

Credit to private sector in Southern Africa Development Community (SADC): Determinants and the role of institutions

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Abstract

The study used annual panel data (1996-2010) for eleven SADC countries to establish the determinants of credit to private sector; the possibility of a crowding out effect of government debt and the contribution made by institutional quality. The study used both the fixed effects and dynamic model based on GMM estimations. There is strong evidence suggesting that financial development, economic growth, trade openness and domestic credit by banks were important in explaining growth in credit to the private sector. Government debt was insignificant while institutional factors play a complementary role. Extension of financial resources to the private sector is enhanced by keeping low levels of corruption, improving government effectiveness as well as the regulation quality. Reduction in the risk profile for investments allows banks to release more financial resources to the private sector. Monetary policy initiatives like favorable credit rationing policies play a key role in developing financial markets.

Keywords: Panel Data, Credit to Private Sector, Institutions, SADC, Economic growth, Financial development

1. Introduction and Background

There is a general consensus that for economic growth to take place there should be strong support from the financial sector which provides a source of funds. The role played by finance of bringing together borrowers and lenders cannot be under estimated in the modern society. The important role of financial development in fostering growth and that their association is of a long term is supported by several studies, (Cecchetti and Kharroubi (2012), Osman (2014)). The banking sector attracts deposits which can either lie idle or be used productively. The banking sector changes deposits into assets that are advanced to the private sector. The private sector supports economic growth in the country and the availability of financial assets provides huge mileage to this sector in advancing growth. These resources can be in the form loans, non equity securities, trade credit and accounts receivables which generate a claim for repayment. The amount of resources available is limited due to the fact that part of it is taken by the government. The advancement of debt to the government has a potential of crowding out debt to the private sector which subsequently affects growth of output. Credit to the private sector can have a positive impact on sectoral GDP, (Were et al (2012) and Iqbal et al (2012)). It will be interesting to examine this perceived relationship with particular reference to SADC.

Considering the SADC region the amount of credit to the private sector has been erratic. Table A1.1 show that South Africa released up to 162% of their resources to the private sector as a proportion of Gross Domestic Product (GDP) but this was still a cause for concern for other member states. The majority of the members advanced less than 30% of financial resources to the private sector with the exception of Mauritius, Namibia and Zimbabwe which managed to extend at least 50% of the resources which was still lower compared to other developing countries in other regions. This explains the reason why the average for Sub Saharan Africa (SSA) was around 60%. This suggests that more still needs to be done to enhance credit to the private sector particularly in the SADC region where there is a call for combined efforts to foster growth. The regional bloc seeks to attain development and growth by taking advantage of the complementary role between regional and national strategies, (SADC, 2011). Eliminating poverty and increasing growth is achievable where more resources are provided to strategic areas like the private sector. Thus taking a regional approach to financial development provides synergistic benefits as well as scale economies which are not possible at country level. It also provides financial institutions with a platform for reducing credit risk as they pool resources together and channel them to productive sectors at low cost. This helps to bring out key issues that are vital for effective regional financial sector development which can only take place where there are good quality regulatory frameworks and policies on supervision at regional level. The quality of institutions also plays a key role in influencing the amount of credit extended to the private sector. For example Atoyebi et al (2012) argued that the political situation, explaining investment climate, best describes the growth for private investment. This brings justification for the need to take a regional approach in examining the credit to private sector. This paper therefore aims to determine the drivers of the growth in private sector credit in the SADC region and to examine the role of the quality of institutions in this regard. Financial development greatly impacts on poverty, makes available more finances and deposit opportunities and avoids inequality. Literature fails to agree on the drivers of bank lending to the private sector and the role played by institutions is not clear particularly within a regional bloc. Previous studies are country specific and are much focused on other regions of the world, (Saito et al

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(2014), Osman (2014), Nezakati et al (2011), Anthony (2012), Were et al (2012), Iqbal et al (2012)). The level of development of the financial system within SADC differs greatly from other regions and hence it is against this background that the study becomes important for the region. This paper contributes to the debate on credit to private sector, another indicator of financial development, by addressing the following key issues in the context of SADC as a regional bloc:

- What determines the credit extended to the private sector by banking institutions?
- How significant is the role played by country risk factors in the determination of credit to private sector?
- Does government debt crowd out financial resources extended to the private sector?

The remainder of the paper is organized into four sections: the next section reviews literature, which is followed by the section on methodology and data, then a discussion of results and finally conclusions and policy implications are outlined.

2. Literature review

2.1: Determinants of Credit to Private sector

Financial institutions like banks, pension funds, insurance corporations and foreign exchange companies provide financial resources in the form of loans, trade credit, purchases of non equity securities and other receivables to the private sector. The total of such monies is expressed as a percentage to GDP to give credit to private sector. Empirical work focuses on the effect of different factors on the level of financial resources extended to the private sector. Evidence shows that the drivers of credit to private sector can either have a positive or a negative effect. Studies that show factors which have a negative influence are several. Hofmann (2001) shows that innovations in short term interest rates have a significant negative effect on bank credit, Gross Domestic Product and property prices. Standard demand factors failed to explain the development of credit over the long term. This study showed that the long term negative relationship between credit to private sector and interest rates could only be explained by including property prices in the model. Abuka and Egesa (2007) argued that government borrowing from banks, a proxy of government debt, crowded out the extension of credit to the private sector within the East African Region. This was supported by Sogut (2008) who showed that in the high income countries private sector credit is negatively related to central government debt. The other factors that reduce extension of credit to the private sector include prime lending rate and reserve ratio, Enisan and Oluwafemi (2015). This is consistent with a study by Sharma and Gounder (2012) which shows that, in a regional grouping, factors which are detrimental to growth in credit to private sector include average lending rates and inflation. Pissarides (2001) provides evidence that one of the major challenges experienced by the private sector is the failure by the local banking sector and the under developed financial markets to respond to the demand for finance. A banking sector that is under capitalized with low liquidity often fails to support the private sector. This is worsened by inadequate legal and regulatory environment and poor effective supervision by the central bank. Rashid (2011) also provides evidence that an increase in foreign banks in the financial sector where there is overreliance on non deposit based funding will lead to less resources being extended to the private sector. This is so because an increase in foreign banks results in less deposits being attracted by local banks and these foreign banks tend to allocate less of their deposits to the private sector. In the end local banks will lend less to the private sector due to a limited deposit base. Haas and Lelyveld (2002) argued that foreign banks can be a source of cross border credit as they supply more financial resources to their subsidiaries especially during crisis periods. Thus it may be beneficial to increase the level of financial liberalization in the banking sector to attract more foreign participation by banks to increase credit flows to the private sector.

There is strong evidence in literature supporting the existence of positive relationship between private sector credit and factors like economic growth in both the short and long term. Studies reviewed from literature shows that the factors that have a positive influence on credit to private sector include broad money supply, cyclical risk premium, stronger economic growth, GDP per capita, democracy, financial deepening, rule of law, liquidity ratio, trade openness, investment profile, socioeconomic factors, financial liberalization and real interest rate, exchange rate, private domestic savings, external debt, (Enisan and Oluwafemi (2015), Touny (2014), Raza et al (2014), Assefa (2014), Anthony (2012), Iqbal et al (2012), Rachdi and Mensi (2012) and Frimpong and Marbuah (2010)). However Touny (2014) also argue that in the long term economic growth does not continue to improve credit extension to the private sector but will instead have a negative impact. A different perspective was brought by Atoyebi et al (2012) who argued that growth in private investments are better explained by changes in the political situation. The creation of an enabling environment through provision of infrastructural facilities and security is necessary for the improvement in the extension of credit to the private sector. As such private investment is hindered by macroeconomic instability and political disturbances. There are studies that show that a causal relationship may not exist between credit to private sector and economic growth which shows the existence of a Schumpeterian independent hypothesis, (Osman (2014) and Nezakati et al (2011) and Aliero et al (2013)). Sogut (2008) showed that in the high income countries private sector credit is positively related with

public sector debt, which is in contradiction to other studies. According to Shijaku and Kalluci (2013) lending incentives are created by having a lower cost of lending, reduced government borrowing and more qualitative bank credit.

The key issues being raised in literature are summarized: the determinants of credit to private sector (CPS) are not common at both country and regional level. There is no consensus of the key drivers of CPS and evidence shows that factors that drive credit to private sector leave no clear direction on either country specific or regional based studies. The contribution of institutional factors, though being important, on growth is still inconclusive and little evidence has been documented in literature. However the importance of institutional reforms in increasing private sector credits, among other factors, in African economies is supported by a study by Okey (2011) which shows that such reforms are a source of growth and increased foreign direct investment as well as job creation. Thus it is possible that African economies can be revived by the improving of economic and legal institutions. The results on the drivers of credit to the private sector varied depending on the country or regional specific factors and the differences in the levels of income and the variables used in the regression. The understanding from literature shows that factors explaining developments in credit to private sector are sufficient but not adequate as such institutional factors have a portion to partake in the discussions on growth. The next section discusses the data and methodology employed in this study.

3. Data and Methodology

The section discusses the econometric models applied to empirically ascertain the factors that determine the extension of credit to the private sector and the effect of country risk (institutional quality variables). The study employs both the static and dynamic models to make estimations using country level data for the period 1996 to 2010 to allow for comparison purposes and making a choice of the best modeling technique. Panel data deals with problems of multicollinearity and increases the data points and its use has found much support from literature (Baltagi (1995), Saito et al (2014), Abuka and Egesa (2007) and Were et al (2012)). The study employs data for eleven SADC member states which had complete data sets during the period under review. Data was extracted from World development indicators and International country risk guide for 2013 and 2014 respectively (see definitions and expected results in table 2). The marginal effect of institutional quality variables was obtained by using interactive terms in the model.

3.1: Static model

This approach makes estimations by using either random or fixed effects but the choice is determined using Hausman test. The difference between the two approaches is that random effects take the individual effects and explanatory variables to be uncorrelated while the fixed effects model accepts the individuality of variables employed. The fixed effects model is used where the statistic is significant and it is unbiased and consistent even if we violate the assumption that unobservable firm effects and exogenous variables are uncorrelated (Mutenheri 2003). The specific model takes the following form:

$$CPS_{it} = \beta_0 + \beta_1 LIQ_{it} + \beta_2 DCB_{it} + \beta_3 GDP_{git} + \beta_4 IF_{it} + \beta_5 TO_{it} + \beta_6 GD_{it} + \beta_7 RIR_{it} + \beta_8 INST_{it} + e \quad (1)$$

Where:

CPS_{it} represents credit to the private sector for the i -th country in the t -th year respectively.

β_0 is the intercept, β_1 to β_8 represent the coefficients for the explanatory variables and e is the error term.

3.2: Dynamic modeling

The dynamic model was employed for comparison with the static model. Specifically the model contains a lagged dependent variable and it is represented as follows:

$$CPS_{it} = \beta_0 + \gamma CPS_{it-1} + \beta_1 LIQ_{it} + \beta_2 DCB_{it} + \beta_3 GDP_{git} + \beta_4 IF_{it} + \beta_5 TO_{it} + \beta_6 GD_{it} + \beta_7 RIR_{it} + \beta_8 INST_{it} + e \quad (2)$$

Where:

The speed of adjustment towards the desired level of credit to private sector is measured by one minus the coefficient for the lagged dependent variable which is given by γ and it carries a value between zero and one. If the value of coefficient of the dependent variable turns out to be zero then there are no adjustments costs to the desired level. The generalized methods of moments (GMM) by Arellano and Bond (1991) was employed in conducting estimations and we tested for the presence of first and second order serial correlations as part of diagnostic tests.

The results surveyed from literature suggested that credit to the private sector (CPS) was dependent on, explanatory, variables like Debt to government (GD), Credit to public sector (CPUB), M2 as % of GDP (LIQ),

vector of institution variables (INST), inflation (IF), trade openness (TO), growth in GDP (GDPg) and real interest rates (RIR). We employed these variables to investigate their impact on private sector credit and to establish the crowding out effect of public sector debt on the credit to the private sector.

4. Results and presentation of findings

This section discusses findings, as provided in the appendix in table A1.3 to A1.6, based on both the static and dynamic models but the analysis was based on the model giving the best estimates. The study used an unbalanced panel for the period 1996 – 2010 for 11 countries.¹ The discussions are as follows:

On average 162 observations were employed in our analysis to determine credit to private sector and findings in table A1.3, annual average for all variables was between 4% and 77%, the highest being found in trade openness and lowest was for credit to public sector. Volatility was measured by the standard deviation which showed that inflation was the most unstable during the period due to the high level of instability experienced by SADC members. The lowest volatility was found for GDPg at the 4% level which shows that there was not much growth within the member states. All variables were normally distributed with values for kurtosis being greater than 3 and all variables were skewed to the right with the exception of CPUB and RIR which had negative values.

Correlation analysis

Tables A1.4 presents results on the relationship among the variables and the study shows that there were both positive and negative relationships among the variables. Values greater 0.8 would indicate the presence of multicollinearity. In this case higher correlation was found between credit to private sector and domestic credit by banks and to deal with this problem we dropped the credit to the public sector variable. This is so because multicollinearity was found due to the way the variable for credit to the public sector variable was constructed. Including this variable brought the modeling problems such that making a choice between fixed and random effects model using Hausman test became impossible.

Regression analysis

Discussion of findings using the static model

Firstly we presented results for both the fixed and random effects models. This was followed by conducting Hausman test which gave a statistic of 269.08 with a probability value of 0.0000 and thus the fixed effects model was found to be applicable on our data. Estimations in table A1.5 were done using three fixed effects models plus a specific model for the regional bloc. The fixed effects model shows that liquidity and GDP growth were positive and statistically significant in explaining credit to the private sector. They remained more important even after introducing institutional quality factors. The other variables had positive but insignificant coefficients (Domestic credit by banks, inflation, real interest rates and corruption). Findings confirm that within the SADC region there is lack of evidence on the importance of domestic credit by banks, inflation, real interest rates, trade openness and government debt on their contribution to expansion of private sector credit. These factors may be important on an individual country level basis.

The study shows that liquidity, a proxy for financial development, was positively and significantly related with credit to the private sector. This is in line with theoretical expectations suggesting that the more money supply grows in the SADC member states the more funds will be available for onward transmission to the private sector for development projects. In SADC region the level of liquidity as a proportion of GDP reached a high of 102.82 % during the period. Consistent with Sogut (2008) results suggest that there can be no meaningful extension of credit to the private sector without financial development occurring. Thus financial depth leads to enhancement of credit facilities to the private sector which will in turn boost growth. The importance of institutional variables (corruption and regulation quality) cannot be underestimated as they strengthened the effect of financial development on credit extended to the private sector. The coefficient of financial development increased in value as we introduced institutional factors thus they are necessary for the region when considerations are being made to extend more funds in an effort boost future growth potential. Money supply growth will have huge potential for increasing the amount extended to the private sector, but this will still need to be controlled to avoid the negative effect of inflation. This suggestion is supported by Krause and Rioja (2006) who showed that monetary policy is effective in a well developed financial system. The levels of inflation were not strong enough to cause adverse effects to the growth in private sector credit within the regional bloc.

¹ The countries included in the analysis were Angola, Botswana, Democratic Republic of Congo, Madagascar, Mauritius, Malawi, Mozambique, Namibia, South Africa, Tanzania and Zambia. Others were excluded for lack of data or because of they were unstable, in the case of Zimbabwe.

The credit to the private sector was positively and significantly influenced by economic growth, as proxied by growth in GDP. The coefficient remained positive and significant even after checking for the effect of institutional variables. Thus the quality of institutions had a complementary effect on GDP growth as they increased its statistical significance in the model. The result agrees with our theoretical expectations which show that as the level of income increases in the SADC countries more funding will be made available to the private sector. In other words as the economy grows it enhances the need to supply more financial resources to the strategic areas of the economy and in this case the private sector. The result was consistent with findings by David et al (2014) and Aduda et al (2012) but contradicted results by Rachdi and Mensi (2012) and Touny (2014). The growth in output in the economy will signal growth in money extended to the private sector considering the role played by this sector in the region.

The specific model (4) was obtained after eliminating the insignificant variables one by one. The variables for economic growth and financial development remained positive and significant as discussed above. This means for the SADC region the key variables explaining credit to private sector are GDP growth and financial development as measured by money supply growth as proportion of GDP even after taking into account the role of institutional factors. The static model shows that institutional variables, by themselves, were weak in explaining credit advanced to the private sector but they played a complementary role during the sample period. The negative effect of regulation quality was not strong enough to offset growth of credit extended to the private sector. When the right institutions are put in place then there is a sustainable increase in credit to private sector which enhances economic growth in the long term.

Discussion of findings using dynamic model

This section discusses findings presented in table A1.6 in the appendix and findings showed that the coefficient of the lagged dependent variable turned out to be approximately zero suggesting the absence adjustments costs thus the actual credit to private sector adjusts to the desired level instantaneously. The z-tests for first and second order autocorrelation were mixed but insignificant showing the absence of autocorrelation in the model.

All the exogenous variables as depicted by model 1, including the lagged dependent variable, were insignificant and the signs for coefficients were both positive (lagged dependent, domestic credit by banks, inflation, real interest rates) and negative (liquidity, GDP growth, trade openness and government debt). The institutional quality variables were included in the model, one at a time, to investigate their role in the extension of credit to the private sector. The study employed two institutional variables (Regulation quality and corruption) and an interaction term. Findings show that the magnitude and signs of the coefficients were sensitive to the introduction of institutional factors in the model. All the significant parameters changed their signs such that the level of credit to private sector was positively influenced by level of financial development, growth in output, trade openness and the interaction term while corruption and regulation quality had a negative influence. The quality of regulation was introduced in the model to capture the level of investor protection and there is evidence in model 2 that the need to improve the investor profile would result in bringing out the importance of domestic credit by banks and growth in output in explaining credit to private sector. The domestic credit by banks maintained its positive influence but the level of significance improved while growth in output moved from being adverse to positive as expected. In the SADC region local financial institutions, banks in particular, immensely contribute to the availability of credit to the private sector. Thus flexible credit extension policies to the private sector by banks are desirable in the region as a whole. Credit is enhanced as banks become willing to extend more resources to the private sector. Evidence suggests that the banking institutions play a bigger role in the development of financial sector within SADC better than the stock market which is still developing. Thus the growth in output as expected causes an increase in the growth of financial resources extended to the private sector.

The dynamic model appears to provide some value addition by the inclusion of institutional factors which were significant. There is evidence, as expected, that regulation quality and corruption have negative influences on credit to private sector. As regulation quality, a measure of investment risk in a country, worsens within the region then credit to private sector should decline. The negative sign for the regulation quality coefficient shows that when the level of risk to invest within SADC has a value closer to one (1), reflecting low risk profile, then more resources are channeled to the private sector. In the SADC region the risk profile is still low as such financial institutions have an incentive to advance more financial resources and as a result growth in GDP was realized as well. Thus good quality institutions strengthen the capacity of banks to avail credit to the private sector. Our results suggests that as regulation quality improves in the SADC region domestic credit by banks and expansion in output, a proxy for economic growth, will positively contribute to the improvement in credit transfers to the private sector which is consistent with studies by Takyi and Obeng (2013), Aduda et al (2012) and David et al (2014).

The study employed a measure of corruption in the model and evidence showed that it has a negative and significant influence as expected but it was insignificant using the static model. After incorporating the

corruption variable it turned out that three variables had a positive influence on the level of credit extended to the private sector. This shows that lower levels of corruption within the member states will help stimulate growth by making it possible to increase liquidity levels and opening up to international markets. Low levels of corruption support more credit flow to the private sector due to an increase in the movement of exports and imports within the region (trade openness). Consistent with findings by David et al (2014) and Touny (2014), as the member states become more open to trade then more resources are needed in the private sector to support this endeavor. High levels of corruption will have adverse effects on private sector credit. There is strong evidence to suggest that financial development (liquidity), economic growth (GDPg) and trade openness (TO) have significant influence on credit to private sector as expected which means that more resources are extended to the private sector as the country level of output grows, opens up to the outside world for business and increase the level of broad money supply as proportion of GDP. This should, of course, be supported by good investment profile and low levels of corruption. The other parameters had the correct signs but not significant. There is no sufficient evidence using regional analysis to suggest that variables like interest rates, inflation and debt can influence the amount of credit extended to the private sector. Liquidity and growth in output maintained their significance using the static as well as the dynamic model and trade openness carried a different sign from the one found using the static model. An increase in trading activities by the member states has a potential of attracting more funds to the private sector as financial institutions would aim to support business. This will underpin future growth within the economy which has an effect of pulling more financial resources for further expansions through the multiplier effect.

The interactive term for financial development and bureaucratic quality (LLGE) was positive and significant which suggests that government effectiveness in the SADC countries managed to stimulate financial development in order to boost credit to the private sector. Thus governments within the SADC region were more responsive to the needs of their citizens which increase their likelihood of success. The impact of financial development increases as the government's response improves. The signs and levels of significance for financial development, economic growth and trade openness were consistent with findings by David et al (2014), Touny (2014), Aduda et al (2012).

5. Conclusions and Implications

This study endeavored to establish the determinants of credit extended to the private sector by banking institutions and the role of institutional quality in that regard within the SADC region. The study also determined the role of government debt in crowding out extension of financial resources to private sector. The study used unbalanced annual panel data for the years 1996 to 2010 for 11 SADC member states. This was done by employing seven (7) variables to explain credit to private sector and three institutional quality variables. Findings using the static model suggest that the level of money supply as a proportion of gross domestic product and economic growth are the key variables that enhance credit to private sector, which becomes the specific model for the region after dropping off non significant parameters one at a time. Thus there can be no expansion of private sector credit within SADC without financial development and economic growth taking place. However institutional variables were insignificant using the static model but their importance was to strengthen the explanatory power of economic growth and financial development.

For comparison purposes the study introduced dynamics in the model and results suggested that financial development, economic growth, trade openness and domestic credit by banks were important in explaining the growth of financial resources extended to the private sector. The positive impact of financial development on was stimulated by government effectiveness in the region. Lower corruption levels would improve the impact on credit to private sector by three variables: financial development, trade openness and economic growth. The institutional factors were important using the dynamic model as such the resultant estimates were better than those found using the fixed effects (static) model. Banking institutions are ready to forward more financial resources to the private sector as long as there is a low risk profile for investments. An improvement in the level of money supply in proportion to GDP levels enhances credit to the private sector. But this will need constant monitoring by the monetary authorities to avoid raising inflationary pressures. More funds are attracted to the private sector to support growth in output levels, thus as output level balloon then more credit will be channeled to the private sector to support growth. The important role played by banks in providing credit to the private sector has been confirmed in this study. Thus credit rationing policies should be favorable for banks to improve the level of funds given to the private sector. Money supply can be increased by monetary policy initiatives of central banks like reduction in the reserve requirement. The member states need to open up to doing business with the outside markets in order to enhance development in the private sector. Credit to private sector is improved the more the economies increase the flow of imports and exports into and out of their borders. Thus member states may need to do away with stringent measures that hinder business transactions across their borders. The regional indicative strategic development plan for SADC should be reinforced on the trade front and facilitate processes that lead to the immediate realization of the liberalization of trade and

financial sector. There is no evidence to suggest that government debt has a crowding out effect on credit to the private sector. Thus the level of financial resources extended to the government can be increased without fear of reducing the share of the private sector within SADC.

There is evidence to suggest that corruption levels should be kept at lower levels which can be achieved as member states improve their corruption index as viewed by ICRG index; lowering corruption will support the impact of financial development on credit to private sector credit. The positive impact of economic growth on credit to private sector is very much dependent on the way countries improve the investment climate through improving the quality of regulation. The governments within SADC should endeavor to respond and meet the demands or expectations of their citizens in the shortest possible time to enhance their effectiveness and regulation quality should be enhanced by creating a good investment climate for new and prospective investors. Policies to increase investor confidence are preferable such as the giving of tax concessions to new investors. Thus good quality institutions will support more credit to the private sector by working through growth in output, improvements in the flow of imports and exports and improvements in liquidity levels within the economies. Bureaucratic quality should be improved so as to stimulate the impact of financial development (liquid liabilities) on credit to private sector. As the level of bureaucracy falls then the effectiveness of the government will improve which will subsequently attract more resources to the private sector. The channels of decision making should not be counter-productive but should rather be shortened and remain objective to avoid dampening the initiatives by the financial institutions to support the private sector. As the economies for member states grow the level of financial development improves as well. The development of financial markets in the SADC region is vital for private sector growth which is supported by Backe and Zumer (2005). Inflationary pressures remained insignificant though showing the signs of having an adverse effect thus member states should endeavor to contain inflationary pressures to avoid the reduction in the extension of financial resources to the private sector. The study leaves room for further empirical work and the following lines for future research are suggested: A study can be done considering countries in the Southern Africa Customs Union (SACU) as they fall within a different set of guidelines for performance which may affect their choices they make on resources channeled to the private sector; the study was limited to the period 1996 – 2010 for lack of data and similar work producing different results can expand the study period; country specific studies can be done to see if results would be different using time series models considering the fact that different countries have different credit rationing policies and lastly there is still space to do comparative studies for SADC and other regional blocs in Africa.

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Appendix:

Table A1.1: Credit to the private in selected SADC member states

Year	Botswana	DRC	Malawi	Mauritius	Mozambique	Namibia	South Africa	Tanzania	Zimbabwe	Zambia	SSA
2000	15.12	3.44	9.08	57.50	16.74	39.79	133.73	4.09	27.11	8.55	60.68
2001	15.09	0.77	8.42	57.82	12.56	41.31	142.59	5.38	34.52	7.48	60.39
2002	17.21	0.68	5.80	58.59	12.88	41.86	114.96	6.83	103.63	6.29	47.54
2003	18.56	0.84	5.46	73.25	11.04	44.70	118.87	8.08	57.02	6.73	54.43
2004	19.55	1.53	6.04	73.05	9.47	46.67	128.60	9.24	18.02	8.06	59.71
2005	19.13	1.87	7.91	75.28	11.84	51.81	138.69	10.18	15.79	7.70	62.27
2006	18.43	2.93	8.83	74.19	13.26	48.54	157.14	12.74	44.47	9.74	64.86
2007	20.03	3.73	10.88	75.04	13.51	47.93	161.98	14.89	47.57	11.82	66.92
2008	20.94	7.14	11.90	84.76	18.30	44.95	145.77	16.08	50.64	14.97	56.90
2009	25.89	7.24	14.24	82.83	24.50	47.03	147.79	15.33	55.63	11.98	63.80
2010	23.40	6.57	15.99	87.81	25.77	45.64	145.48	16.11	60.78	11.50	65.40

Source: Compilation by author – World Bank Development Indicators

Measures of private sector credit a percentage of GDP in selected SADC member states for the period 2000-2010

Table A1.2: Definition of terms:

The table summarizes all the variables used outlining the definitions assumed in this study according to WDI data base. A summary of the expected signs for each variable in relation to the dependent variables is given.

Variable	Definition	Source	Expected sign
Private sector credit (CPS)	Credit to private sector as a % GDP	WDI	Dependent variable
Domestic credit by banks (proxy of financial development (DCB))	Credit to all sectors as a % GDP	WDI	Positive
Liquid liabilities (LL)	M2 as % of GDP – proxy for financial development	WDI	Positive
Economic growth (GDPg)	Annual % growth in GDP at market prices based on constant United States dollars	WDI	Positive
Trade openness (TO)	(Imports + exports)/GDP	WDI	Positive
Government debt (GD)	Total external debt as a % of GDP	WDI	Negative
Inflation (IF)	Inflation as % of GDP	WDI	Negative
Interest rate (RIR)	This is the lending rate adjusted for inflation as measured by the GDP deflator	WDI	Ambiguous
Regulatory quality/investment profile (RQ)	Investor protection. Measures the risk to investments in a country being high (value of 0) and low (value closer to 1).	ICRG	Ambiguous
Democratic accountability (GE)	Measures how responsive the government is to its citizens. The less responsive the government is the more likely that it will fail. Value ranges from 0 (less responsive) to 1 (more responsive).	ICRG	Positive
Corruption (CC)	The level of corruption ranges from 0 (high level of corruption) to 1 (low level).	ICRG	Negative

Source: World Development Indicators (2013)

Table A1.3: Summary statistics

Stats	CPS	LIQ	DCB	CPUB	GDPg	IF	TO	GD	RIR
Mean	30.09	31.68	35.59	4.63	4.94	30.41	77.00	66.71	9.13
Max	161.98	102.82	195.34	62.58	22.70	513.91	179.00	271.55	37.87
Min	0	0	-72.99	-84.21	-12.67	-1.22	0	0	-72.56
Range	161.98	102.83	268.33	146.79	35.37	515.13	179.00	271.55	110.42
Sd	39.14	23.50	53.57	23.15	4.20	77.50	29.02	68.47	12.47
Skewness	1.90	1.33	1.29	-1.16	0.207	4.58	0.67	1.05	-2.90
Kurtosis	5.62	4.05	4.59	7.18	7.81	24.63	3.40	3.04	20.80
N	162	162	158	162	162	145	162	162	162

Summary statistics obtained from stata 12 based on all explanatory variables and CPS as the only dependent variable. Data is for 11 SADC countries, being unbalanced panels for the period 1996-2012. Variables used: Credit to private sector (CPS); Domestic credit by banks (DCB); Credit to public sector (CPUB), economic growth (GDPg); inflation (IF); trade openness (TO); Government debt (GD); Real interest rate (RIR). Detailed variable definitions are provided in table A1.2.

Table A1.4: Correlation analysis

stats	CPS	LIQ	DCB	CPUB	GDPg	IF	TO	GD	RIR
CPS	1								
LIQ	0.7891	1							
DCB	0.9178	0.7173	1						
CPUB	0.4200	0.3181	0.7454	1					
GDPg	-0.1170	-0.0602	-0.1989	-0.1600	1				
IF	-0.1967	-0.3020	-0.1407	-0.0389	-0.3440	1			
TO	0.0583	0.3698	-0.0346	-0.1404	0.2248	0.0455	1		
GD	-0.4680	-0.5826	-0.2500	0.1727	-0.2490	0.4983	-0.3809	1	
RIR	-0.0522	0.0013	0.0139	0.1176	0.0191	-0.7039	-0.3683	0.0556	1

Pairwise correlation used to check strength of relationship between CPS (dependent variable) and explanatory variables which are defined table A1.2.

Table A1.5: Results based on the static model using CPS as the dependent variable

Variables	Model	Fixed effects models			Specific model
	1 – Random effects	1	2	3	4
LIQ	0.247 (2.35)*	0.795 (7.55)*	0.845 (6.81)*	0.845 (6.86)*	0.783 (14.58)*
DCB	0.554 (16.37)*	0.052 (1.13)	0.050 (0.86)	0.054 (0.95)	-
GDPg	-0.117 (0.38)	0.262 (1.99)*	0.293 (1.97)**	0.294 (2.02)*	0.175 (1.76)*
IF	0.010 (0.18)	0.003 (0.15)	0.008 (0.35)	0.001 (0.03)	
TO	-0.121 (1.92)**	-0.019 (0.49)	-0.020 (0.48)	-0.013 (0.30)	
GD	-0.182 (7.03)*	-0.005 (0.36)	-0.006 (0.38)	-0.004 (0.28)	
RIR	-0.260 (2.04)*	0.001 (0.03)	0.001 (0.14)	0.005 (0.09)	
CC			2.156 (0.01)		
RQ				-3.965 (0.51)	
Constant		3.15 (0.72)	-0.056 (0.01)	2.72 (0.51)	4.39 (2.42)*
R ²	92.83	68.94	70.15	69.65	61.73
Wald tests	1371.59 [0.0000]				
F – test		32.13 [0.0000]	23.18 [0.0000]	23.44 [0.0000]	107.59 [0.0000]
Rho	0	0.97	0.97	0.97	0.97
N	130	130	107	107	162
Hausman Chi2(7)	269.08 [0.0000]				

Hausman test used to select the best model for the data (using random effects model and fixed effects model 1). All the other models were estimated using the fixed effects model. The figures in parenthesis are the z-statistics for random and t-statistics for the fixed model. * and ** represent significance at 5% and 10% level. Inside [] are the probability values. Variables are as defined in table A1.2 and institutional quality is represented by corruption (CC) and regulation quality (RQ).

Table A1.6: Results based on the dynamic model: CPS- dependent variable

Variables	Model 1	2	3	4
CPS _{t-1}	6.00e-11 [0.134]	-1.01E-11 [0.505]	-2.09e-11 [0.110]	-8.15e-11 [0.098]
LIQ	-1.36e-12 (0.07)	-2.67e-11 (0.82)	2.27e-11 (2.08)*	-
DCB	5.25e-12 (0.70)	4.87e-11 (1.99)*	-4.10e-12 (1.24)	-1.03e-11 (1.15)
GDPg	-2.28e-11 (1.29)	5.02e-11 (2.02)*	9.79e-12 (2.13)*	1.17e-13 (0.01)
IF	1.82e-12 (0.40)	-3.04e-12 (0.44)	-3.56e-13 (0.93)	-3.58e-12 (0.67)
TO	-1.80e-11 (1.12)	-1.27e-11 (1.64)	2.18e-12 (2.24)*	1.80e-11 (1.39)
GD	-3.55e-12 (1.13)	-1.34e-12 (0.41)	7.20e-13 (1.36)	2.58e-12 (0.84)
RIR	2.54e-12 (0.31)	-6.33e-12 (1.20)	-2.04e-12 (1.05)	-7.05e-12 (0.80)
Constant	9.55e-10 (0.95)	1.73e-09 (1.66)**	-2.32e-10 (1.10)	-2.41e-09 (1.79)**
RQ		-1.82e-09 (2.14)*		
CC			-6.21e-10 (2.20)*	
LLGE				3.33e-11 (1.70)**
N	133	74	74	113
Autocorrelation				
z-test 1	0.2309 [0.8174]	-1.2683 [0.2083]	-1.6715 [0.0946]	-0.77587 [0.4378]
z-test 2	-1.060 [0.2894]	-2.5347 [0.0113]	-0.23258 [0.8161]	-0.10993[0.9125]

Notes: The figures in parenthesis are the z-statistics for the model. * and ** represent significance at 5% and 10% level. Figures in [] are the probability values. Robust estimator was used after one step estimator such that Sargan test was not conducted. Variables employed are defined in table A1.2.

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