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Financial sector development and macroeconomic volatility: Case of the Southern African Development Community region

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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE Financial sector development and

Financial sector development and macroeconomic volatility: Case of the Southern African Development Community region

Forget Mingiri Kapingura¹*, Nwabisa Mkosana² and Suhal Kusairi²

Abstract: The study examines the effect of financial sector development on macroeconomic volatility in the Southern African Development Community (SADC) region for the period 1980–2018 employing the Cross-Sectionally Augmented Autoregressive Distributed Lag (CS-ARDL) model. The empirical findings show that banking variables have a negative and significant effect on growth volatility in the SADC countries. Also, stock market capitalisation, which is a measure of capital market development, was also found to have a negative effect on macroeconomic volatility when looking at the whole financial sector. The results suggest that a well-developed capital market where both the stock market and banking sector are thriving mitigates macroeconomic volatility. The empirical results however reveal that when the stock market is dominant, there is bound to be macroeconomic volatility. The results imply that pursuing the development of the overall financial system reduces macroeconomic volatility in a country as well as the region. Authorities should therefore ensure that policies geared towards development of the entire financial system are pursued.

Subjects: Economics and Development; Macroeconomics; Development Economics

Keywords: Macroeconomics; Financial sector development; CS-ARDL; SADC

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PUBLIC INTEREST STATEMENT

The importance of the financial sector to the broader economy cannot be underestimated. This is the sector that plays a huge role of mobilising and allocating capital to productive sectors of the economy. However, there has been divergent views regarding the effects of this sector on the broader economy. The study thus examines the extent to which financial sector development may contribute towards macroeconomic volatility in the Southern African Development Region.





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1. Introduction and background

The role of financial sector development in promoting long-run economic growth is welldocumented in the literature (Akinlo & Egbetunde, 2010; Balago, 2014; Ewubare & Ogbuagul, 2017; Le et al., 2021; Muhammad et al., 2014; Tang & Abosedra, 2020; Valderrama, 2003). However, conclusions differ. Financial sector development is defined as a process of establishing and expanding the provision of financial services to satisfy the requirements of households and financial institutions in a proficient manner (South African Reserve Bank, 2014).

The available studies that have examined the link between financial sector development and economic growth such as Akinlo and Egbetunde (2010), Balago (2014), Muhammad et al. (2014), and Le et al. (2021) propose that a well-developed financial system enhances economic growth through mobilising and allocating capital to productive sectors of the economy. These studies also highlight that an advanced financial sector can reduce risk and promote investment through reducing transaction costs.

There is a growing body of both theory and empirical studies highlighting that financial sector development can be another source of macroeconomic volatility. Macroeconomic volatility refers to instability of macroeconomic variables, which is brought about by internal and external factors, and it is a major concern for developing economies (Loayza et al., 2007). The available studies carried out in this respect include Aizenman and Pinto (2005), Hnatkovska and Loayza (2005), Loayza et al. (2007), Kong and Wei (2016), Ibrahim and Alagidede (2017), and Tang and Abosedra (2020), even though conclusions differ.

Aizenman and Pinto (2005) and Le et al. (2021) highlight three different channels through which financial sector development may affect the macroeconomic variables. Firstly, financial sector development may affect macroeconomic activity in both the short run and long run. In the short term, volatility which arises from financial sector development is seen as having a positive influence on growth due to the positive correlation between risk and return. However, in the long run, volatility from financial sector development has a negative impact as it reduces consumption levels, factor productivity and investment, thus lowering economic growth. Aizenman and Pinto (2005) further suggest that this is more pronounced in developing countries.

The second channel is through the real sector shocks (Beck et al., 2000; Ibrahim & Alagidede, 2017). Bernanke and Gertler (1990) highlight that changes in financial sector development may affect the net worth of borrowers which likely impacts on economic upturns and downturns through an accelerator effect on investment.

The third possible link is through the credit channel of monetary policy (Beck et al., 2000). In this view, monetary policy affects the real economy through its effect on the financial markets and its implications on bank's supply of loans. For example, when a tight monetary policy is implemented, that may affect the amount of loans which small businesses may borrow (Beck et al., 2000). This will, therefore, have an impact on the business' output, affecting the broader macroeconomic environment.

For the Southern African Development Community¹ (SADC) region, it is interesting to note that the region has long been pursuing financial sector development as one of its goals to achieve sustainable economic growth given the high levels of poverty and inequality in the member states (Southern African Development Community, 2012). In the SADC region, poverty is a challenge in the majority of the countries; this is shown in the high levels of human deprivation and low levels of income. Almost 40% of the population in the SADC region live below the US\$1 per day poverty line (African Development Bank, 2013). The condition is aggravated by the high rate of HIV and AIDS in the member countries (African Development Bank, 2013). Furthermore, the African Development Bank (2013) also shows that approximately 61% of the population is dependent on agriculture as their source of income. However, the growth rate of agriculture has not been enough to influence economic growth of the region (South African Reserve Bank, 2016). The SADC countries have also embarked on financial sector reforms with the aim of achieving financial sector development. Nyawata and Bird (2004) show that SADC countries have adopted measures to liberalise their financial sectors. Firstly, there were moves to eliminate restrictions on credit allocations in the member states (Masenyetse & Motelle, 2012). Secondly, SADC countries have relaxed controls on the current and capital accounts allowing residents to have offshore accounts. Nyawata and Bird (2004), show that other measures include restructuring the banking sector and relaxing entrance requirements. This has resulted in the member states' financial sectors developing with some such as South Africa comparing favourably to those of developed countries even though some countries still lag behind (African Development Bank, 2014).

It is also important to observe that regarding macroeconomic performance of the region, inflation in the region as of 2016 stood at 9.8%, which is 2.4% lower than the 2018 rate of 7.4% (Southern African Development Community, 2012). The same applies to the real GDP growth rate, which decreased from 2.1% in 2017 to 1.8% in 2018. At country level, the disparities are wide. The Economic Commission for Africa (2018) report on the Southern African region shows that inflation rates at country level for countries such as Angola and Malawi in 2017 were in excess of 10%, which is a decrease of nearly 100% from the previous year.

This to a greater extent suggests that there is macroeconomic volatility in the region. This becomes important considering the conflicting results on the literature and theory as highlighted earlier, which has analysed the role of financial sector development on influencing macroeconomic volatility (Aizenman & Pinto, 2005; Hnatkovska & Loayza, 2005; Iwasaki & Shida, 2020; Kong & Wei, 2016; Loayza et al., 2007). These studies highlight that financial sector development may cause macroeconomic volatility through reducing consumption levels, reduce investment levels, lower productivity, and eventually reduce the rate of economic growth. In addition, financial sector development may cause macroeconomic volatility through affecting the net worth of borrowers. It is also important to observe that there are recent studies such as Rousseau and Wachtel (2011); Demetriades, Rousseau and Rewilak (2016) which highlight that the effect of finance on the domestic economy is now questioned given the systemic banking crises on growth. Also, Andianova, Demetriades and Shortland (2012), and Kneer (2013) highlight that financial development which is achieved through deregulation or liberalisation does have the potential to divert human capital away from technological innovation as economic agents pursue less productive activities with artificially inflating reward structures in finance.

The study seeks therefore to examine the extent to which financial sector development may cause macroeconomic volatility in the SADC region. The study utilised the Cross-Sectionally Augmented Autoregressive Distributed Lag (CS-ARDL) model given its ability to deal with cross-country heterogeneity and cross-country dependence. The empirical results revealed that when both financial intermediaries and markets are developed, they reduce volatility. However, where the stock market dominates, that may cause macroeconomic volatility. The results also revealed that financial openness is another source of macroeconomic volatility in the SADC region.

It is important to recognise that a number of studies have been undertaken on the importance of the financial sector development in promoting economic growth in the SADC region (Al-Qudah, 2016; Barua & Rana, 2015; Iheanacho, 2016; Prochniak & Wasiak, 2017). Also, financial sector development has also been topical in the SADC region given the role it plays in promoting investment (Kapingura et al, 2016). However, it is interesting to note that there are few studies which have examined the extent to which financial sector development may contribute towards macroeconomic volatility. This becomes important considering that the role of financial sector development in the growth process has been questioned recently (Demetriades & Rousseau, 2016). Thus, this study contributes by analysing the effect that financial sector development may have on macroeconomic volatility as the majority of the available studies have largely looked at the role of the financial sector development on growth in the region. Following the introduction, Section 2 presents the review of the available studies on the subject. Section 3 discusses the model and estimation techniques which were utilised. Section 4 presents and discusses the results obtained. Lastly, Section 5 focuses on the conclusion of the study.

2. Theoretical model and review of relevant literature

Of the available models which explain how financial sector development may cause macroeconomic volatility, Aghion et al. (1999) suggest that nations with low levels of financial sector development have greater fluctuations and experience sluggish growth. These authors highlight that underdeveloped financial sectors result in macroeconomic fluctuations. Furthermore, the model shows that demand and supply for credit are cyclical in an underdeveloped financial sector. On the contrary, countries with developed financial systems experience stable growth and instabilities arise as a result of exogenous shocks.

Beck et al. (2006) in another model highlight that productivity shocks results to an adjustment in the ratio of high and low entrepreneurs' wealth which is greater when information asymmetry exists. The assumption is that an advanced financial sector lessens the cash flow of firms that are credit constrained, hence decreasing the effect of shocks on output while increasing effects on monetary shocks. Regarding volatility, the theory suggests that real instability on productivity and growth is greater when there is asymmetric information.

The available studies on financial sector development and macroeconomic instability include studies which have been carried out at cross-country level. These studies include Hahn (2003) on OECD countries. The findings suggest a strong link between the development of the stock market and the macroeconomic volatility. There is also support that advanced financial sectors increase mone-tary shocks and reduce real shocks. This result was also found to be consistent with Alagidede and Ibrahim (2016) for 23 sub-Saharan countries. The results also corroborate the finding of Park (2015), who established that higher development of the financial system reduces output volatility.

Liu and Yang (2016) also carried out a cross-country study for both developing and developed countries. Their findings suggest that financial deepening has an imperative role in reducing the growth rate of macroeconomic volatility, but up to a certain point. This is consistent with the study conducted by Dabla-Norris and Srivisal (2013), who found that financial depth can only reduce the investment, output, and consumption volatility up to a certain point. However, at extremely high levels, financial deepening increases investment and consumption volatility. There is also robust support that financial depth lessens adverse effects of external shocks on macroeconomic volatility. This result is also consistent with Iwasaki and Shida (2020) and Levine and Warusawitharana (2021). This result was found to be consistent with Manganelli and Popov (2015), who found that financial development has the potential to reduce aggregate volatility for the OECD countries.

Xue (2020) in another study on 50 countries indicates that growth volatility in advanced countries is much smaller than volatility in emerging economies. These results in a way suggest that advanced countries experience lower growth volatility due to the development of the financial sector. On the other hand, emerging economies are not able to mitigate growth volatility due to the level of development of the financial sector. In another study, Ibrahim and Alagidede (2017) indicate that for the sub-Saharan Africa, unbridled financial development may magnify volatility.

There are studies which suggest that the link between financial sector development and volatility is U-shaped. These studies include Alatrash et al. (2014), who suggest that developed financial sectors offset risk stability attached to financial development. However, in countries with low-quality financial systems, there is no important link which exists. This finding was found to be consistent with Kunieda (2008) and Easterly et al. (2000).

There are also empirical studies that have been undertaken at country level. These studies include Balago (2014) on Nigeria, who found that financial deepening variables have a positive impact on economic growth. These results were found to be contrary to Ewubare and Ogbuagul

(2017), who found that a long-term influence of financial deepening on economic growth and exchange rate instability exists.

Abbas and Iftikhar (2016) in another study examined whether financial development affects growth volatility in Pakistan. The study found that the instability of financial development in both the banking industry and the stock market amplifies growth volatility in industries of emerging countries such as Pakistan.

Kong and Wei (2016) in the case of China established that financial markets, measured by the stock market, have an effect on macroeconomic volatility. However, the results revealed that the banking sector does not have a significant effect on macroeconomic volatility. On the other hand, Du and Luo () still in China revealed that development of the financial intermediaries increases monetary shocks, although it does not affect real shocks. This was found to be consistent with Beck et al. (2006), who argue that financial development intermediaries balance the economic effect in an economy and increase monetary shocks.

The available studies on the SADC region have largely focused on analysing the relationship between financial sector development and economic growth. The studies include Bara & Le Roux, (2016); Mahlangu & Matsvai, 2016; Nene & Taivan, 2016; Pillay, 2013; South African Reserve Bank, 2014. The reviewed literature has also indicated that unbridled financial sector development may amplify volatility. Thus, the study contributes to the literature through analysing the effect of financial sector development on output volatility in the SADC region.

3. Data and methodology

The data used in the study was obtained from World Bank development indicators and Reserve Banks of the specific countries in annual form. The period of study is from 1980 to 2018. The study benefitted from the work of Dabla-Norris and Srivisal (2013) and Kong and Wei (2016). The model presents growth volatility as a function of financial sector development amongst other factors. The model was amended to consider variables which are of importance in the case of the SADC region. Apart from the banking variables as in the case of Dabla-Norris and Srivisal (2013), the role of the stock market was also considered in this study. The model is presented as follows:

$$V_{it} = aV_{it1} + \beta_1 FD_{it} + \beta_2 X_{it} + U_i + \varepsilon_{it}$$
(1)

where V represents volatility at time t for country i, FD denotes financial sector development, X indicates control variables, U_i represents specific effect of a country, and ε_{it} represents the error term.

3.1. Definition of variables and a priori expectations

Financial development entails the development of both financial markets and financial intermediaries (Kong & Wei, 2016). Two measures for banking sector development were employed; these are bank credit to bank deposit, which represents the financial resources provided to the private sector by domestic money banks as a share of total deposits, and private credit to GDP defined as the financial resources provided to the private sector by financial institutions as a share of GDP (King and Levine 1993). The two measures reflect the scale of growth of the financial sector and efficiency development of the financial sector. The capital market is represented by the stock market capitalization.

The Chinn-Ito Financial Openness Index was used to capture financial openness. The index assesses the level of capital account openness. It ranges from 2.44 to -1.86. A negative relationship between all these variables and instability was expected. Volatility is measured using the growth rate per-capita standard deviation. This is consistent with Beck et al. (2006).

Several control variables were included in the model. These variables include exports as a measure of trade openness, government expenditure, and inflation. Trade openness is expected to have a positive relationship with macroeconomic volatility. This is in line with Easterly et al. (2000) and Van Bezooijen and Bikker (2017), though conflicting the findings of Tharavanij (2007), Dabla-Norris and Srivisal (2013), and Mallick (2014). A negative relationship between growth volatility and financial sector development is expected. This is in line with Fatas and Mihov (2003), who argue that volatility of output is to a greater extent caused by discretionary changes in fiscal policy. On the other hand, inflation was expected to have a positive relationship with macroeconomic volatility.

3.2. Estimation techniques

The study utilised a panel data approach to analyse the relationship between the variables of interest. Given the nature of the panel data and also that the time period is more than the cross-sections, the procedure involved testing for cross-sectional dependence, panel unit root tests, cointegration tests, and estimation of the CS-ARDL technique. When considering empirical studies that make use of panel data sets of countries or states, the cross-sectional units could be interdependent due to externalities, spillovers, and competition. Theoretically, estimators which are obtained by ignoring cross-sectional dependence could be found to be inconsistent. This evidence encourages the growing demand for modelling cross-sectional dependence in both methodological and theoretical research as well as in real applications (Qiu-hua et al., 2016). To check if there is evidence of cross-sectional dependency, the study utilised three tests, the Breusch and Pagan (1980) test, the Pesaran scaled-type LM test, and the Pesaran CD test. The CD test is suitable for dynamic panel models and follows the normal distribution.

Having determined the presence of cross-sectional, the next step was to analyse the stationarity of the variables used in the study. The study utilised the second-generation tests for unit root tests. These tests can deal with the problem of cross-sectional dependency. Hansen (1982) indicates that the traditional unit root tests have low power and size distortions are a serious challenge. The cross-sectional augmented Dickey––Fuller (CADF) unit root test was employed in this regard. The CADF test is stated as follows:

$$\Delta y_{it} = a_i + d_i y_{i,t-1} + c_i \bar{y}_{t-1} + b_i \Delta \bar{y}_t + u_{i,t}$$
(2)

The cross-sectional augmented Im, Pesaran, and Shin (CIPS) unit root test was also employed for robust results. The test is also a second-generation unit root test which considers cross-sectional dependency.

The next step in the empirical analysis involved ascertaining the existence of cointegration. The study employed the Kao (1999) and the Westerlund () tests. The generalised cointegration test is expressed as follows:

$$\mathbf{y}_{i,t} = \beta_i \mathbf{x} \mathbf{i}, \mathbf{t} + \gamma_i \mathbf{Z} \mathbf{t} + \mathbf{e}_{i,t} \tag{3}$$

The covariates in $x'_{i,t}$ are assumed to not to be cointegrated. β_i is the cointegrating phenomenon which differs across the panels. The Westerlund (2007) cointegration test does consider the problem of cross-sectional dependency which is important in this study.

Given that the data utilised in this study is integrated of orders 1 and 0 and there is a problem of cross-sectional dependency, the study utilised the CCS-ARDL. The test was proposed by Cavalcanti et al. (2015) and Chudik and Pesaran (2015). Chudik and Pesaran (2015) indicates that the test "augments the ARDL model with the linear combination of the average cross-sectional of both the dependents variables and independent variables to capture the cross-sectional correlation in the error term." The CS-ARDL model is presented as follows:

$$\Delta y_{it} = \mu_i + \alpha_i()y_{i,t-1} - \theta i x_{i,t-1} + \alpha_i^{-1} n_i \bar{y}_t + \alpha_i^{-1} y i \bar{\bar{x}}_t \sum_{j=1}^{p-1} \emptyset_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij} \Delta x_{i,t-j} + \sum_{j=0}^{p-1} v_{ik} \Delta \bar{y}_{t-j} \sum_{i=0}^{q-1} y_{ik} \Delta \bar{x}_{t-j} + \varepsilon_{it}$$
(4)

In Equation 4 \bar{y}_t and \bar{x}_t represent the cross-sectional average of y_t and x_{it} . Eberhardt and Presbitero (2015) highlight that the long-run coefficients which are associated with y_t and x_{it} and the rate of adjustment back to equilibrium α_i are the main coefficients of interest which will be reported in the study. Four models were estimated based on Equation 4 to further analyse the relationship between the variables of interest. The first model is the baseline model, which is followed by model 2, which analyses the effect of the stock market, model 3 the banking sector variables, and lastly Equation 4, which is on financial openness.

4. Presentation of empirical results

Table 1 presents descriptive statistics of all the variables utilised in the study. The descriptive statistics table shows a mean of -2.12 for GDP volatility with a minimum of -17.32 and a maximum of 13.88, and its standard deviation is 5.84. Inflation has a mean of -15.62, its minimum and maximum values are -8.28 and 31.82, respectively.

On the financial sector development variables, the mean value of stock market turnover is 11.87, with a standard deviation of 69.94 and 0.02 and 1081.12 minimum and maximum values, respectively. On bank private credit, the mean value is 27.72, minimum and maximum values are 2.59 and 102.54 with a standard deviation of 23.95. Dabla-Norris and Srivisal (2013) indicate that financial development is measured by bank private credit that reduces output volatility up to a certain level. However, at high levels above 100% of GDP it may magnify investment and consumption volatility. The mean value for bank credit to bank deposit is 75.33, with a minimum value of 23.35 and a maximum of 137.33, and a standard deviation of 28.18. The descriptive statistics show that the stock market is more volatile as compared to the banking sector variables.

Table 2 presents the correlation matrix for all the variables. The results indicate that both banking variables and stock market variables have a negative correlation with GDP volatility, which is a measure of macroeconomic stability.

These results, though inconclusive, suggest that developments in the financial sector promote stability of the macroeconomic environment in the SADC region.

Cross-sectional dependence test was conducted to examine the extent to which residuals in panel cross-sections depend on each other, and the results are presented on Table 3.

Table 3 shows that all the tests, Breusch–Pagan LM test, Pesaran scaled LM, and Pesaran CD test, are all highly significant, though the Pesaran CD is significant at 10%. This result suggests that the null hypothesis of cross-sectional independence is rejected. In other words, there is evidence of cross-sectional dependency.

The next step in the empirical analysis involved checking for stationarity of the series utilised in the study. The results are reported in Table 4.

Table 4 shows that the variables employed in the study are either I(0) or I(1). In other words, the variables which were not stationary at level series became stationary after first differencing. This therefore confirms that there is no series which is I(2), which guarantees the model estimated to analyse the link between the variables of interest.

Having determined the order of integration of the variables, cointegration tests were performed utilising the Kao (1999) and the Westerlund tests. The results are presented in Table 5.

Table 1. Descri	ptive statistics								
	GDPVOL	BANK CREDIT	BANK CREDIT TO BANK DEPOSIT	CHINN_ITO	EXPORTS	GDP	GOVER NMENT	INFLATION	STOCK_ MARKET
Mean	-2.122718	27.72903	75.33586	-0.503365	37.61568	3.216407	18.04992	15.62851	11.87526
Median	1.691593	17.43640	68.22450	-1.194733	35.07200	2.688329	17.78391	11.96467	4.475980
Maximum	13.87795	102.5360	137.3310	2.374419	75.12957	19.63795	31.81937	112.6936	1081.120
Minimum	-17.32452	2.590200	23.35660	-1.903586	10.26206	-11.56493	8.284477	-0.112203	0.023725
Std. dev.	7.206990	23.75513	28.18825	1.456005	15.00386	5.753998	5.109620	14.19492	69.94128
Skewness	0.220484	1.005214	0.394290	1.087717	0.281833	0.676237	0.396135	3.705223	14.92986
Kurtosis	3.102457	3.118475	2.138388	2.630835	1.984881	3.930831	2.386227	22.42983	228.5590
Observations	241	241	241	241	241	241	241	241	241

Table 2. Corre	lation matrix									
Correlation										
Prob ability	VOLGDP	STOCK MRKT	BANKS PRIVATE	BANK LENDING	BANK CRED	GDP	GOV EXP	CHINN-ITO index	INFL	EXPORTS
VOLGDP	1.00									
STOCK MRKT	-0.03	1.00								
BANKS PRIVT	-0.25	0.10	1.00							
BANK LENDING	- 0.04	-0.07	-0.44	1.00						
GDP	-0.29	-0.04	-0.25	0.04	-0.30	1.00				
GVT EXP	0.19	0.11	0.03	-0.40	0.33	-0.19	1.00			
CHINN	0.05	-0.05	0.20	-0.16	-0.15	0.05	-0.13	1.00		
INFL	0.02	-0.07	-0.09	0.29	-0.25	0.02	-0.26	0.00	1.00	
EXPORTS	-0.15	0.03	0.22	-0.32	0.02	-0.15	0.28	0.43	0.01	1.00

Table 3. Cross-sectional dependency test Residual cross-sectional dependence test

Null hypothesis: no cross-sectional dependence (correlation) in residuals

Test	Statistic	d.f.	Prob.
Breusch–Pagan LM	56.74245***	21	0.0000
Pesaran scaled LM	5.515179***		0.0000
Pesaran CD	1.745214*		0.0809

Table 4. Panel unit root test						
	Cross-sectional augmented Im– Pesaran–Shin (CIPS)		Cross-sectional augmented Dickey– Fuller (CADF)			
Variable	Level series	First difference series	Level series	First difference series		
VOLGDP	-4.685***		-3.629***			
STOCK MRKT	-1.153	10.643***	-1.045	-4.167***		
BANKS PRIVT	-1.497	7.765***	1.654	8.123***		
BANK LENDING	-1.543		-0.788	-8.028***		
BANK CRED	2.561*		-2.298*	_		
GDP	4.653**		-5.005***	—		
GVT EXP	3.654**		-2.480**	—		
CHINN	-3.667***		-3.578***	—		
INFL	0.124	11.654***	-0.254	-10.298***		
EXPORTS	-2.790***		-2.215	-4.665***		

Notes. Standard errors reported in parentheses ().

*indicates significance of the coefficients at 10%.

** indicates significance of the coefficients at 5%.

*** 1% indicates significance of the coefficients at 1%.

Source: Author's computation using STATA 15.

As presented in Table 5, both tests are significant indication that there exists a long-term relationship between the variables of interest. These results suggest that financial sector development variables and growth volatility have a long-run relationship.

Table 6 presents the empirical results where GDP growth volatility is the dependent variable. The results show that of the two variables which represent banking sector development have a negative and significant effect on growth volatility. This is consistent with the a priori expectations that well-developed financial intermediaries can help mitigate the effect of financial frictions associated with asymmetric information problems on macroeconomic volatility through acquiring and verifying information. This is in line with Van Bezooijen and Bikker (2017), Iwasaki and Shida (2020), and Levine and Warusawitharana (2021). These authors indicated that banks develop expertise in acquiring information and can mobilise economies of scale in terms of screening and monitoring borrowers, resulting in a reduction in both adverse selection and post-moral hazard problems. This will reduce financial frictions, cap the financial accelerator effect, and smoothen the business cycles. This is also supported by Aghion et al. (2010), who highlight that countries which have less developed and poor financial systems experience higher macroeconomic volatility as the demand for and supply of credit is more cyclical. Therefore, deeper financial systems have the ability to reduce volatility of growth through alleviating liquidity constraints on companies and facilitating long-term investment. Hence, financial development reduces macroeconomic instability significantly according to this model.

Table 5. Panel cointegration test					
Cointegration tests		Test statistic			
Kao (1999)	Modified Dickey–Fuller t	2.3807***			
	Dickey–Fuller t	3.3812***			
	Augmented Dickey–Fuller t	3.0867***			
	Unadjusted modified Dickey–Fuller t	2.2552**			
	Unadjusted Dickey–Fuller t	3.0515***			
Westerlund test	Gt	-3.942***			
	Ga	-11.326			
	Pt	-12.848***			
	Pa	-15.293**			

Notes. Standard errors reported in parentheses ().

* indicates significance of the coefficients at 10%.

** indicates significance of the coefficients at 5%.

*** 1 % indicates significance of the coefficients at 1%.

Source: Author's computation using STATA 15.

The empirical results also reveal that stock market capitalisation which is a measure of capital market development has a negative effect on macroeconomic volatility in the base model. In other words, a well-developed capital market reduces macroeconomic volatility. This result is again consistent with a priori expectations and empirical studies such as Tharavanij (2007), who indicated that well-developed capital markets reduce financial frictions by improving disclosure and higher transparency in the financial system. This reduces asymmetrical information and agency costs. The author also shows that deep capital markets offer diversification opportunities, which is the ability to reduce idiosyncratic risk. Levine (2005) also shows that a well-developed capital markets. This therefore supports investment needs and enhance output growth. However, when looking at the capital markets alone, controlling for the banking sector development, the results suggest that the stock market can be another source of macroeconomic volatility in the region.

Financial openness was found to have a positive effect on macroeconomic volatility in both the base model and model 4. This is consistent with Dabla-Norris and Srivisal (2013). These authors argue that greater financial openness may provide another mechanism through which a country can be exposed to external shocks, which would eventually disrupt economic activities, resulting in enhanced macro-economic volatility. This is also supported by Kose et al. (2003), who found that the link between financial openness and macroeconomic volatility is exacerbated by structural characteristics which are inherent in developing countries that exposes them to external shocks originating from other countries. Firstly, sudden changes in capital inflows induce boom-bust cycles in developing countries, which is a characteristic of the SADC region where the majority of the countries do not have deep financial sectors. This makes it difficult to cope with high volatility of capital flows, resulting in macroeconomic volatility. This is supported by Aghion et al. (1999) and Caballero and Krishnamurthy (2001).

Also, Kose et al. (2003) indicate that the size of a country is another important factor through which financial openness may influence macroeconomic volatility. Usually developing economies are smaller compared to industrialised countries, therefore productivity fluctuations in large industrialised countries may have a significant effect on the dynamics of business cycles in small open developing countries. This becomes important in the case of the SADC region where the countries have been moving towards opening up their financial sectors.

Table 6. Cross-sectional augmented autoregressive distributed lag technique results Dependent variable: ΔGDP growth volatility

Variable	Model 1	Model 2	Model 3	Model 4
Long-run equatior	ı			
BANK_LENDING	2149** (.0872)		4198** (.1474)	
BANKS CREDIT TO BANK DEP	9105 **(.2484)		9361* (.0440)	
STOCK_MARKET	3795 **(.2484)	.3795 (.1922)		
EXPORTS	-0.3322***(.2922)	2556***(.0796)	2211* (.0256)	6116***(.2841)
GOVERNMENT Exp	.3401*** (.1544)	.4735 (.3532)	1155* (.3001)	.9958** (.2470)
INFLATION	.05492 *(.0148)	.0698 (.0498)	.1136** (.0598)	.6968 (.1498)
CHINN-ITO Index				.7210 (.3692)
CHINN-ITO Index * Domestic credit				8937** (.2334)
GDP	9064** (.1175)	1166** (.0297)	-0.2637*(0.1158)	.1253** (.1693)
Short-run equation				
ECT	2874*** (.0342)	7784** (.3010)	7594* (.3665)	6317 (.4805)
∆BANK_LENDING	8144***(0.2449)		8975*** (.1019)	
ΔBANKS CREDIT TO BANK DEP	.9878 (.2782)		.9478** (.1524)	
∆STOCK_MARKET	-0.7349 (.1722)	.3532** (.1239)		
ΔEXPORTS	.2877 (.2156)	.2604** (.0840)	.0307 (.2249)	.2496*** (.0803)
∆GOVERNMENT Exp	.9686 (.2399)	.3195 (.2151)	.0932 (.3004)	.4671 (.3532)
ΔINFLATION	0.8005 (0.4934)	.0848 (.0599)	.1080 (.0588)	.0775 (.0500)
$\Delta CHINN-ITO$ Index	.6023 (.2188)			.7197 (.4521)
ΔGDP	.7147 (.2401)	9664* (.4252)	.1433 (.6812)	.7988 (.4065)
Constant	.1447 (.3902)	5747(.1434)	.1434 (.5411)	.7333 (.1549)
No. of obs.	234	234	234	234
R-squared	0.38	0.41	0.35	0.37
R-squared (MG)	0.52	0.52	0.50	0.49
F statistic	2.18	2.40	1.82	2.06
CSD statistic	1.31	0.60	0.60	0.55
p-Value	0.816	0.392	0.850	0.7786

Notes. Standard errors reported in parentheses ().

* indicates significance of the coefficients at 10%.

** indicates significance of the coefficients at 5%.

*** 1 % indicates significance of the coefficients at 1%.

Source: Author's computation using STATA 15.

The results also show that trade openness has a significant and positive impact on growth volatility in all models. This means that trade openness results in an increase in growth volatility. These findings are consistent with Easterly et al. (2000), Van Bezooijen and Bikker (2017), and Tang and Abosedra (2020). However, conflicting the findings of Tharavanij (2007), Dabla-Norris and Srivisal (2013), and Mallick (2014).

The empirical results reveal that government expenditure has a positive and significant effect on macroeconomic volatility in the SADC region. This result is inconsistent with the a priori expectations in which a negative relationship was expected. Here, government was expected to smoothen out growth volatility through the use of discretionary changes in fiscal policy and the use of automatic stabilisers, which would ensure an interrupted positive growth. In this case, an increase in government expenditure can be another source of business cycle fluctuation, which is likely to exacerbate macroeconomic volatility. This is supported by Fatas and Mihov (2003), who argue that the volatility of output is caused by discretionary changes in fiscal policy. This lowers economic growth by more than 0.8% for every point increase in volatility. Also, studies such as Ramey and Ramey (1995), Aghion and Banerjee (2005), and Imbs (2006) highlight that transitory and cyclical changes in government expenditure through either expansionary or discretionary fiscal policy may increase output volatility which would eventually reduce output growth. Hence, the more government spending there is in a country the greater the instability will be in the country.

Inflation was also found to have a positive effect on macroeconomic volatility. This is consistent with the a priori expectations and empirical studies such as Tang and Abosedra (2020). These authors indicate that increasing inflation can affect macroeconomic volatility through the opportunity cost of holding non-interest-bearing money. This may reduce output through lowering capital accumulation and labour supply (Rocheteau and Wright 2005); Lagos and Rocheteau (2005) argue that inflation may also alter search intensity.

In the second model, when analysing the effect of the stock market controlling the banking sector, the results show that the coefficient is positive, implying that the stock market is another factor which contributes towards macroeconomic volatility. This is in line with Van Bezooijen and Bikker (2017), who indicate that financial markets participants may exhibit similar behaviour which exacerbate volatility through displaying a heading behaviour. Also, Chu (2020) highlights that an unbalanced financial structure has the potential to weaken the role of the securities markets as far as growth is concerned. This is also important considering that the majority of the countries in the SADC region do not have deep and well-developed stock markets.

The third model shows the effect of banking sector variables excluding the stock market variable. The empirical results reveal that all banking sector variables reduce macroeconomic volatility in the SADC region. These results are consistent with what was established in the first model;; as indicated earlier, financial intermediaries reduce macroeconomic volatility. This is consistent with Kong and Wei (2016), who highlight that the link between financial sector development and macroeconomic volatility is rooted in the external financing needs of financially constrained firms whose borrowing capacity is likely to be influenced by market imperfections. In this regard, shocks to the macroeconomy are propagated through a financial accelerator, which operates through the credit channel and arises due to information asymmetry between lenders and borrowers. Therefore, shocks to the financial sector are likely to be mitigated when financial intermediaries are well developed.

In the last model, following the work of Dabla-Norris and Srivisal (2013), financial openness was interacted with domestic credit to the private sector representing financial sector development. The empirical results revealed that the interaction term has a negative sign; this implies that even though financial openness is associated with higher macroeconomic volatility, its effect is reduced with greater financial depth. In line with Dabla-Norris and Srivisal (2013), this therefore suggests that financial deepening has the ability to attenuate the impact of external shocks on output volatility in the SADC region.

The short-run results indicate that all the ECM terms are negative and statistically significant, an indication that in the case of disequilibrium the variables of interest adjust to their long-run equilibrium. Also, the CD statistic's *p*-values are greater than 5% which is an indication that the estimates from the CS-ARDL estimations are valid and there are no shortcomings with the models.

5. Summary of the study and conclusion

The focus of the study was on analysing the effect of financial sector development on macroeconomic volatility in the SADC region for the period from 1980 to 2018. It was noted that the SADC region is pursuing financial sector development as one of the ways to achieve sustainable economic development. However, literature on the link between financial sector development and macroeconomic volatility presents mixed results. Even though a well-developed financial sector could assist in mobilising and allocating capital to productive sectors of the economy, there are recent studies which indicate that it could be another source of macroeconomic volatility. Employing the CS-ARDL, given the nature of the data, the empirical results reveal that banking variables have a negative and significant effect on growth volatility in the SADC region. This suggests that well-developed financial intermediaries can help reduce the effect of financial frictions associated with asymmetric information problems on macroeconomic volatility through acquiring and verifying information. The effect of the stock market on growth volatility, controlling for the effect of the banking sector, revealed a positive effect, implying that the stock market is another factor which contributes towards macroeconomic volatility when it is dominant in the economy.

Following the work of Dabla-Norris and Srivisal (2013), financial openness was interacted with domestic credit to the private sector representing financial sector development. The empirical results revealed that the interaction term has a negative sign; this implies that even though financial openness is associated with higher macroeconomic volatility, its effect is reduced with greater financial depth.

The results found in the study have implications for the development of the financial sector of the SADC region countries. Firstly, the results established that banking variables reduce macroeconomic volatility. This therefore suggests that policies which are targeting deepening the function of the banking sector should be pursued. Further, it was also established that when the stock market and the banking sector are combined, the whole financial sector is able to reduce macroeconomic volatility. However, when the stock market is dominant, this may result in macroeconomic volatility. Therefore, authorities should pursue policies that promotes the development of both the stock market and the banking sector.

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Note

 Angola, Botswana, Congo (DR), Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe

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