</td>
<td>11,8 per cent</td>
<td>20,6 per cent</td>
<td>8,8 per cent</td>
</tr>
<tr>
<td>risk-weighted assets ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loans and advances</td>
<td>SCR 3,37 billion</td>
<td>SCR 4,52 billion</td>
<td>34 per cent</td>
</tr>
<tr>
<td>Non-performing loans</td>
<td>SCR 67,7 million</td>
<td>SCR 415,9 million</td>
<td>514 per cent</td>
</tr>
<tr>
<td>Non-performing loans to total</td>
<td>2,03 per cent</td>
<td>9,22 per cent</td>
<td>7,19 per cent</td>
</tr>
<tr>
<td>advances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provisions for bad and</td>
<td>SCR 74,5 million</td>
<td>SCR 192,5 million</td>
<td>158 per cent</td>
</tr>
<tr>
<td>doubtful debts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit after tax</td>
<td>SCR 380,7 million</td>
<td>SCR 330,5 million</td>
<td>-13 per cent</td>
</tr>
<tr>
<td>Total income</td>
<td>SCR 1,20 billion</td>
<td>SCR 1,07 billion</td>
<td>-11 per cent</td>
</tr>
<tr>
<td>Total expense</td>
<td>SCR 0,52 billion</td>
<td>SCR 0,59 billion</td>
<td>13 per cent</td>
</tr>
<tr>
<td>Return on asset</td>
<td>5,04 per cent</td>
<td>2,61 per cent</td>
<td>-2,43 per cent</td>
</tr>
<tr>
<td>Return on equity</td>
<td>44,4 per cent</td>
<td>28,2 per cent</td>
<td>-16,2 per cent</td>
</tr>
<tr>
<td>Loan to deposit ratio</td>
<td>30,9 per cent</td>
<td>28,2 per cent</td>
<td>-2,7 per cent</td>
</tr>
</tbody>
</table>

South Africa

The turmoil experienced in international financial markets in 2008 was followed by a slow global and domestic economic recovery in the subsequent years. Although the South African banking sector was not impacted by global events of the past few years to the same extent as many of its international counterparts, the spillover effects of the crisis, coupled with the protracted economic recovery, impacted the operating environment of the sector negatively. This was evidenced by the moderate recovery in growth in total banking-sector assets, and in loans and advances against a backdrop of
subdued economic activity. Despite the challenging environment, the banking sector remained profitable and sound with the total capital-adequacy ratio remaining well above the minimum regulatory capital requirements.

The total assets of banks increased from R2 547 billion in December 2007 to R3 836 billion at the end of December 2013. The four largest banks in South Africa continued to dominate, contributing 83,4 per cent to the balance-sheet size of the total banking sector in 2013. At the end of 2013 there were 31 banking institutions registered in South Africa – slightly down from 33 in 2008 – while the number of foreign banks with approved local representative offices fluctuated between 43 in 2008, 41 in 2012 and back to 43 in 2013. In December 2013 there were three Mutual banks with total assets of R2,4 billion, up from R0,9 billion in December 2007.

The Co-operative Banks Act 40 of 2007 (CBA) came into operation on 1 August 2008 with the aim to create a development strategy and a regulatory environment for deposit-taking financial co-operative institutions. The Co-operative Banks Development Agency supervises primary co-operative banks that hold deposits of R20 million or less. Primary co-operative banks that hold deposits of above R20 million as well as secondary and tertiary co-operative banks are supervised by the Co-operative Banks Division of the Financial Stability Department of the South African Reserve Bank (SARB). As at 28 February 2014 there were two registered co-operative banks with assets totalling R85 million.

Over the years, the international participation in the local banking industry has continued to increase, from 3,0 per cent at the end of December 1994 to 8,2 per cent by the end of December 2004, to 45,5 per cent recorded at the end of December 2008 and 47,7 per cent at the end of December 2013. A significant contributing factor for the large foreign shareholding (measured by nominal value) in the sector is the foreign shareholding in Absa Bank Limited (Absa), one of the largest banks registered in South Africa.
In 2005 South African regulatory approval was granted for the acquisition of a majority shareholding in Absa, a bank controlling company, by Barclays Bank plc (UK) (Barclays). Barclays acquired 50.1 per cent of Absa shares for a total consideration of R33 billion. On 24 October 2007, South African regulatory approval was granted to the Industrial and Commercial Bank of China (ICBC), in terms of which ICBC could acquire up to 20.5 per cent equity in the Standard Bank Group Limited (SBG), a bank controlling company. The acquisition of the minority interest by the ICBC resulted in R36.7 billion (approximately US$5.5 billion) equity investment into the SBG.

In addition to fulfilling its normal supervisory and regulatory tasks, the Bank Supervision Department continued to focus on the ongoing review and amendment of the banking legislative and regulatory framework in South Africa to ensure that it reflects local and international market developments and complies with international regulatory standards.

South Africa implemented Basel II with effect from 1 January 2008. The implementation entailed, among other things, a radical change in reporting methodology, revised regulatory returns and greater alignment of regulatory reporting requirements with International Financial Reporting Standards (IFRSs). During 2012, the focus shifted towards ensuring that the domestic regulatory and supervisory framework would be appropriately amended in time for the phased-in approach of the higher capital requirements introduced as part of the Basel III framework, which commenced on 1 January 2013. South Africa was one of 11 jurisdictions that published finalised Basel III regulations effective from 1 January 2013, along with Australia, Canada, China, Hong Kong SAR, India, Japan, Mexico, Saudi Arabia, Singapore and Switzerland.

Essentially, the Basel III framework presents the details of global regulatory standards on banks’ capital adequacy and liquidity as agreed by the Governors and Heads of Supervision, which is the oversight body of the Basel Committee, and endorsed by the G-20 leaders. Based on the key lessons learnt from the global financial crisis, the Basel III framework sets out requirements for higher and better-quality capital, better risk coverage, the introduction of a leverage ratio as a backstop to the risk-based
requirement, measures to promote the build-up of capital that can be drawn down in periods of stress, and the introduction of two global liquidity standards, namely (i) the liquidity coverage ratio (LCR) and (ii) the net stable funding ratio (NSFR).

In 2012 the SARB approved the provision of a committed liquidity facility (CLF) to commercial banks to assist them in meeting their liquidity coverage ratio as there was limited availability of high-quality liquidity assets (HQLA) in South Africa. The Bank also approved that statutory cash reserves could be included in the banks’ HQLAs for purposes of calculating the LCR.

The expansion of local banks into Africa has gained further prominence in recent years. Because of the somewhat subdued growth outlook for South Africa, the positive growth differential offered by certain African economies and the resultant potential for higher revenues remains a core motive behind banks’ expansion plans. The challenging global and domestic economic landscape has resulted in South African banking groups having to explore non-traditional opportunities in search of sustained growth. Banks considered expanding into Africa through both the establishment of new operations and acquisitions. Expansion into Africa was predominantly considered a medium- to long-term strategy as banks indicated that high start-up costs and strong competition meant that acceptable returns would only materialise over time. Moreover, banks’ African initiatives were integrated into their overall group strategies rather than considered on a stand-alone basis. The following factors were identified by banks as the rationale for pursuing business interests in Africa:

- continued higher levels of growth experienced by Africa;
- increasing presence of South African corporates across the continent;
- increasing levels of trade flows between Africa and the rest of the world;
- higher levels of foreign direct investment in Africa;
- abundance of resources on the continent; and
- favourable technological advancements to support financial-sector developments.