Asymmetric Effects of Financial and Trade Integration Policy Shocks and Economic Vulnerability in South Africa

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Abstract: *This study examines the impact of open trade and financial policy on macroeconomic vulnerability in South Africa over the period 1984-2018. In order to address this dynamic nature, we apply the structural vector autoregression model (SVAR) estimation. The choice of the country was based on its membership in the African, Caribbean and Pacific (ACP) group of states, which benefit from economic partnership agreements with the European Union, ensuring that the advantages of open trade are accompanied by rules equally shared by all. Our analysis is built on models that take into account the asymmetric diffusion different sources of shocks. The empirical results indicate that the South African economy is marked by asymmetries, insofar as the impulse responses and the degrees of variables sensitivity to the same type of shock are different. As a result, we suggest adjustment mechanisms to asymmetric shocks that reduce macroeconomic vulnerability. Thus, deepening financial integration increases real convergence, leading the banking system to a better allocation of domestic savings to exports, which in turn weakens the effect of shock and boosts inclusive growth. This positive relationship is justified by good governance, flexible exchange rate regime, and healthy open economy. On the other hand, the opening of the capital account alone is unlikely to fuel product market competition and attract FDI. Thus, the development of trade integration to the extent of adjusting imbalances through policy consolidation, deepening financial development, and structural economic performance allows for real convergence and enhances the symmetry of shocks in South Africa.*

Keywords: asymmetry, financial integration, macroeconomic vulnerability, trade integration, shocks, structural VAR

JEL Classification: G01, G21, F41, F43

1. Introduction

As in many parts of the world, financial and trade integration in Africa are key determinants of an inclusive economy performance. However, the existing literature discusses the impacts of trade openness on growth and per capita growth on trade openness. Regional trade agreements in Africa have facilitated international trade in financial and non-financial goods and services, Ejmeyovwi and al (2018).

South Africa has managed to gain the confidence of the international community and preserve long-term growth potential. Also, the government implemented the Growth Employment and Redistribution Strategy (GEAR) in 1996. In fact, maintaining a flexible exchange rate with increased integration led to rand devaluation and financial flows massive outflow. In this context, the South African government has been working to improve the economic structure as well as introduce reforms for effective economic policies that are conducive for investment attractiveness and economic integration. Thus, the challenge for the South African economy is to find a trade-off between efficiency in financial openness policies (financial development, capital account opening), trade flows liberalization and long-term inclusive growth. The initiative is designed to reorganize South Africa's external environment in order to move forward with concrete progress and address vulnerability in international markets. The activity translates South Africa's strong incorporation into a global economy and expresses the South African government's responsibility towards more open economy.

The objective of financial liberalization was to benefit the economic development of nations. In this regard, the large volume of literature on endogenous growth has shown that it will lead to increased growth (Bencivenga, V. R., & Smith, B. D. (1991). With foreign direct investment, some developing and emerging countries have embraced trade liberalization in the hope that it will preserve their economies from shocks. Yet, despite the significant benefits of trade liberalization, the impact of these reforms has had little positive effect on growth performance, Sachs and Warner (1995), Eriş, M. N., & Ulaşan, B. (2013).

In the early 1990s, a large number of developing countries, regardless of their trade openness, rapidly adopted financial openness. In the second half of the 1990s, these could not escape the financial crises, which renewed the debate on trade openness appropriateness as a part of structural adjustment programs to cushion the economic shocks and financial crises. Subsequently, the improvement of reform policies related to financial and economic openness has plunged researchers into an intense debate on the determinants of openness, Zaman, Mubasher, et al (2021). Many studies have examined the impact of trade openness on financial openness and economic growth. The theoretical and empirical literatures in this area present mixed pictures of the links between trade openness, financial openness and economic performance, Pradhan, Rudra P., et al (2017), Arvin, Mak B., Rudra P. Pradhan, and Mahendhiran Nair (2021). However, few have attempted to understand the dynamic relationship between trade and financial openness and growth. In this context, the main objective of our paper is to study the case of the South African economy and

answer the following question: How do key macroeconomic indicators and policies respond to trade and financial openness shocks?

Thus, we test the validation of the hypothesis:

H1: The effects of shocks from financial or trade liberalization are asymmetric.

To achieve our objective, we use SVAR structural vector model estimation for the South African case. Actually, our research is structured as follows: The second section is dedicated to the literature review. The third section deals with the methodology and indicators. In the last part, we present and discuss the results of the SVAR model, the impulse responses and the variance decomposition.

2. Review of Literature

Kose and al (2003) use measures of restrictions on financial flows to capture different aspects of financial openness while accounting for differences in the degree of openness across countries. They found that as economies liberalize their financial flows, consumption volatility increases, as they determined a threshold at which financial openness significantly reduces volatility. These authors find that most developing economies, including the POFs, are unfortunately well below this threshold.

Indeed, convergence towards a better quality of governance allows economies to benefit increasingly from foreign capital flows, Smarzynska and Wei (2000). In fact, these foreign capital flows or FDI allow financially open countries to enhance their economic growth. Therefore, a policy to attract foreign direct investment is necessary to benefit more from foreign flows.

The study presented by (Aghion, P., Bacchetta, P., & Banerjee, A. (2004) examines the dynamic impact of financial factors on the volatility of small open economies. They find that the financing options for developing countries for long-term investment projects are often hampered by market imperfections, associated with credit constraints and limited any access to global financial markets; a fact that could exacerbate the negative impact of volatility in the short run, and growth, in the long run. For that, it is important to focus on financial and trade openness reforms to absorb greater macroeconomic volatility and generate economic growth, Kim, an al. (2010).

The article by Aghion, P., Bacchetta, P., Rancière, R., & Rogoff, K. (2005) provides empirical evidence that the choice of exchange rate regime has a significant impact on economic growth conditional on a certain degree of financial market regulation and openness to international trade. The study is based on a sample of 83 countries for the period. In addition, it shows a negative impact of the real exchange rate in a simple growth model on investment and private credit. Indeed, the authors highlight results that contrast with the literature that validates the effects of small exchange rate volatility on financial and economic activity.

Macroeconomic volatility and instability have been defined by Loayza and Raddatz (2007) as the variability of key macroeconomic aggregates due to the occurrence of fundamental shocks. In other words, macroeconomic volatility refers to a single imbalance, while macroeconomic instability results from multiple imbalances across the economy. In fact, access to international capital markets appears to have a perverse effect on relative consumption volatility for developing countries that opted for financial integration. When the level of financial integration is low, any increase in financial integration leads to a rise in the relative volatility of consumption. However, the effect is reversed once the level of financial integration exceeds a certain threshold. This implies that for countries that enjoy sufficient financial openness, the relative volatility of consumption tends to decrease. This finding is potentially consistent with the idea that international financial integration is likely to promote financial sector development.

In the same line of analysis, Lusardi, A., & Mitchell, O. (2016) study the impact of financial liberalization as being measured by capital account openness on economic growth. They confirm the crucial role that foreign direct investment plays in promoting the development of new financial services and products as well as the attractiveness of investments that complement savings. That is to say, a new model examining the effect of financial market openness on growth does not necessarily have the same impact as financial market growth in the face of financial crises De Haan, J., Pleninger, R., & Sturm, J. E. (2018), Sadalia, and al. (2019). .

The study presented by D'Onofrio, A., & Rousseau, P. L. (2017) examines financial development, growth and trade flows. Similarly, it deploys the LSDV (least squares dummy variables) and MMG estimator in system. The research reveals, also, that the financial development measured by broad money supply is a factor of economic performance underlying trade and production. However, trade openness negatively affects financial development and output. These results emphasize the importance of a well-functioning and developed financial system in order to strengthen integration into the global economy.

The work of EYEA, A. R. Z. (2021) contributes to the debate on identifying shocks and their macroeconomic impact in the CEMAC[1] zone. The researchers determine different degrees of asymmetry for countries in the subregion added to different responses to the same type of shock. In fact, they re-examine the issue and prove that long-run convergence analysis emphasizes the limits of economic policies in adjusting imbalances. They conclude, furthermore, that deepening trade liberalization increases the asymmetry of shocks for CEMAC economies.

From a comparative perspective, SODOKIN, K. and GAMMADIGBE, V. (2021) study three currency unions (WAEMU[2], CEMAC and EMU[3]). That is to say, they use

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[1]CEMAC : Central African and Monetary Community
[2]WAEMU :West African Economic and Monetary Union

the instrumental variables method for panel data and find divergence of cycles in the WAMZ with symmetry between cycles and trade integration Ratanavararak, L. (2018), Yolcu Karadam, D., & Öcal, N. (2020).

3. Data and Methodology

In order to study the asymmetric effects of trade and financial openness policy on macroeconomic performance in Africa, we estimate a Structural VAR (SVAR) model with five endogenous variables: the coding of the external component of financial liberalization from the Chinn & Ito (KAOPEN) database Ito database (KAOPEN) as a de facto measure of external financial liberalization, capital inflows and outflows as a percentage of GDP (LIBFIN) as a de jure measure of external financial liberalization, liquidity ratio defined by money supply as a percentage of GDP (ME) as a de facto measure of internal financial liberalization, private credit (PC) as a de jure measure of internal financial liberalization and a trade openness indicator (OUVC) measuring the volume of trade equal to the sum of exports and imports as a percentage of GDP.

The explanatory variables are: GDP per capita (PIBH), Trade openness index (OUVC), Real effective exchange rate (TXC), Liquidity ratio (ME), External financial liberalization indicator (LIBFIN), Economic instability (INSTA) measured by the standard deviation of the trade openness index, policies consolidation index of real and financial sphere simultaneous opennessINTER measured by Trade openness (OUVC) multiplied by (KAOPEN), de jure index of internal financial openness (CP), the index of simultaneous liberalization (INTER) equal to Trade openness (OUVC) multiplied by (LIBFIN), the indicator of foreign direct investment FDI (IDEE), the variable (POP) measuring the population level of the country.

In order to establish the asymmetric impact between trade openness, financial integration, and macroeconomic variables, the appropriate methodology would be structural VAR estimation. The choice of SVAR modeling is justified by the fact of providing two major analytical tools based on the dynamics of the three specified models, namely the analysis of impulse response functions (IRFs), which will allow us to detect the impact on openness as well as analyze the effect of the shock, and the variance of the forecast error, which will enable us to assess the average share of the shock, measure the magnitude of the impact of one openness on the other, and identify the asymmetry. Before proceeding to this step, we conduct an ADF stationarity test and a determination of the optimal number of lags for the SVAR representation.

In this study, the SVAR approach primarily aimed at analyzing the effects of external and domestic financial liberalization as well as trade openness policy shocks on macroeconomic activity and openness policies in South Africa. Five relationships were chosen to explain the joint dynamics of external financial liberalization measured by a de facto variable (KAOPEN), external financial liberalization measured by a de jure variable (LIBFIN),

internal financial liberalization measured by a de facto variable (ME), internal financial liberalization measured by a de jure variable (CP) and trade openness.

Thus, we define the five relationships to be studied:

The relationship of external financial liberalization: This model is characterized by two measures of endogenous financial liberalization variables (FLt): a de facto measure (KAOPEN) and a de jure measure (LIBFIN). It is also characterized by two specifications.

Specification (1)

$$FL_t = \beta_0 + \beta_1 FL_{t-n} + \beta_2 PIBH_t + \beta_3 OUVC_t + \beta_4 DF_t + \beta_5 TXC_t + \beta_6 FI_t + \beta_7 INSTA_t + \varepsilon_t \quad (1)$$

Specification (2)

$$FL_t = \beta_0 + \beta_1 FL_{t-n} + \beta_2 PIBH_t + \beta_3 OUVC_t + \beta_4 DF_t + \beta_5 TXC_t + \beta_6 FI_t + \beta_7 INTER_t + \varepsilon_t \quad (2)$$

With DF_t measuring financial development and taking two measures, either private credit extended to the private sector (CP) or the broad money supply ratio (ME). The FI_t variable indicates financial integration and takes two measures, either LIBFIN or KAOPEN.

In the financial development model, we hold two measures of endogenous variables: a de facto measure (ME) and a de jure measure (CP). This model is characterized by two specifications.

Specification (1)

$$DF_t = \beta_0 + \beta_1 DF_{t-n} + \beta_2 PIBH_t + \beta_3 OUVC_t + \beta_4 INTER_t + \beta_5 TXC_t + \beta_6 LIBFIN_t + \beta_7 INSTA_t + \varepsilon_t \quad (3)$$

Specification (2)

$$DF_t = \beta_0 + \beta_1 DF_{t-n} + \beta_2 PIBH_t + \beta_3 OUVC_t + \beta_4 TXC_t + \beta_5 LIBFIN_t + \beta_6 INTER_t + \varepsilon_t \quad (4)$$

For the trade openness model, we hold a single endogenous variable (OUVC) and a single specification.

$$OUVC_t = \beta_0 + \beta_1 OUVC_{t-n} + \beta_2 PIBH_t + \beta_3 POP_t + \beta_4 IDEE_t + \beta_5 TXC_t + \beta_6 CP_t + \beta_7 LIBFIN_t + \varepsilon_t \quad (5)$$

Based on the previous relationships, we proceed to a study of the variables stationarity, determination of the lag, analysis of the structural VAR model, impulse responses and the of the forecast error variance.

4. Result and Discussion

4.1 Results of Panel Root Test

The first step of our analysis is to test the unit roots for each variable of the opening models. As such, we apply the Dickey-Fuller stationarity test (DFT). In fact, the following table reports the results of the ADF test for the

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[3]EMU:Economic and Monetary Union

level, as well as for the first difference of the relevant variables.

Table 1: Panel unit root test analysis

Dickey-Fuller Test (ADF Test)			
Variables	At level	At first difference	Order of integration
CP	-0.05	-3.79	I (1)
INSTA	-0.56	-6.03	I (1)
INTER	0.35	-5.61	I (1)
KAOPEN	-0.67	-5.57	I (1)
LIBFIN	2.24	-5.01	I (1)
ME	0.19	-5.55	I (1)
Ouvc	-1.31	-6.19	I (1)
PIBH	-0.68	-4.87	I (1)
TXC	0.80	-5.04	I (1)
FDI	-1.13	-8.81	I (1)
POP	-0.25	-4.21	I (1)
TAX	-0.12	-3.50	I (1)

Source: Author's Calculation

The results of the ADF test conducted reveal that the unit root tests with the criterion chosen for the determination of AIC lag show that all the series integrated are of order one. Indeed, the null hypothesis of non-stationarity is accepted for all the variables in level, while it is rejected for all the variables in first difference. This analysis allows us to proceed to the determination of the optimal number of lags for the structural VAR modeling.

4.2 The determination of the number of delays of the SVAR representation for the three opening models:

4.2.1 Economic analysis of economic relationships for financial liberalization specifications:

For the relation (1) of the first specification, we note that the AKAIKE criterion leads to an optimal delay $p^* = 3$, while the LR criterion leads to an optimal delay $p^* = 2$. We are, therefore, in the presence of a contradiction between these two information criteria, which is often the case in practice. However, according to a principle of parsimony, we must choose the model including the minimum of parameters. Hence, we will choose $p^* = 3$. The results are presented in the following table:

According to Table 2, the AKAIKE test reveals an optimal lag $p^* = 3$, while the LR test at the 5% level indicates an optimal lag $p^* = 1$, for the second specification of the first relationship. By choosing the model that minimizes the parameters, we retain the optimal lag $p^* = 3$.

Table 2: Determination of the optimal number of lags for the model with the endogenous variable LBFIN

Specification (1)
Delay **LogL LR FPE AIC SC HQ**
0 193.984 NA 9.10e-15-12.465-12.138-12.361
1 364.523 **250.124*** 3.02e-18-20.568-17.952-19.731
2 424.329 59.805 2.67e-18-21.288-16.384-19.719
3 538.480 60.880 **2.97e-19*-25.632*-18.439*-23.330***
Spécification (2)
Delay **LogL LR FPE AIC SC HQ**
0 193.984 NA 9.10e-15-12.465-12.138-12.361
1 364.523 **250.124*** 3.02e-18-20.568-17.952-19.731
2 424.329 59.805 2.67e-18-21.288-16.384-19.719
3 538.480 60.880 **2.97e-19*-25.632*-18.439*-23.330***

Source: Author's Calculation

For the first specification relation (2), the AKAIKE criterion indicates an optimal delay $p^* = 3$, while the LR criterion indicates an optimal delay $p^* = 2$. According to the principle of parsimony, we have to choose the model

including the minimum of parameters. So, we will choose $p^* = 3$. Table 3 shows the results for the second specification:

Table 3: Determination of the optimal number of lags for the model with the endogenous variable KOPEN

Specification (1)
Delay **LogL LR FPE AIC SC HQ**
0 267.723 NA 1.17e-16-16.820-16.497-16.715
1 440.472 256.337 4.33e-20-24.804-22.214-23.960
2 528.464 **90.830*** 5.97e-21-27.320-22.463-25.737
3 633.261 60.849 **1.05e-21*-30.920*-23.796*-28.597**
Specification (2)
Delay **LogL LR FPE AIC SC HQ**
0 251.791 NA 5.35e-16-15.299-14.978-15.193

1 437.372 **278.372*** **1.13e-19***-**23.835***-**21.270***-**22.985***					
2 479.598 44.865 2.79e-19-23.412-18.602-21.818					

Source: Author's Calculation

For the second specification, all criteria show an optimal delay p* = 1, while the AKAIKE test minimizes the parameters. Indeed, we retain the optimal delay p* = 1.

4.2.2 Economic analysis of economic relationships for financial development specifications:

To analyze the cointegration relationships of domestic financial liberalization, we identify two specifications: the first measures financial development through private credit, whereas in the second specification, the ratio of ME (a measure of market liquidity) defines domestic financial liberalization.

Table 4: Determination of the optimal number of lags for the endogenous variable (CP)

Specification (1)
Delay **LR FPE AIC SC HQ**
0 NA 1.74e-13-12.353-12.073-12.264
1 301.758 4.05e-18-23.073-**21.112***-22.446
2 **53.800*** 2.58e-18-23.838-20.195-22.672
3 41.082 **1.84e-18***-**25.173***-**19.848***-**23.469***
Specification (2)
Delay **LR FPE AIC SC HQ**
0 NA 2.31e-13-12.070-11.792-11.979
1 346.498 1.33e-18-24.185-**22.242*-**23.551
2 51.536 **9.21e-19***-**25.709***-20.435-**23.990***

Source: Author's Calculation.

We determine the number of co-integration lags from the estimated VAR equations. Based on the results of the first relationship, we find that all the criteria in the first specification indicate an optimal lag p* = 3. Therefore, the optimal number of lags to retain according to the AKAIKE criterion including the minimum of parameters is p* = 3.

Table 5: Determination of the optimal number of lags for the endogenous variable (ME)

Specification (1)
Delay **LR FPE AIC SC HQ**
0 NA 6.01e-18-18.758-18.445-18.674
1 328.879 5.66e-23-31.461-28.841-30.624
2 68.082 2.88e-23-32.716-27.828-31.161
3 **71.584* 7.41e-25***-**38.534***-**31.348***-**36.236***
Specification (2)
Delay **LR FPE AIC SC HQ**
0 NA 1.73e-13-12.530-12.079-12.265
1 301.571 4.04e-18-23.083-**21.112*-**22.451
2 **53.801*** 2.58e-18-23.843-20.195-22.672
3 41.086 **1.81e-18***-**25.172***-19.848-**23.469***

Source: Author's Calculation.

The results indicate in the first specification, all criteria indicate an optimal delay p* = 3. Therefore, the optimal delay number to be retained according to the AKAIKE criterion including the minimum number of parameters is p* = 3. The AKAIKE test of the second specification reveals an optimal lag p* = 3, while the SC test indicates an optimal lag p* = 1. By choosing the model that minimizes the parameters, we retain the optimal lag according to the AKAIKE criterion p* = 3.

4.2.3 Economic analysis of economic relations for trade opening:

The results in the following table show that all the criteria indicate an optimal delay p* = 2. However, the AKAIKE criterion minimizes the parameters. For that, we retain p=2 according to the AIC criterion.

Table 6: Determination of the optimal number of delays for the trade opening relationship

Retard	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	NA	2.61e-17	-15.48	-15.11	-15.36
1	417.37	1.07e-23	-30.32	-26.99	-29.23
2	**112.09***	**5.71e-25***	**-34.20***	**-27.91***	**-32.15***

Source: Author's Calculation

By analyzing the number of delays for the opening model, we distinguish that all the criteria point to an optimal delay p* = 2. As the AKAIKE criterion minimizes the parameters, we retain p=2 according to the AIC criterion.

4.3 Estimation of the SVAR model:

The results of the SVAR model identify different estimates of the structural parameters resulting from the matrices A and B:

Matrix A Matrix B

Matrix A

$$
\begin{bmatrix}
1 & 0 & 0 & 0 & 0 & 0 & 0 \\
-0.07^* & 1 & 0 & 0 & 0 & 0 & 0 \\
0.03^* & 0.14^* & 1 & 0 & 0 & 0 & 0 \\
-0.21^* & -0.13^* & -0.08^* & 1 & 0 & 0 & 0 \\
0.02^* & 0.93^* & -0.11^* & -0.01^* & 1 & 0 & 0 \\
0.68^* & 39.66^* & -1.03^* & 2.36^* & 44.35^* & 1 & 0 \\
-1.68^* & -0.27^* & -3.14^* & -0.01^* & -0.19^* & 0.01^* & 1
\end{bmatrix}
$$

Matrix B

$$
\begin{bmatrix}
0.10^* & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0.04^* & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0.02^* & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0.02^* & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0.01^* & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0.22^* & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0.01^*
\end{bmatrix}
$$

*, **, and *** indicate the 1%, 5%, and 10% level of significance, respectively.

The third row shows that the financial development and the exchange rate positively influence the liberalization of financial flows. The signs of the coefficients in the fourth row are negative. Moreover, the structural shock of opening the capital account worsening the economic growth, leads to uncertainty in the financial market by reducing the inflow of foreign direct investment financing the economy, and slows down the stimulation of international trade. In the fifth row, the vulnerability in financial development induces positive, negative and significant shock effects. In this case, we estimate an asymmetric impact.

In the sixth row we find that the signs of all coefficients are positive (except that economic instability negatively influences the liquidity of the money market). While the coefficients in the seventh row are positive and significant except for the coefficient of foreign direct investment inflows which are negative. Indeed, the vulnerability of trade flows negatively impacts the inflow of FDI for an economy highly dependent on foreign investment financing.

4.4 Impulse responses:

In order to study these changes and their impacts on the South African economy, we will investigate the impulse functions and determine the dynamics of the Central African economy response. To achieve our objective, we used the Eviews 11 software.

4.4.1 Impulse responses for external financial liberalization specifications

In this section we analyze the lessons from the shock response functions of the de facto and de jure financial integration variables.
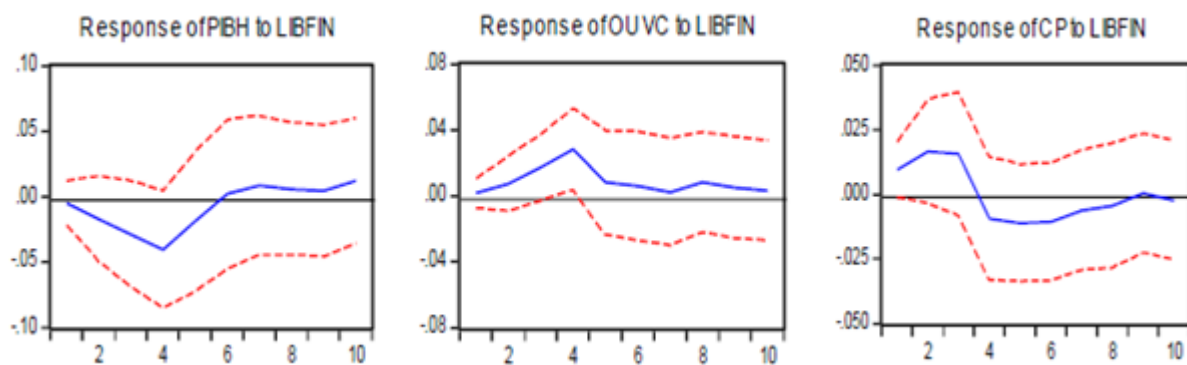

Figure1: Responses of growth (GDPH), trade openness (OUVC) and financial development (CP) variables following a shock to financial flow liberalization

Source: Developed by the author using results from Eviews

Analyzing the response of economic growth (GDPH) to the financial flow shock, the graph shows an early response. The growth rate declines in the first three years as a result of financial flow vulnerabilities. It then increases from the fourth year onwards in response to the improvement in financial flows. This shock leads to an instantaneous drop in gross short-term capital flows following capital flight amplified by non-conservative management. However, it is characterized by a gradual return to equilibrium and becomes positive from the sixth period. In fact, financial openness increased the need for external financing of the South African economy and aggravated the risk of capital outflows, which led to a double deficit: public finance and current account.

The gradual return to balance confirms the main role of capital flows. Indeed, South Africa's financial sectors have experienced a positive trend of flow liberalization as a

result of interest rate liberalization, which has eased financing constraints. The positive return to financial liberalization is explained by both the large number of financial firm's resilience to the stresses of the crisis and the limited level of integration.

However, trade flows (OUVC) show an increase following the liberalization of financial flows. This positive relationship lasts for only three years. Then, trade flows start to decline in the fourth year and return to their initial point in the eighth year. The positive return is explained by the contribution of trade liberalization in reducing the effects of financial repression.

On the other hand, the impact of the shock of financial liberalization leads to a decrease in banking sector development, through the decline of private credit. Actually, we note that the process of international capital movements is unable to maintain the financial system development. A level of financial development can not last longer as it registers a fall from the third year. Thus, external financial liberalization in South Africa remains a source of uncertainty for the development of both financial institutions and monetary policy. The high need for external financing of the South African economy has increased the risk of capital outflows.
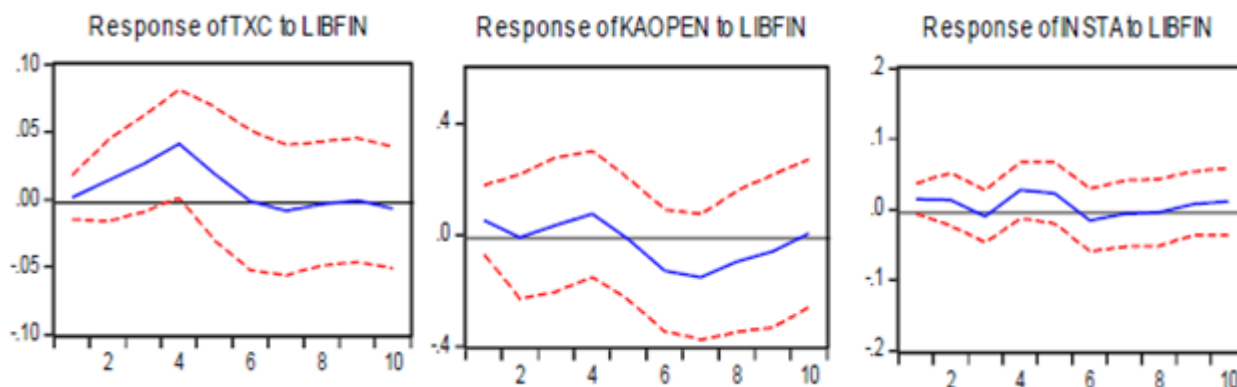

Figure 2: Responses of control variables following a shock to the liberalization of financial flows

Source: Developed by the author using results from Eviews.

As far as economic instability is concerned, as the graph above shows, the impact of shock is relatively weak in the short term, peaking after three periods, before gradually returning to its long-term trend. For its part, massive capital flight aggravates macroeconomic volatility. Nevertheless, the organization of the economic structure and the rescue policies adopted by the South African government allowed the return to equilibrium. The

monetary independence created by prudent economic and financial policies, added to a stable political and economic environment but mainly not fixing rand parity, explains the rapid return to equilibrium.

The graph shows that the impact of the shock on the capital account opening is felt from the first period. Undeniably, the effect between the "de jure" and "de facto" measures of financial openness is positive and significant. At this level, financial flows can play a catalytic role.
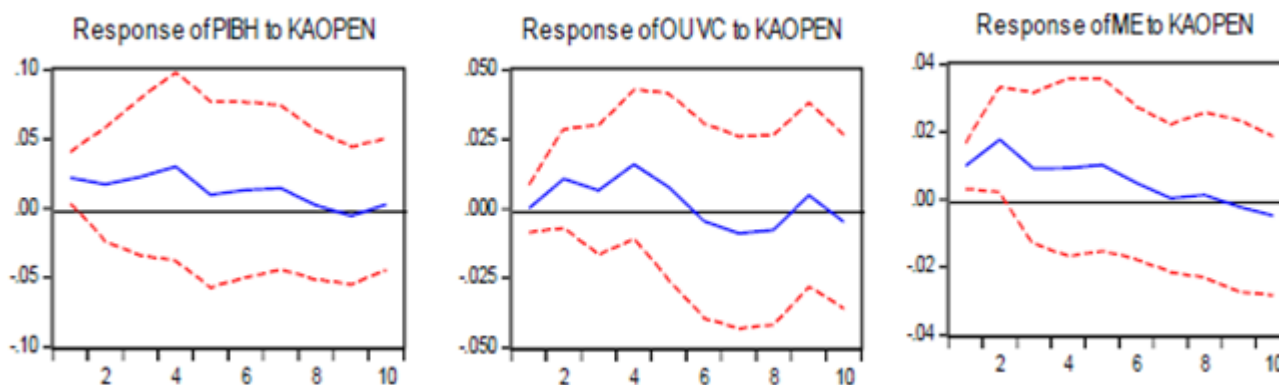

Figure 3: Responses of growth (GDPH), trade openness (OUVC) and financial development (CP) variables to a shock on financial liberalization (KAOPEN)

Source: Developed by the author using results from Eviews.

The above figure analysis of the response of economic growth (GDPH) to the capital account opening shock shows an early variation. The stock market shock may increase financial distress, which impacts growth, despite

the fact that the South African government has an efficient financial market.

The stock market shock leads to a capital flight and a disruption of the financial sector dominated by banks. In this case, the state must intervene with policies to stimulate the investment by encouraging international trade. More explicitly, in the absence of barriers in the financial system, banks must mobilize resources towards exports.
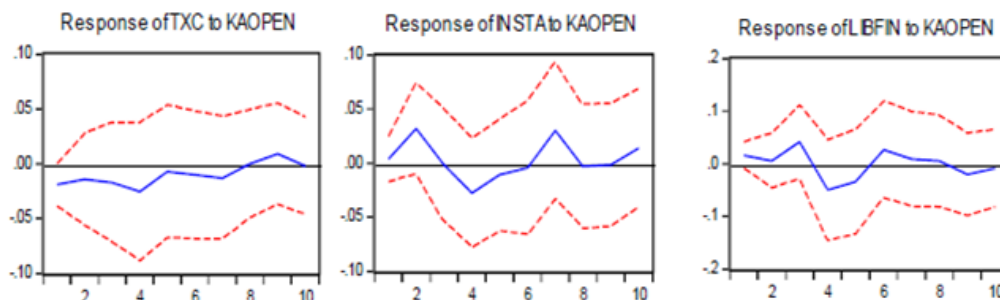

Figure 4: Responses of control variables following a shock to financial liberalization (KAOPEN)

Source: Developed by the author using results from Eviews.

We will examine whether using in our model the exchange rate as an indicator of systematic market risk in the economy. This reflects the behavior of foreign investors in relation to shocks. In general, the shock of opening the capital account aggravates economic and financial policy risks, especially in the presence of a fixed exchange rate regime as well as an unsound and unprudent financial system. From the impulse responses of the TXC exchange rate and financial liberalization, it is clear that the shock of capital account liberalization leads to a decrease in foreign financial flows and slightly impacts the exchange rate, with a rapid return to the initial situation. However, the shock impact on economic instability is worsened at the beginning of the period and reduced from the seventh period onwards to return to equilibrium.

Nonetheless, the international experience has guided South Africa in dealing with these types of shocks. More explicitly, economic performance, prudent and orthodox financial policies, and also the willingness not to fix the exchange rate are likely to promote a sound and efficient financial system added to prudent flow control policies that support potential growth. Thus, economies with more flexible exchange rate regimes and prudent control of financial flows as well as well-regulated banking system fare better than economies with fixed exchange rate regimes.

4.4.2 Impulse responses for internal financial liberalization specifications:

In this section we analyze the responses of the variables following the financial development level.
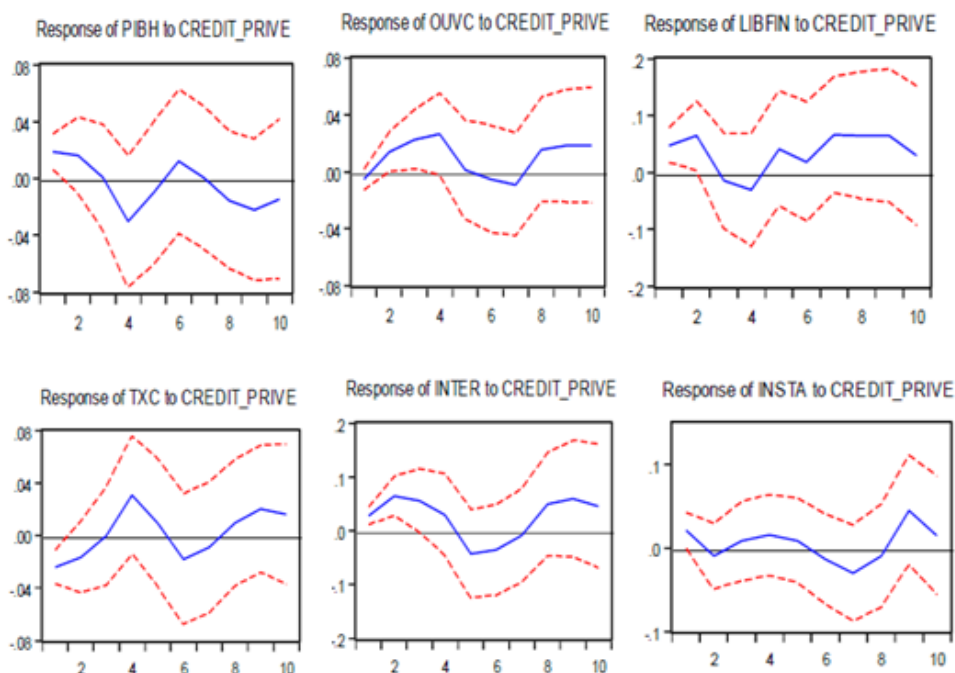

Figure 5: Responses of growth and openness variables following a shock to financial development (CP)

Source: Developed by the author using results from Eviews.

Indeed, the literature on the impact of financial development on growth following crises for emerging countries excludes South Africa which benefits from a sophisticated, efficient and transparent financial system. Financial policies aligned with the recommendations of the Bretton Woods institutions, a sound economy validated by the IMF and good financial sector governance, moderate exchange rate controls, reduced trade costs with neighboring countries, and a very open economy are the determinants of macroeconomic stability facing shocks.

The good governance and stability of the South African economy have allowed it to escape crises and reduce sovereign risk. The macroeconomic structure at the time of the rand crisis in 2001 was organized as follows: domestic savings, growth, very low external deficit, well-controlled inflation and a floating currency. In fact, the currency's slide acted as a catalyst for exports, thus enabling speculative (unnecessary) investments to be chased and productivity to be increased. This good functioning of the state justifies the complementary relationship between the different opening policies. Such a financial liberalization allows the banking system to better allocate domestic savings to exports, which in turn weakens the effect of the shock and boosts economic growth. This positive relationship is justified by good governance and healthy, open economy.
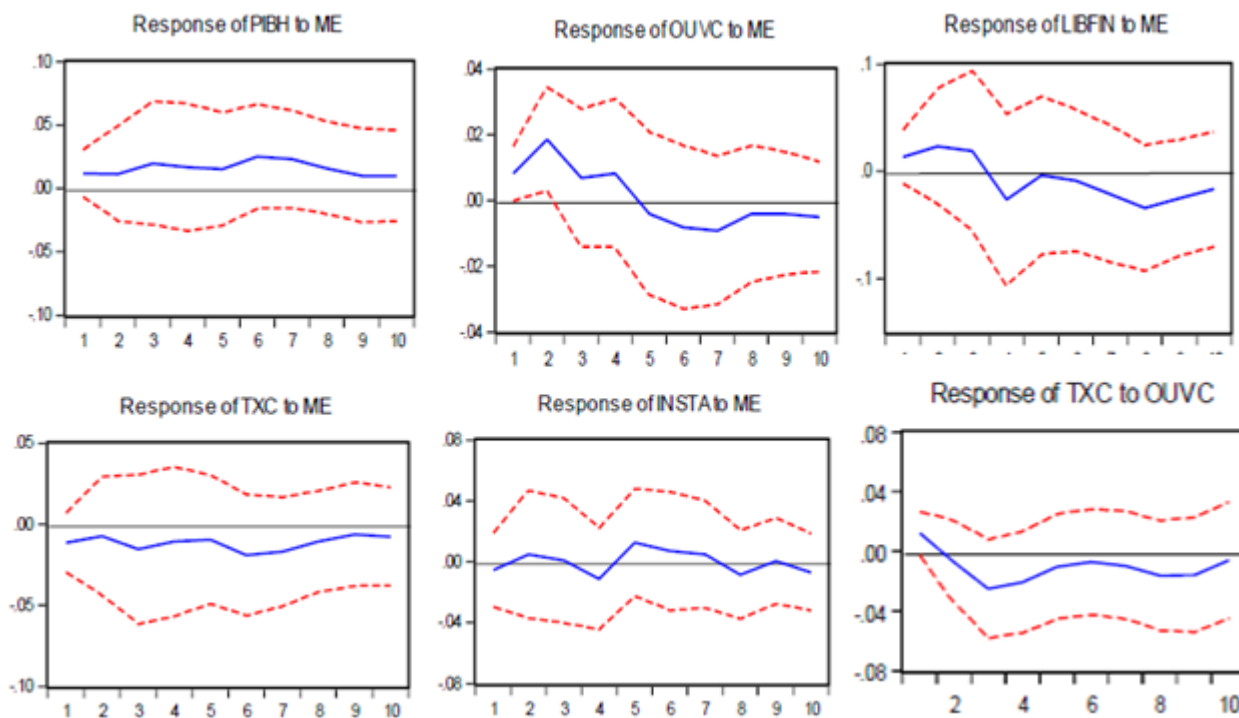

Figure 6: Responses of variables following a shock to financial deepening (ME)

Source: Developed by the author using results from Eviews.

The analysis of the above figure of the variables response to a shock in financial deepening shows the same results as the shock on financial development measured by the CPs, except for trade openness and financial liberalization records an early variation with a return to equilibrium. This fact emphasizes the importance of financial intermediation and the dominant effect of banks on financial markets. Therfore a strictly regulated money market, in complementarity with the commercial opening and an efficient and open financial market constitute the main sources of economy financing. It is also worth mentioning that South Africa has the most advanced financial sector in sub-Saharan Africa and plays an important role in financing economic activity. However, the South African economy is quite dependent on foreign investment because of the low savings rate. In this manner, liquidity disruptions exacerbate the savings rate, undermining export financing and leading to an outflow of financial flows. However, the economic and financial performance and the floating exchange rate regime facilitate the return to equilibrium in a very open economy.

4.4.3 Impulse responses for the trade openness model:

We present in the following figure the responses following the trade shocks.
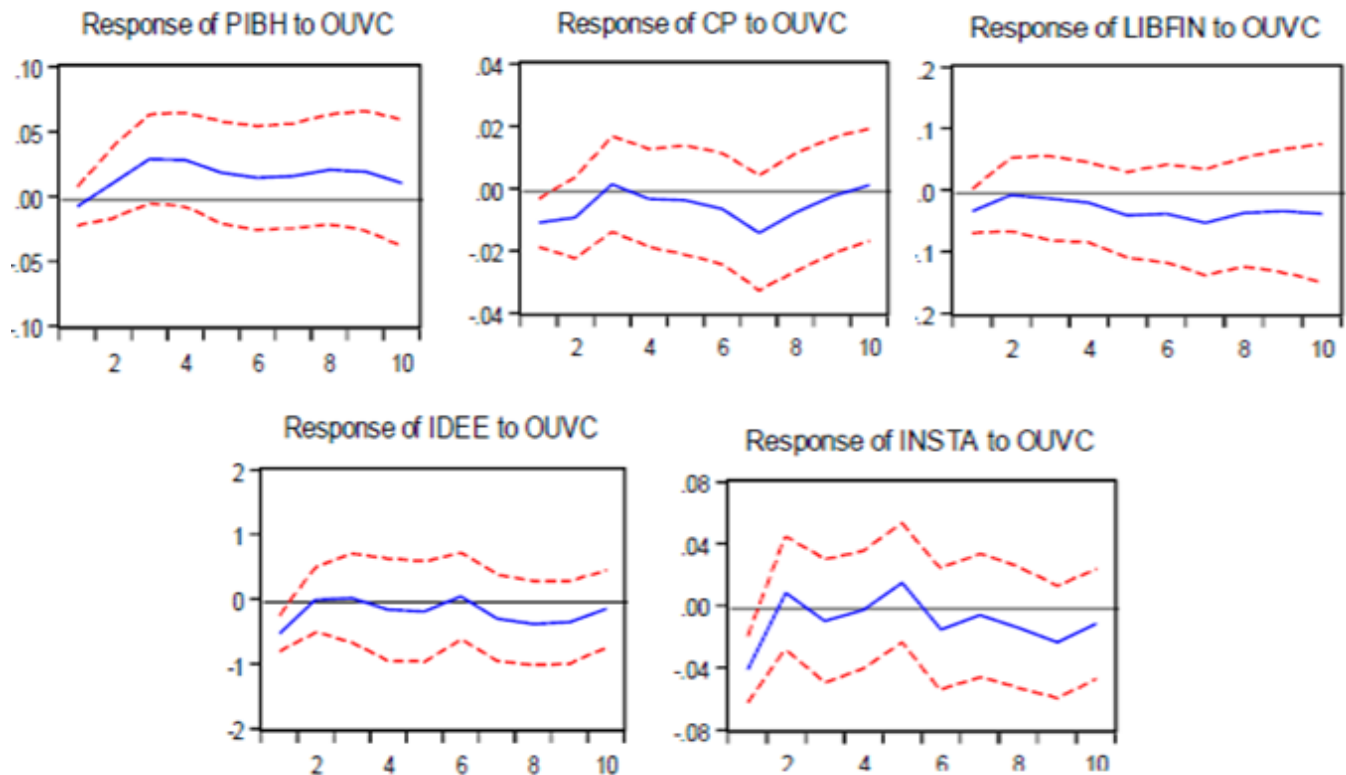
Figure 7: Responses of variables to a shock on trade liberalization

Source: Developed by the author using results from Eviews.

The economic growth responses of the South African state show early variations in the first four years. By the fifth period, innovations in trade positively influence economic growth. This confirms the dynamics of this economy in globalization. Absolutely, South Africa is increasingly integrated into the world economy through the export of natural resources and trade agreements with neighboring countries and Europe. Actually, the recovery from vulnerability is due to the fiscal buffer. However, the trade shock translates into a decline in global demand and growth cannot compensate for the persistent weakness of this demand. Therefore, the government must manage prudently.

In addition, vulnerable trade flows aggravate financial flows and encourage capital outflows. In fact, exports reduce unnecessary investment and help attract risk-averse investors. Thus, the shock of trade liberalization is a main source of uncertainty in the financial sector for a country that depends heavily on foreign direct investment financing. This analysis confirms the fluctuations in foreign direct investment (FDI) when facing the trade shock.

For financial development through private credit, as the graph above shows, the impact of a financial shock is instantly negative and reaches its maximum level in the fourth period. It is clear that its effect has the expected depressive issue on export-oriented investment and increases uncertainty in the financial sector although maintaining a flexible exchange rate regime reduces vulnerability.

South Africa's economy is the most open of the sub-Saharan economies and taking advantage of this global integration plus coping with shocks requires good governance and simulated investment by encouraging international trade. In fact, trade, monetary, and investment policies must be consistent in order to promote international trade and simulate long-term growth potential.

4.5 Analysis of variance decomposition:

This analysis step allows us to identify the variance of the forecast error of the variables to its own innovations. By analyzing macroeconomic vulnerability to shocks following policies of openness to the world market, we identify the distribution of forecast errors of an openness variable on the other ones.

4.5.1 The variance decomposition analysis of capital liberalization:

Table 8: The variance decomposition of capital flows (LIBFIN)

Specification (1)						
Period	LIBFIN	PIBH	OUVC	CP	TXC	KAOPEN	INSTA
1	100	0	0	0	0	0	0
5	47.52	10.76	2.28	17.15	14.46	6.45	1.35
10	38.79	10.16	7.45	14.77	15.36	12.35	1.09
Specification (2)						
Period	LIBFIN	PIBH	OUVC	CP	TXC	KAOPEN	INTER
1	100	0	0	0	0	0	0
5	35.91	20.42	5.02	5.61	20.55	12.25	0.26
10	29.01	18.97	7.48	5.96	23.4	14.63	0.52

Source: Developed by the author using results from Eviews.

The results relating to the study of the variance decomposition for the two variables of growth and trade openness correspond to the results of the impulsive responses. In an economic environment characterized by economic stability and a policy of simultaneous opening of the financial and real spheres, the construction of the variation of liberalization of financial flows (LIBFIN) is represented by its innovations with a percentage of 100%. This translates that financial instability is due to external shock (crisis) and not to instability or economic failure. In the tenth period, its share in the variation is reduced in favor of other variables. In the second position, we find the exchange rate with a rate of 23.40% (flexible exchange rate regime) then, the economic growth (the performance of the economic structure) at a rate of 18.97% occupying the third position. In fourth and fifth place we find respectively trade openness (OUVC) and financial development (CP). These results highlight the importance of a flexible exchange rate regime and the performance of the economic structure to reduce the capital account shocks effect.

However, in the presence of economic instability (specification 1), the construction of the variation of financial liberalization (LIBFIN) is represented by the exchange rate innovations at 15.36%, financial development at 14.77% and the opening of the capital account (KAOPEN) at 12.35%. Economic growth accounts for 10% of KAOPEN innovation. These results confirm the catalytic role of a flexible exchange rate regime and the performance of the financial market in reducing the shock.

Comparing the two specifications, we notice that the most sensitive aggregates to the financial shock for the first specification (KAOPEN, TXC and CP) do not correspond to the same most sensitive aggregates for the second specification (TXC, GDPH, Kaopen), even the innovation rates are different, which confirms an asymmetry.

Overall, we find that the results of the variance decomposition align with the impulse responses. So, the liberalization of financial flows is more influenced by prudent and orthodox financial policies and the nature of the exchange rate regime. Then, the recovery is driven by the performance of economic structure and trade openness, which in turn dampens the size of the shock.

Table 9: The variance decomposition of capital flows (KAOPEN)

Specification (1)						
Period	KAOPEN	PIBH	OUVC	TXC	ME	LIBFIN	INSTA
1	100	0	0	0	0	0	0
5	75.77	3.58	13.14	4.72	1.58	0.18	1.07
10	53.41	7.16	16.86	17.01	2.26	1.81	1.53
Specification (2)						
Period	KAOPEN	PIBH	OUVC	TXC	ME	LIBFIN	INTER
1	100	0	0	0	0	0	0
5	47.53	10.14	13.41	5.91	16.29	0.56	6.22
10	40.22	9.56	19.93	8.72	12.04	2.09	7.45

Source: Developed by the author using results from Eviews.

Analyzing the relationship between the two financial and trade openings, 19.93 % of the forecast error variance of KAOPEN is due to innovations in trade liberalization and 12.04 % to innovations in financial development (FD), in a stable economic environment. Assuming that the authorities adopt the policy of simultaneous opening (OUVC and KAOPEN), the forecast error variance of KAOPEN is presented in third position at a 9.56% rate of economic growth and in fourth position by the policy of simultaneous opening at a rate of 7.45%. In fact, these results emphasize the importance of sequencing financial openness and trade liberalization policies. However, in an unstable macroeconomic environment, the variance of the KAOPEN forecast error is presented mainly by the exchange rate, trade openness and economic growth at rates of 17.01%, 16.86% and 7.16% respectively.

At the fifth period level, the first specification shows that the most influential variable is only trade openness. At the tenth period level, the most influenced variables are

economic growth, trade openness and exchange rate. Thus, it is an asymmetric impact.

Indeed, in an international environment characterized by the vulnerability of capital movements, the sources of external financing impact macroeconomic instability and block the policy of combining the autonomy of monetary policy and exchange rate stability. Therefore, the financial opening requires monetary policy consolidating and financial system strengthening, a prudential management and an efficient economic structure. Accordingly, the process of opening the capital account in South Africa maintains the long-term interdependence of economic performance factors, namely, on the entry of foreign direct investment and economic growth.

4.5.2 Analysis of the variance decomposition of financial development:

Table 10: The variance decomposition of financial development CP

Specification (1)						
Periode	CP	PIBH	OUVC	LIBFIN	TXC	INTER	INSTA
1	100	0	0	0	0	0	0
5	72.67	1.58	5.45	11.76	1.98	2.91	3.62
10	62.56	4.08	13.36	8.85	3.49	3.84	3.8

Specification (2)					
Period	ME	PIBH	OUVC	LIBFIN	TXC	INSTA
1	100	0	0	0	0	0
5	70.72	17.44	2.92	2.75	4.72	1.41
10	53.56	18.96	4.94	14.7	6.15	1.65

Source: Developed by the author using results from Eviews.

In the first period, the construction of the variation of the financial development (CP) is represented by its innovations with a percentage of 100%. In the fifth period, the financial flows liberalization explains the private credits variations with 11.76%. These results are in line with the results of the impulse responses confirming that the financial liberalization allows the banking system to better allocate savings. During the tenth period, the variations in private credits are explained in second position by trade opening with a rate of 13.36%, then financial liberalization with a rate of 8.85% and in fourth and fifth position we find respectively the economic growth and the exchange rate.

The results of financial development in the presence of economic instability (specification 2) show that economic growth explains the variations of the liquidity ratio with 17.44% increasing in the tenth period to reach 19.96%. This emphasizes the significant role of South Africa economic structure. The contribution of the liberalization of financial flows in third position with a rate of 14.70% and the fourth and fifth position are respectively the exchange rate and trade liberalization (OUVC). These results are consistent with those of the impulse response.

Table 11: The variance decomposition of financial development ME

Specification (1)					
Period	ME	PIBH	OUVC	LIBFIN	TXC	INSTA
1	100	0	0	0	0	0
5	70.73	17.44	2.93	2.75	4.73	1.41
10	53.56	18.97	4.95	14.71	6.15	1.66

Specification (2)					
Period	ME	PIBH	OUVC	LIBFIN	TXC	INTER
1	100	0	0	0	0	0
5	70.72	13.43	7.61	2.41	3.63	1.94
10	55.18	16.76	9.43	3.38	11.91	3.34

Source: Developed by the author using results from Eviews.

During the first period, the variation construction of the liquidity ratio (ME) is represented by its innovations with a percentage of 100%. In the presence of economic instability, the variance of the forecast error of ME is due to 18.97% to the innovations of economic growth and 14.71% to the liberalization of financial flows. While in a stable environment and in the presence of policy consolidation of financial liberalization and trade openness, the variance of the ME forecast error is presented in the first place to innovations in economic growth (16.76%), in the second place to innovations in the exchange rate (11.91%) and in the third place to innovations in trade openness (9.43%).

At the level of the fifth period, the most influenced variable is economic growth, whereas at the level of the tenth period, the most influenced variables become growth, exchange rate and trade openness, thus marking an asymmetry.

In conclusion, the vulnerability of the financial development shock is offset by the efficient financial

policies (aligned with the recommendations of the Bretton Woods institutions), a sound economy, prudent financial sector management and a flexible exchange rate regime that encourages international trade.

4.5.3 The variance decomposition analysis of trade globalization:

The results for the study of the variance decomposition of trade openness for the two relationships are presented below:

Table 12: The variance decomposition of trade openness

Period	OUVC	PIBH	POP	LIBFIN	TXC	IDEE	CP
1	100	0	0	0	0	0	0
5	70.97	1.87	12.77	18.62	4.37	1.21	10
10	44.25	7.13	13.13	14.13	6.01	1.76	10.01

Source: Developed by the author using results from Eviews.

The above table shows that the contribution of financial liberalization to the change in trade openness is greater than the contribution of financial development. The fourth and fifth positions are reserved for economic growth and exchange rate, respectively.

Overall, we note that the variance decomposition results align with the impulse responses, as the South African economy is very open, making it very vulnerable to shocks. Recovery requires good governance, stimulating investment and encouraging international trade. In fact, trade and financial policies need to be coherent in order to promote international trade, cope with shocks, and simulate long-term growth potential.

We note that the effects of trade openness shock in the fifth period do not correspond to those in the tenth period. The most influenced variables for the fifth period are LIBFIN, POP and CP while in the tenth period the most influenced ones are LIBFIN, TXC, CP, GDPH and TXC. Therefore, this is an asymmetry.

Referring to international experiences and OECD recommendations[4], South Africa needs to consolidate certain policies, namely, external financial liberalization and investment attractiveness; developing financial sector, improving access to export credits and credit insurance; adopting anti-deflationary monetary policies; opening trade policy; improving economic performance, promoting potential growth, reducing regulatory and financial restrictions; strengthening the performance of the long-term economic structure and developing the business climate.

5. Conclusion

This paper examines the asymmetric relationship between financial liberalization policy shocks, financial development, trade liberalization and some macroeconomic aggregates in South Africa. To do so, we perform a structural VAR estimation. The results show that volatility in international markets implies lower capital inflows. As a result, the South African economy is highly dependent on foreign investment financing. Liquidity disruptions reduce the relatively low savings rate and weaken the rand. Thus, a highly regulated money

market and prudent management are needed to weaken the magnitude of the shock.

Impulse response functions show that financial shock causes the expected depressive effect on export-oriented investment and increases uncertainty in the financial sector. Still, maintaining a flexible exchange rate regime and depreciating the currency allow for recovery. The South African economy is very open, making it vulnerable to international market disruptions. Our empirical results contrast with the literature that proves the weak impact of the exchange rate on economic activity in times of crisis, and also align with the empirical evidence of Aghion, P., Bacchetta, P., Rancière, R., & Rogoff, K. (2005) highlighting the positive impact of the exchange rate on economic growth and the strengthening of financial markets. However, this result is not always valid in an unstable economic environment.

Moreover, good governance is needed to deal with shocks, investment must be simulated by encouraging international trade, and the complementarity between the opening and development of the financial sphere as well as the liberalization of trade flows must be taken into account. In fact, trade policies, monetary policies and investment policies must be coherent in order to promote international trade and simulate potential long-term growth. Finally, from this perspective, increased transparency in trade, credit liberalization and capital flows can modify the macroeconomic equilibrium by strengthening capacities in trade policy formulation, negotiation and implementation.

Nevertheless, trade openness alone would not promote financial development because markets are likely to try satisfying their increased need for supporting through financial repression. On the other hand, opening up the capital account alone is unlikely to foster competition in the product market. As a result, domestic investors will not need more financing. Moreover, domestic small businesses will not be able to tap into international one. This view clearly explains the link between trade, capital flows and financial development.

Furthermore, it should be noted that the volume of trade is primarily determined by the economic and financial structure; the degree of exposure can be measured by the value of overall trade openness, predicted by its main

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[4] OECD Economic Surveys: South Africa 2020

determinants (income and population levels and trade policy).

In conclusion, the economic vulnerability associated with trade openness (exposure and shocks) can be mitigated by the appropriate economic and financial policies effectiveness. However, the presence of foreign capital in a country may entail other risks, and in this case, there is a need for transparent and appropriate management, both at the levels of financial sectors and macroeconomic. The advantage of open policies and good governance in this case is to restore economic balances more quickly.

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