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The Effect of Financial Market Capitalisation on Economic Growth and Unemployment in South Africa

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Abstract: The dynamic impact of financial market capitalisation on South Africa's unemployment and economic growth is empirically explored in this study using the finance-augmented Solow model framework. South Africa's high rate of structural unemployment and its robust financial market, which is at the same standard as those in countries with advanced economies, served as the driving force for the study. Evidence for the dynamic link is presented by a time series analysis that employed the VECM model. South Africa continues to face persistent macroeconomic issues, including stagnant economic growth, declining investment, and rising unemployment. Market capitalisation, net acquisition of financial assets, and foreign direct investment all have a favourable and substantial effect on economic growth. According to VECM estimation results, unemployment has a detrimental effect on economic growth. Also, market capitalisation has significant positive effects on economic growth. Unemployment and economic growth are inversely related, thus unemployment has an adverse effect on economic growth. According to the findings, financial markets have distinct effects on economic growth because of their various functions within the economy. It was also shown that foreign direct investment has a crucial role in increasing economic growth. This implies the important role that the financial market and systems have in South Africa's economic growth. The article advises authorities to keep enacting measures to boost capital market growth to increase employment, while also making sure that other structural issues affecting the labour market are effectively addressed to stimulate job creation.

Keywords: financial markets; economic growth; market capitalisation; Granger causality

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1. Introduction

Numerous studies have investigated the relationship between financial depth and economic growth in recent years; however, there is a paucity of research in developing countries with growing financial markets or industry and the effect these markets have on unemployment and economic growth. In recent years, the financial sector in developing nations has grown significantly, with many of these nations undergoing financial liberalisation and deregulation (Popov, 2018; Mabeba, 2024).

One of the main concerns of global economies is thought to be unemployment. Unemployment was at 5.7% of the world's labour force, according to a 2017 ILO estimate. However, South Africa is especially affected by this severe problem, and the country's economy needs steady growth in order to quickly lower the high unemployment rate. The Quarterly Labour Force Survey 2019 revealed that South Africa's unemployment rate in 2019 Q2 was 29.0%, meaning that it increased by 1.4% from 2019 Q1. Additionally,

6.7 million South Africans between the ages of 15 and 64 were unemployed, according to the survey. Of those who were unemployed, 57% had a level of education below the metric, 33.4% had a level of education above the metric, 2.2% had a university degree, and 6.9% had finished tertiary education. The remaining 0.5% were unemployed with a higher level of education. According to these figures, for the past 20 years, the unemployment rate for the educated youth has been steadily rising (Khalid et al., 2021).

Several studies found that as financial development expanded, economic growth decreased. This nonlinear association was shown by an inverted U-shape or Kuznets curve (Cecchetti & Kharroubi, 2012; Shaddady, 2023). This tendency has been attributed to inefficiencies in the derivative market, which impede the normative direction of financial flow (Law & Singh, 2014; Arcand et al., 2015; Shaddady, 2023). Thus, the "financial curse", or the notion that "too much finance harms growth", could result from excessive liquidity in the absence of proper regulation and oversight (Samargandi et al., 2015). Additionally, (Aghion et al., 2005; Shaddady, 2023) contended that the nonlinearity in the relationship between financial development and growth may be a constraint on the influence on economic growth.

Akyüz (2012) states that a particularly large financial sector should be expected to cause economic growth to stagnate. Economic growth, policies, financial systems, institutions, cultures, and legal systems vary throughout nations. Developed nations have better public policies and structures to create a favourable atmosphere. Nonetheless, it is anticipated that developed nations will often have advanced financial markets. Economists are interested in how the expansion of the financial sector explains the rise in economic growth; this study will examine how financial market expansion affects unemployment and economic growth.

Government decision-making is influenced by both foreign and domestic financial capital. The economy of South Africa is heavily indebted and has adopted financial neoliberalism and limited government intervention. The economy is susceptible to the financial sector as it accounts for a larger portion of the economy (Fedderke, 2021; Mabeba, 2023). There is a robust financial market system in South Africa, which drives financial intermediation. The foreign currency market, commodities market, money market, bond market, and equities market make up the South African financial market (Kapingura, 2013).

Prior to 1994, the economy's financial market sector was concentrated in particular sectors. A significant amount of financialisation was invested in the mining sector (Southall, 1981). Markets were exclusive and it was an extractive economy devoid of democratic procedures. A group dedicated to apartheid ruled the nation. The international community's sanctions on the apartheid government caused the country's minority economic beneficiaries to stockpile capital. There was a lot of concentration in the financial markets. More than half of all the companies listed on the formal stock market in South Africa were owned by one large private company. The main sectors of the South African economy were wholesale, manufacturing, mining, and finance. Out of these four, the finance industry's market share was smaller from 1960 to 1987. The finance sector held the greatest market share in the economy from 2003 to 2021. In the 1960s, the financial industry contributed 10% of GDP; by 2008, it had increased to 22% of GDP; by 2020, it was 20% of GDP (Mabeba, 2023).

South Africa's financial services sector was allowed to re-join the international financial system when the nation adopted democracy in 1994. A democratic constitution created a financial framework that allowed those with money to engage in the provision of financial services. Only a small number of new market participants were able to gain from having access to significant capital and buying unbundled equities. In a nation where economic inequality was already quite high, this made it even worse, South Africa is currently the most unequal country on the planet (Karwowski et al., 2018). Throughout the 1970s and 1980s, the South African economy's expansion was heavily reliant on the export of mineral

resources. In recent times, the industrial and mining sectors have increasingly diminished in importance. Manufacturing had been the top industry since 1960 but prior to the year 2002 (Karwowski & Stockhammer, 2017).

According to Chirila et al. (2015) and Hlongwane and Sheefeni (2023) the tightening of the US quantitative easing program in 2013 caused capital inflows into financial markets in developing market economies, such as Brazil, India, South Africa, and Indonesia. This reversal of the unconventional monetary policy meant to boost market liquidity. The previous policy actions also led to exchange rate depreciation and instability in the US financial markets.

The results of this investigation will help policymakers make decisions that aim to expand the financial market industry and advance the economy. The study is important in and of itself in terms of the breadth of the financial system and will add to the expanding body of information about financial markets in emerging economies like South Africa. The data acquired for this project will also ascertain the impact of financial markets on economic growth, as there is currently little research in this field in the South African context.

Contrary to related research like that of Alfaro et al. (2004), Arestis et al. (2001), and Calderón and Liu (2003), which concentrated more on the connection between market interactions and financial stability and economic growth, this study is motivated by the fact that previous research on the financial market factors influencing economic growth focused mostly on developed countries, giving developing economies minimal attention in the process. The aim of the study is to investigate the relationship between financial market profitability, unemployment and economic growth in South Africa. It also seeks to ascertain the degree to which financial market profitability affects unemployment and economic growth in the long run and to offer empirical guidance for fostering sustainable economic growth within the financial market. Specifically, we employ the VECM model to conduct the empirical analysis. This study's initial hypothesis (H1) holds that financial market capitalisation has no influence on economic growth. The second hypothesis (H2) suggests that financialisation has a significant impact on economic growth and unemployment.

2. Literature Review

Economic theory's history informs the development of financial markets and economic expansion. When considering the many schools of economic thinking, the Classics, Neo-Classics, and Monetarists all held that the financial markets were a means of mobilising capital and that the market mechanism was used to distribute that capital among productive endeavours. Monetarists hold that the banking system should regulate the money supply in order to manage production. This is demonstrated by the part banks play in lending to the private sector, the way the central bank coordinates with them, and the authority central banks exert across an economy's liquidity (King & Levine, 1993b). The Keynesians distinguished between financial markets and investment, attributing their nature and magnitude to "animal spirits". It is evident that the Classical school established the financial framework for the establishment of mechanisms of the financial market that impact investment and savings in the economy (Wait et al., 2017).

The findings of studies on the relationship between the financial market and economic growth demonstrate that, from the standpoint of theoretical analysis, there is a 1connection between the capital market and economic growth (Didier et al., 2021). Regarding the verification of the possible relationship between capital markets and economic growth, a number of theoretical presumptions may be identified (Zhao, 2019). According to Q-Tobin W. Brainard's expanded hypothesis, positive stock market circumstances have an impact on the rise in investment levels. The authors exploit the causation brought about by rising share prices to support their chosen approach (Brainard & Tobin, 1968).

The premise that financial advancement facilitates economic growth was first put forth by Schumpeter in 1911 (Schumpeter, 1912). Authors like Goldsmith et al. (1969), McKinnon (1973), and Shaw (1973), among others, emphasised the necessity of this idea. Opinions that oppose the idea that financial development and economic growth are related include the demand-following argument, which holds that financial development is seen as a catalyst for economic development but ignores the need for financial services in a developing economy. The real economy's expansion contributes to the smoothing of the financial economy's growth. The feedback hypothesis, on the other hand, contends that the different stages of economic development have a significant influence on the bidirectional relationship between financial development and economic growth (Khetsi & Mongale, 2015).

There has been much research carried out so far on the relationship between financial markets and unemployment; of those that have been completed, there have been mixed findings. There are many studies that have empirically looked at how financial development, in general, especially stock market development affects both unemployment and economic growth. Instead, stability, rather than the financial system's pure development is often the focus of the vast majority of these studies on labour dynamics. In this study, we take a close look at how financial market profitability affects unemployment and economic growth.

Prochniak and Wasiak (2017) collected data from 34 OECD countries and 28 EU countries from 1993 to 2013 to examine the relationship between financial stability and development and economic growth. Their findings validated three theories: the empirical model's inclusion of a crisis period offers fresh perspective on the relationship between the financial system and economic growth. (i) There is a nonlinear relationship between financial development and economic growth; (ii) an excessively large financial system does not promote economic growth and may even have the opposite effect.

According to Bolbol et al. (2005), who conducted an assessment into the implications of financial markets (as determined by the ratio of market capitalisation on GDP and the turnover ratio) on total factor output and growth (the per capita GDP growth rate) in Egypt (1974–2002), the study's findings indicated that a robust capital market positively impacted factor productivity and growth. Three methods were used in a study by Minier (2003) and Khetsi and Mongale (2015) to examine the impact of the stock market dimension on economic development. It was shown that, in terms of turnover, the beneficial effects of stock market development on economic growth were only feasible for mature stock markets; in the case of underdeveloped stock markets, the influence was negative.

Shravani and Sharma (2020) examined the correlation between a few indicators of the Indian Stock Exchange and the industrial output index, taking into account the years 1996–1997 through 2015–2016. They employed a vector error correction model and an autoregressive distributed lag estimator to determine the long-term association. Economic development and the stock market have a long-term association, according to the study. For the purpose of allowing more firms to participate in the stock exchange, Indian lawmakers are suggesting reducing the listing criteria.

According to Nyasha et al. (2021), there were positive results found regarding the relationship between financial development and unemployment. Chen et al. (2021) use data from 97 OECD and non-OECD countries for the years 1991–2015 to examine whether excessive finance has a negative impact on unemployment. They reported three unique findings using the GMM estimate approach. First, they discovered that excessive financing reduces unemployment, particularly in nations with more inflexible labour markets. Second, they found that market-oriented financial systems that are either too small or too centrally located exacerbate unemployment. Third, they demonstrated that excessive

lending to private businesses exacerbates unemployment, especially in nations with more inflexible labour markets.

Using a panel data model, Ayadi et al. (2015) investigated the relationship between financial development and economic growth in the Mediterranean region between 1985 and 2009. Financial development was measured using bank deposits, credit to the private sector, stock market value as a percentage of GDP, and stock market turnover. According to empirical findings, bank deposits and private sector credit are inversely correlated with economic growth, although stock market capitalisation and turnover are positively correlated with economic growth. All in all, the findings from these empirical studies show conflicting results and provide the grounds for further inquiry.

3. Data and Methodology

3.1. Data

The study employed annual data for South Africa. Secondary data was collected from World Bank Development indicators and the South African Reserve Bank. The data was collected annually between 1990 to 2023 (refer to Table 1). Table 1 shows the variables used in the study, the abbreviations used, and the source of the series.

Table 1. Variable description.

Variables	Abreviation	Data Source
Gross domestic product per capita	GDP	World Bank
Market capitalisation	*MCAP*	World Bank
Unemployment	UNEM	South African Reserve Bank
Net acquisition of financial assets	NAT	World Bank
Foreign direct investment	*FDI*	World Bank

3.2. Model Specification

One of the most widely utilised models for conceptualising economic growth is the Solow growth model (Solow, 1956). To increase our knowledge of economic growth and help guide policy decisions, economists are always evaluating and optimising growth frameworks. We incorporate the financial variable as a source of growth not covered by the fundamental Solow model using this approach (Mabeba, 2024).

As stated by Cooray (2009), the finance-augmented Solow model can investigate the relationship between changes in financial conditions, such as enhancements in financial markets and institutions, and economic growth by incorporating financial elements. It acknowledges that the effects of capital accumulation and technical advancement on economic growth can be amplified or attenuated by financial considerations. The foundation for analysing the relationship between finance and economic growth is provided by the finance-augmented Solow model, which recognises the significance of financial considerations in determining long-term economic outcomes.

Through the application of growth accounting and the decomposition of economic growth determinants, Solow (1956) was able to provide insight into the extent to which a nation's determinants account for its economic growth. The aggregate production function that the Solow model uses is expressed in general form in Equation (1). It has been determined that this framework, which is quite frugal, ought to be enlarged to incorporate additional development sources. To address this shortcoming, Mankiw et al. (1992) included human capital into the framework to take into consideration the combined contributions of the workers' work experience, education, and skills. Equation (2) shows the enlarged version of Equation (1).

The finance-augmented Solow model framework makes use of the Cobb-Douglas production function, which postulates that labour, capital, and total factor productivity are the functions that determine total output (Cobb & Douglas, 1928). For the first time, the financial component was explicitly included to the original Solow model (Equation (3)) by Atje and Jovanovic (1993), demonstrating the role of finance in the expansion of economic growth. The Solow model with an addition for finance was then used by other researchers (Cooray, 2009, 2010; Haibo et al., 2023). Some researchers in the past (King & Levine, 1993a; Levine & Zervos, 1998; Zhou & Dev, 2020) inadvertently included the finance-augmented Solow growth model. Thus, by applying this approach, we can demonstrate how the depth of the financial market influences the rate of economic growth directly.

$$Y(t) = K(t)^{\alpha}[A(t)[A(t)L(t)]^{1-\alpha},\ 0 < \alpha > 1 \tag{1}$$

$$Y(t) = K(t)^{\alpha}H(t)^{\beta}[A(t)L(t)]^{1-\alpha-\beta}\ 1 >, \alpha, \beta < 1,\ \alpha + \beta < 1 \tag{2}$$

$$Y(t) = F(t)^{\alpha}K(t)^{\beta}H(t)^{\gamma}[A(t)L(t)]^{1-\alpha-\beta}\ 1 >, \alpha, \beta, \gamma < 1,\ \alpha + \beta + \gamma < 1 \tag{3}$$

Economic growth is represented by Y, financial market profitability is represented by F, while K is capital and H is human capital, L is labour force. Elasticity of economic growth is α, in terms of financial capital, while β is economic growth with respect to physical capital and γ represents economic growth with respect to human capital. Financial, physical, and human capital are the three types of capital that are expressed in Equation (3). The following can be used to specify the linear–logarithmic regression model:

$$lnGDP = \beta_0 + \beta_{mcap} lmcap + \beta_{nat} lnat + \beta_{fdi} lfdi + \beta_{unem} unemp + \varepsilon_t \tag{4}$$

where $LGDP$ represents gross domestic product; β_0 represents intercept coefficient; $lmcap$ represents market capitalisation; nat is net acquisition of assets; $unemp$ represents unemployment; ε_t represents disturbance or error term.

3.3. Estimation Technique

VECM is a very helpful tool for estimating the long-term impact of the time series data as well as the short-term effects of both variables (Usman et al., 2017). A particular kind of VAR model called the VECM was created especially to identify and characterize the existence of co-integration across variables. Engle and Granger (1987) established the concept of co-integration and error correction. Then, in 1990, Johansen joined forces with Juselius to develop the notion of the VECM model (Farida et al., 2024). This study adopts the VECM technique to estimate the relationship between capital market development and economic growth. We follow the standard procedure as detailed below.

3.3.1. Unit Root Test

Checking for the stationarity property of the variables under investigation is the first stage in the time-series analysis process. Because a model's statistics, such as correlations and averages, will not accurately indicate whether the model is acceptable in the presence of a unit root, this time series attribute is crucial to the creation of a VAR analysis. Simple VAR models are only used in cases when the variables being studied have integrated values of order one, or I(0). In the case where all variables are non-stationery but integrated of order one, the VECM technique can be implemented. To find out if any of the variables in our study include unit roots, we apply the augmented Dickey–Fuller (ADF) test (Dickey & Fuller, 1981). In the ADF test, the series is a non-stationary process, according to the null hypothesis (H_0), and it is stationary when level, according to the alternative hypothesis (H_1). H0 is rejected, indicating the series is stationary, if the ADF test statistic is lower than

the crucial *t*-test value. As there is no transformation required in this instance to obtain stationarity, the analysis can move on to the next stage, which is determining the proper lag length for the model.

3.3.2. Lag Structure Selection

To determine which lagged values in a time-series setting will be used as predictors in VAR (p) specifications, lag specification criteria are introduced. Using very short lags (p) can result in autocorrelated error terms, as Lütkepohl (2005) reported. As a result, the suggested econometric model may not be well described since the residuals might not meet the requirements for white-noise error terms. Conversely, a significant number of lags (p) will result in the loss of many degrees of freedom (d.f). The VAR system's mean-square-forecast errors will increase when too many lags are included since this leads to over-fitting, or the over-parameterised model. Because of this, when considering stationary variables in VAR models, the number of lags should be sufficient for the residuals to generate distinct white noise.

Fitting general VAR (p) models with varying lag lengths (e.g., p = 0, 1, 2, 3, …, *pmax*) is the optimal method. Then, choose the lag order value that best meets the model selection requirements. Several statistics are used, such as the Schwarz information criterion (SIC), the Hannan–Quinn criterion (HQ), and the Akaike information criterion (AIC), as recommended by Vrieze (2012). Lütkepohl (2005) states that for VAR studies, the quantity of lags linked to the lowest value of an average criterion is selected.

3.3.3. Vector Error Correction Model

The model's error correction component examines how quickly historical departures from equilibrium are fixed. A class of several time series models, known as error correction models (ECMs), calculates the rate at which a dependent variable, Y, returns to equilibrium following a change in an independent variable, X. ECMs are effective for calculating the impact of one time series on another over the short and long terms. ECMs are insightful models for integrated data, but they may also be applied to stationary data. Using a VAR model as a framework, empirical evidence's intricate interrelationships between stationary variables are explained. The VECM test uses the model that follows (Khetsi & Mongale, 2015).

The long-run information for the model is lost if data is differenced I(1). In this instance, just the short-run model is calculated (Barunik & Kristoufek, 2010). Barunik and Kristoufek (2010) recommends modelling the long-term and short-term relationships together using the error correction model. The following illustrates how to estimate a vector error correcting model:

$$y_t = a_0 + \gamma_0 x_t + \gamma_1 x_{t-1} + a_1 y_{t-1} + \varepsilon_t \quad (5)$$

where y_t is the independent variable, x_t is the dependent variable, and x_{t-1} and y_{t-1} are the, respectively, lagged values of x_t and y_t. The parameters are a_0, a_1, γ_0, and γ_1, and the error term is ε_t.

Short-run models typically lead to false correlation and multicollinearity. Estimating the equation's initial differences solves this issue.

$$\Delta y_t = a_0 + \gamma_0 \Delta x_t + \gamma_1 \Delta x_{t-1} + \gamma_1 \Delta y_{t-1} + \varepsilon_t \quad (6)$$

This results in the long-run equilibrium information being lost and the economic theory being differentiated. The dynamic structure's error correction mechanism (ECM) formulation is used in the following manner to address the two issues:

$$y_t = a_0 + \gamma_0 x_t + \gamma_1 x_{t-1} + a_1 y_{t-1} + \varepsilon_t \tag{7}$$

Subtracting y_t on either side gives,

$$\Delta y_t = a_0 + \gamma_0 x_t + \gamma_1 x_{t-1} - (1 - a_1) y_{t-1} + \varepsilon_t \tag{8}$$

Subtracting $\gamma_0 x_t$ on either side

$$\Delta y_t = a_0 + \gamma_0 \Delta x_t + (\gamma_0 + \gamma_1) x_{t-1} + (1 - a_1) y_{t-1} + \varepsilon_t \tag{9}$$

$$\Delta y_t = \gamma_0 \Delta x_t - (1 - a_1) \left[y_{t-1} - \frac{a_0}{(1 - a_0)} - \frac{(\gamma_0 + \gamma_1)}{(1 - a_0)} x_{t-1} \right] + \varepsilon_t \tag{10}$$

$$\text{Let } \beta_0 = \frac{a_0}{(1 - a_0)} \text{ and } \beta_1 = \frac{(\gamma_0 + \gamma_1)}{(1 - a_0)} x_{t-1} \tag{11}$$

$$\Delta y_t = \gamma_0 \Delta x_t - (1 - a_1)[y_{t-1} - \beta_0 - \beta_1 x_{t-1}] + \varepsilon_t \tag{12}$$

This is the ECM, where $\varepsilon_t - 1 = y_{t-1} - \beta_0 - \beta_1 x_{t-1}$ is the error mechanism that quantifies the structure's separation from equilibrium, and $-(1 - \alpha_1)$ is the speed of adjustment. In order for the system to converge to equilibrium, the coefficient $\varepsilon_t - 1$ needs to be negative.

$$\begin{aligned} \Delta lnGDP_t = {} & \alpha_0 + \textstyle\sum_{i=1}^{P=5} \alpha_{1,i} \Delta lnGDP_{t-1} + \sum_{k=1}^{P=5} \alpha_{2,i} \Delta lnMCAP_{t-1} + \sum_{l=1}^{P=5} \alpha_{3,i} \Delta NAT_{t-1} + \\ & \textstyle\sum_{j=1}^{k} \alpha_{4,i} \Delta UNEMP_{t-1} + \sum_{m=1}^{p=5} \alpha_{5,i} \Delta lnFDI_{t-1} + \delta_1 ECT_{t-1} + \varepsilon_{1t} \end{aligned} \tag{13}$$

$$\begin{aligned} \Delta lnMCAP_t = {} & \beta_1 + \textstyle\sum_{i=1}^{P=5} \beta_{2,i} \Delta lnGDP_{t-1} + \sum_{k=1}^{P=5} \beta_{3,k} \Delta lnMCAP_{t-1} + \sum_{l=1}^{P=5} \beta_{4,l} \Delta NAT_{t-1} + \\ & \textstyle\sum_{j=1}^{p=5} \beta_{4,j} \Delta UNEMP_{t-1} + \sum_{m=1}^{p=5} \beta_{5,m} \Delta lnFDI_{t-1} + \delta_1 ECT_{t-1} + \varepsilon_{2t} \end{aligned} \tag{14}$$

$$\begin{aligned} \Delta NAT_t = {} & \varnothing_1 + \textstyle\sum_{i=1}^{P=5} \varnothing_{2,i} \Delta lnGDP_{t-1} + \sum_{k=1}^{P=5} \varnothing_{3,k} \Delta lnMCAP_{t-1} + \sum_{l=1}^{P=5} \varnothing_{4,l} \Delta NAT_{t-1} + \\ & \textstyle\sum_{j=1}^{k} \varnothing_{4,i} \Delta UNEMP_{t-1} + \sum_{m=1}^{p=5} \varnothing_{5,m} \Delta lnFDI_{t-1} + \delta_1 ECT_{t-1} + \varepsilon_{3t} \end{aligned} \tag{15}$$

$$\begin{aligned} \Delta UNEMP_t = {} & \gamma_1 + \textstyle\sum_{i=1}^{P=5} \gamma_{2,i} \Delta lnGDP_{t-1} + \sum_{k=1}^{P=5} \gamma_{3,k} \Delta lnMCAP_{t-1} + \sum_{l=1}^{P=5} \gamma_{4,l} \Delta NAT_{t-1} + \\ & \textstyle\sum_{j=1}^{k} \gamma_{4,i} \Delta UNEMP_{t-1} + \sum_{m=1}^{p=5} \gamma_{5,m} \Delta lnFDI_{t-1} + \delta_1 ECT_{t-1} + \varepsilon_{4t} \end{aligned} \tag{16}$$

$$\Delta \ln FDI_t = \theta_1 + \textstyle\sum_{i=1}^{P=5} \theta_{2,i} \Delta lnGDP_{t-1} + \sum_{k=1}^{P=5} \theta_{3,k} \Delta lnMCAP_{t-1} + \sum_{l=1}^{P=5} \theta_{4,l} \Delta NAT_{t-1} + \sum_{j=1}^{k} \theta_{4,i} \Delta UNEMP_{t-1} + \sum_{m=1}^{p=5} \theta_{5,m} \Delta lnFDI_{t-1} + \delta_1 ECT_{t-1} + \varepsilon_{5t} \tag{17}$$

$\Delta lnGDP, \Delta lnMCAP, \Delta NAT, \Delta UNEMP, \Delta lnFDI$ refer to the respective logarithmic first differences of capital, liabilities, assets, and liquidity. The uncorrelated error terms are indicated by the ε_t, whereas the parameters to be evaluated are the α, β, ϕ, and γ. The calculated residual from the co-integration regression is the error correction term, or EC.

3.3.4. Impulse Response Function

Impulse responses indicate how future structural shocks affect the endogenous variables of VAR systems. Every answer incorporates the influence of a specific shock at impact t, $t + 1$, etc., on one of the endogenous variables. In the event that a stationary VAR model exists, the Yt vector can be expressed as the moving-average representation, or VMA(∞), of all previous white-noise shocks (et). We use a technique known as Wold representation

to achieve this goal, which is to convert our structural autoregressive vector into a sum of shocks. The VMA(∞) representation's general equation is provided in Equation (14) below.

$$Y_t = \mu + G(L)^{-1} e_t \tag{18}$$

where $\mu = G(L)^{-1} G_0$

$$Y_t = \mu + \left(I_n + \psi_1 L + \psi_2 L^2 + \psi_3 L^3 + \cdots \right) e_t \tag{19}$$

$$Y_t = \mu + e_t I_n + \psi_1 e_{t-1} + \psi_2 e_{t-2} + \psi_3 e_{t-3} + \cdots \tag{20}$$

$$Y_t = \mu + \sum_{i=0}^{\infty} \psi_i e_{t-i} \tag{21}$$

where $\psi_i = (n * n)$ matrix of coefficients, ψ_0 is the identity matrix.

VAR and VECM models can be expressed as a VMA(∞) approximation using the error terms of the standard VAR in the following way:

$$\begin{bmatrix} Y_t \\ Z_t \end{bmatrix} = \begin{bmatrix} \overline{Y}_t \\ \overline{Z}_t \end{bmatrix} + \sum_{i=0}^{\infty} \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}^i \begin{bmatrix} e_{1t-i} \\ e_{2t-i} \end{bmatrix} \tag{22}$$

3.3.5. Variance Decomposition

In VECM models, the variance decomposition informs the researchers of the amount of change in an endogenous variable that results from shocks to other endogenous variables and the amount of change that results from the endogenous variable's own impulse. In structural regressions, the shock that causes the majority of a variable's change also contributes to its percentage over an extended period, as the effect of the lag variables begins to take effect. It should be emphasised that this idea makes it possible to evaluate the effective economic significance as a percentage of the forecast error for a variable sum to unity, or 100% (Khalid et al., 2021).

$$X_{t+n} - X_{t-n} = \emptyset_0 \varepsilon_{t+1} + \emptyset_1 \varepsilon_{t-1} + \emptyset_2 \varepsilon_{t-2} + \emptyset_1 \varepsilon_{t-3} + \cdots + \emptyset_n \varepsilon_{t+1} \tag{23}$$

$$\sum_{i=0}^{n-1} \varepsilon_{t+n-i} \tag{24}$$

4. Results and Discussion

The South African Reserve Bank and the World Bank data portals are the sources from which the data were gathered. The data utilised span the years 1990–2023, with an annual frequency. Since democracy did not begin until 1994, our sample period is limited by the time when South Africa was reintegrated into the global economy. Log-linear transformations are used for preliminary data transformations where the source data are not in percentages (Zhou & Dev, 2020).

4.1. Unit Root Test

Table 2 presents the results of the unit roots tests that were conducted. The augmented Dickey–Fuller test (ADF) was used. As indicated earlier, the null hypothesis of this test is that there is a unit root in the series. The results show that all variables are stationary at first difference or I(1).

Table 2. Unit root test results.

Variable	Augmented Dickey–Fuller (ADF)						Order of Integration
	Level			First Difference			
	Critical Value	T Statistic	Probability	Critical Value	T Statistic	Probability	
LGDP	−2.954021	−1.281401	0.6264	−2.957110	−4.334510	0.0018	I(1) ***
MCAP	−2.963972	−0.250961	0.88789	−2.998064	−2.992981	0.0505	I(1) ***
NAF	−2.963972	−1.839944	0.3549	−2.963972	−7.701176	0.0000	I(1) ***
LFDI	−2.957110	−2.714428	0.0827	2.960411	−8.306229	0.0000	I(1) ***
UNEMPL	−2.991878	−0.9990438	0.7689	−2.998064	−5.970719	0.0000	I(1) ***

Source: Researcher's computations. Note: ***, indicate significance at the 5% level.

4.2. Lag Length Selection

Lütkepohl (1993) and Khalid et al. (2021) illustrated how lag length affects inference, showing that a higher mean square predicting error of the VAR results from selecting a lag order that is higher than the genuine lag structure. Conversely, autocorrelated errors are produced when the lag length structure is underfitted. According to Winker and Maringer (2005), if the lag is too short, some information is left unexplained in the disturbance error term. This creates a statistical model in which only a subset of the information is used to represent the data, giving the coefficients erroneous relevance, Table 3 shows the results of the lag length selection. All three leading information criterion (AIC, SC and HQ) show that the appropriate lag is 1. Therefore, the lag used to estimate the VECM is 1 lag.

Table 3. Lag length selection results.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	−145.2136	NA	0.046781	11.12694	11.36690	11.119829
1	−75.26812 *	108.8041 *	0.001740 *	7.797639 *	9.237458 *	8.225772 *
2	−51.61542	28.03283	0.002379	7.897439	10.53711	8.682350

* indicates the best optimal to use.

4.3. Co-Integration Test

A long-term equilibrium relationship between the variables was examined by the co-integration test (Pradhan & Bagchi, 2013). It suggests that there is a lasting correlation between economic factors. The results in Table 4 indicate that there is co-integrating link among the variables because the trace statistic at 5% level of significance. The results indicated that variables are co-integrated. Co-integrated rank (trace statistic) has a maximum of two (2) co-integrating vectors, while the maximum eigen value indicates no co-integrating equation; please see Tables 4 and 5.

Table 4. Co-integration test results (trace).

Hypothised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob
None *	0.636908	85.24195	76.97277	0.0102
At most 1 *	0.597392	57.88824	54.07904	0.0220
At most 2	0.496907	33.32383	35.19275	0.0785
At most 3	0.357167	14.77535	20.26184	0.2395
At most	0.100004	2.844849	9.164546	0.6101

Trace test indicates 2 cointegrating equations at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level.

Table 5. Co-integration test results (max. eigenvalue).

Hypothised No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob
None	0.636908	27.35371	34.80587	0.2938
At most 1	0.597392	24.56441	28.58808	0.1502
At most 2	0.496907	18.54848	22.29962	0.1541
At most 3	0.357167	11.93050	15.89210	0.1900
At most	0.100004	2.844849	9.164546	0.6101

Max-Eigain test indicates no cointegration at the 0.05 level.

4.4. Diagnostic Test Results

Following the estimation of the short- and long-term dynamics, the diagnostics of the model are investigated. The diagnostic checks are crucial because they can prevent a spurious model from being analysed. The diagnostic examination of the data shows that there is no indication of serial correlation, that the residuals are normally distributed, that there is no misspecification, and that the disturbances are ultimately homoscedastic. Since the model passes all diagnostic tests and satisfies Gaussian criteria, it is the optimal model to estimate.

The VECM model underwent diagnostic testing for serial correlation, normalcy, and heteroscedasticity (refer to Table 6).

Table 6. Diagnostic test results.

Test for	Test	*p*-Value	Conclusion
Normality	JB	0.8036	Accept Ho
Serial correlation	LM test	0.6220	Accept Ho
Heteroscedasticity	White (without cross terms)	0.9656	Accept Ho

4.5. Vector Error Correction Estimation Results

Table 7 shows the results of the VECM long-run coefficients. The error correction term (ECT) is negative and significant as expected. The coefficient of the ECT is important to confirm whether there is adjustment towards long run equilibrium following any divergence in the previous year. The coefficient of -0.429 implies that 42.9% of the previous year's $(t-1)$ deviation is corrected within the current year (t). Thus, the error correction term (ECT) shows how quickly the model will change to return to equilibrium after any disruptions.

Table 7. VECM estimation results. Dependent variable *LGDP*.

LMCAP	*NAF*	*LFDI*	*UNEMP*	C	ECT
0.320 ***	0.093 ***	0.130 ***	−0.027 ***		−0.429 ***
(0.051)	(0.036)	(0.052)	(0.009)	2.310	(0.165)
[6.22084]	[2.546]	[2.499]	[−2.970]		[−2.591]

*** indicate significant at 1% level; numbers in parenthesis are standard errors ( ) and t-statistics [ ].

Market capitalisation (*LMCAP*) and economic growth (*LGDP*) have a positive relationship, as per the results of the vector error correction estimation in Table 7. A 1% increase in market capitalisation will result in a 0.32% improvement in economic growth. This result is in line with expectations in the finance-led growth theory and findings from studies such as Zhou and Dev (2020) and Nyasha et al. (2021). Growth of financial markets is therefore expected to boost economic growth in the long-run through its ability to allocate capital to productive sectors. Increased access to capital through financial markets positively impacts firm productivity.

There is a positive and significant relationship between net acquisition of financial assets (*NAF*) and economic growth, a 1% change in the net acquisition of financial assets will result in a 0.093% increase in economic growth.

Foreign direct investment (*LFDI*) has a positive and significant relationship with economic growth, 1% increase in foreign direct investment will lead to a 0.130% increase in economic growth. Unemployment (*UNEMP*) and economic growth (*LGDP*) have a negative and significant relationship, 1% increase unemployment decreases economic growth by 0.027%, according to the results in Table 7.

4.6. Impulse Response Function

To graphically examine the dynamic impacts of all endogenous variables on economic growth, we have utilised the study of the impulse response function, which shows the dynamic effects of all the various impacts on Figure 1 below.

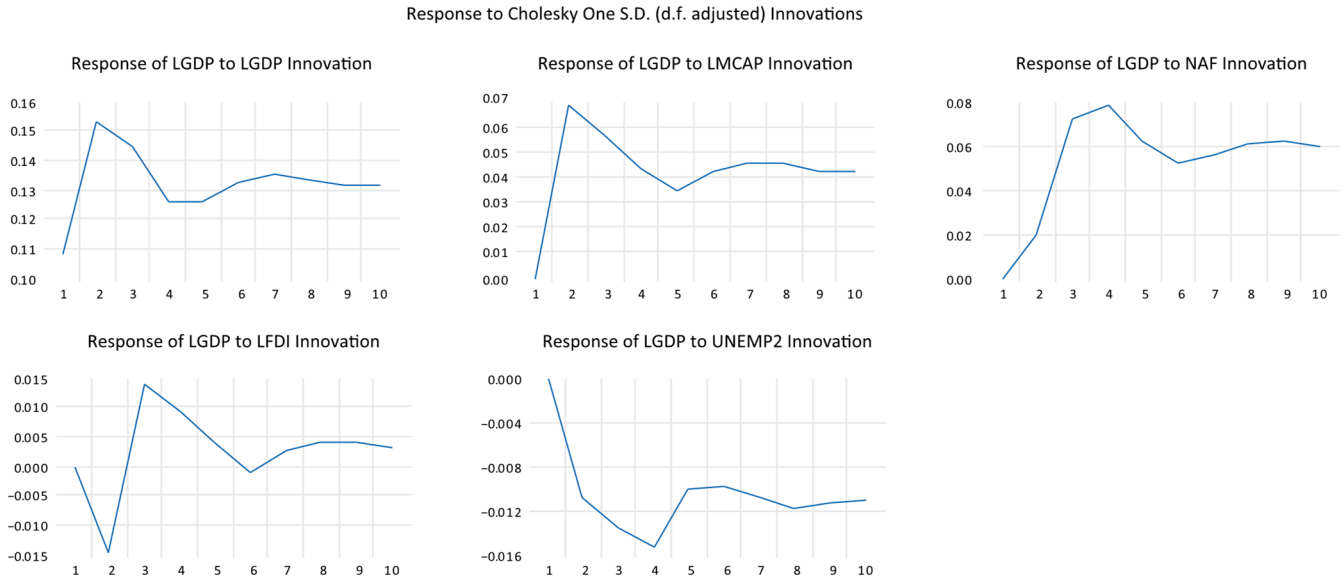

Figure 1. Impulse Response Function.

Economic growth (*LGDP*), which attributes 100% of economic growth to domestic innovations from the first period, shows that domestic innovations are the primary drivers of economic growth. Domestic innovations show a sharp increase with a maximum of 15 at

year 2, followed by moderate downswing and maintaining at 13. A standard deviation of shock to market capitalisation (*MCAP*) has a positive influence on economic growth; between periods 1 and 2, we see a sharp increase in economic growth that reaches a peak at period 2, which is then followed by a moderately steady state to a trough in periods 5 to 10. A standard deviation shock to net acquisition of financial assets (*NAF*) results in a rise in economic growth from period 1 to period 2, followed by a positive and sustained increase in economic growth after period 1 to period 4, thereafter followed by constant steady state. Foreign direct investment (*LFDI*) has a positive and significant correlation with economic growth, a standard deviation shock foreign direct investment will lead to an increase in economic growth. The response of economic growth to a one standard deviation shock in unemployment (*UNEMP*) is negative; the results show this negative impact is sustained from period 1 to period 4.

4.7. Variance Decomposition Results and Analysis

Table 8 shows the variance decomposition findings of the panel vector error correction model system over ten years, according to Table 8.

The variance decomposition of *LGDP*, which attributes 100% of economic growth to its own domestic innovations in the first year, shows that domestic innovations are the primary drivers of economic growth. Market capitalisation (*LMCAP*) has a small contribution of 11.63 percent at year 2, which slightly declines to 8.86 percent by year 10. Net acquisition of financial assets' (*NAF*) impact on economic growth is 0.93 percent at year 2 and increases to 13.94 percent at year 10. Foreign direct investment (*LFDI*) contributed to economic growth (*LGDP*) with a contribution of 0.23 percent at year 10; we observe a steady decrease from 0.53 percent at year 2. Unemployment's (*UNEMP*) contribution to economic growth is 0.28 percent at year 2, rising to 0.54 percent by year 10.

The variance decomposition of market capitalisation (*LMCAP*): in the first period, the market capitalisation has a significant endogenous impact, economic growth (*LGDP*) has a favourable and substantial effect on market capitalisation with a steady but rising contribution in each period, reaching a maximum of 52.79 percent. The net acquisition of financial assets' (*NAF*) impact on economic growth is 2.03 percent at year 10. Foreign direct investment (*LFDI)* has a contribution of 0.23 percent at period 10. Unemployment (*UNEMP*) has a contribution of 0.54 percent at year 10.

The variance decomposition of the net acquisition of financial assets (*NAF*) shows that net acquisition of financial assets has an endogenous impact in the first period, contributing 88.21 percent, while market capitalisation (*LMCAP*) is a significant contributor with a 4.86 percent contribution in the first period; economic growth also has a contribution of 6.91 percent in the first period. Foreign direct investment (*FDI*) and unemployment contributed 20.03 percent and 4.14 in period 10.

The variance decomposition of foreign direct investment (*FDI*) shows that foreign direct investment has a significant endogenous impact in the first period, with economic growth being a factor with an influence of 0.02 percent in the first period, market capitalisation (*LMCAP*) and net acquisition of financial assets (*NAF*) having an effect of 20.82 percent and 0.21 percent, respectively, in the first period. The impact of unemployment is 0.61 in the 10th period.

The variance decomposition of unemployment (*UNEMP*) shows that there is a significant endogenous impact in the first period on market capitalisation, with an influence of 14.41 percent in the first period with net acquisition of financial assets (*NAF*) having an effect of 1.31 percent in the first period. Foreign direct investment (*LFDI)* has a contribution of 1.68 percent in period 1.

Table 8. Variance decomposition results.

Variance Decomposition of *LGDP*						
Period	**S.E**	***LGDP***	***LMCAP***	***NAF***	***LFDI***	***UNEMP***
1	0.107865	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.200759	86.61338	11.63717	0.937810	0.524135	0.287503
3	0.264354	80.01541	11.16800	7.813115	0.574634	0.428845
4	0.306537	76.37457	10.29817	12.24280	0.513855	0.570600
5	0.33896	76.20792	9.469668	13.33590	0.432514	0.553999
6	0.369896	76.73976	9.233501	13.12688	0.363894	0.535970
7	0.400565	76.866636	9.171766	13.11825	0.314415	0.529206
8	0.429117	76.61841	9.102304	13.45787	0.283186	0.538234
9	0.455134	76.43970	8.969645	13.78828	0.260204	0.542174
10	0.479415	76.43970	8.865779	13.94507	0.238164	0.542176
Variance Decomposition of *LMCAP*						
Period	**S.E**	***LGDP***	***LMCAP***	***NAF***	***LFDI***	***UNEMP***
1	0.280193	48.07265	51.92735	0.000000	0.000000	0.000000
2	0.400637	48.15606	44.72264	1.3320458	5.726197	0.074646
3	0.488317	51.61910	42.39906	1.486315	4.299471	0.196051
4	0.566347	51.11453	42.28611	1.672848	4.761433	0.165083
5	0.33896	52.09944	41.47609	1.861536	4.36048	0.196883
6	0.690563	52.08391	41.36503	1.905878	4.456125	0.189057
7	0.744890	52.47720	41.03652	1.954715	4.331316	0.200248
8	0.796369	52.55077	40.94183	1.979716	4.329462	0.198222
9	0.844217	52.72466	40.78656	2.016256	4.270902	0.101617
10	00.88965	52.78768	40.70573	2.039479	4.255561	0.201549
Variance Decomposition of *NAF*						
Period	**S.E**	***LGDP***	***LMCAP***	***NAF***	***LFDI***	***UNEMP***
1	1.016921	6.911954	4.869825	88.21822	0.000000	0.000000
2	1.394489	3.860799	5056793	83.50584	6.563675	1.012890
3	1.542191	5.113887	5.262818	75.07985	11.75863	2.784814
4	1.695611	8.238763	4.374488	67.07603	16.88542	3.425292
5	1.851300	10.42129	3.701796	64.99330	17.26108	3.622534
6	2.003905	10.73595	3.160731	64.86503	17.62399	3.614296
7	2.135008	10.92378	2.851103	64.28254	1815641	3.786167
8	2.253032	11.30772	2.582772	63.06404	19.09157	3.953895
9	2.366280	11.79903	2.347902	62.10861	19.66127	4.083193
10	2.477213	12.12960	2.14517	61.54178	20.03412	4.148789

Table 8. *Cont.*

Variance Decomposition of *LFDI*						
Period	**S.E**	***LGDP***	***LMCAP***	***NAF***	***LFDI***	***UNEMP***
1	1.133192	0.022436	20.82554	0.215764	78.93626	0.000000
2	1.198430	0.032645	21.24033	1.673082	76.33360	0.720339
3	1.417138	1.435863	20.80305	2.221859	75.00265	0.536571
4	1.507475	1.801871	19.57603	2.520670	75.36758	0.733587
5	1.653128	2.058542	19.07029	2.153703	76.07114	0.646326
6	1.751730	2.054214	18.89089	2.077432	76.29473	0.682741
7	1.862560	2.141758	18.87023	2.045831	76.30554	0.636634
8	1.955303	2.232866	18.66250	2.088917	76.38136	0.634353
9	2.050935	2.324068	18.48585	2.052283	76.52053	0.617269
10	2.138765	2.138765	18.35026	2.020228	76.64352	0.614346
Variance Decomposition of *UNEMP*						
Period	**S.E**	***LGDP***	***LMCAP***	***NAF***	***LFDI***	***UNEMP***
1	1.357130	0.007915	14.41271	1.311681	1.68596	82.58173
2	1.996680	18.24441	13.92267	0.632970	13.36263	53.83732
3	2.655809	26.18917	18.60502	0.463887	13.70252	41.03941
4	3.175198	28.95055	20.90336	0.810851	12.32841	37.00684
5	3.572362	29.50494	21.42007	1.459889	11.72587	35.88923
6	3.906353	29.90457	21.43992	1.581454	11.79662	35.27744
7	4.225326	30.43261	21.57184	1.487699	11.95576	34.55210
8	4.533344	30.90910	21.81311	1.429294	11.95085	33.89764
9	4.821081	31.21694	22.00555	1.445928	11.87424	33.45734
10	5.087891	31.41625	22.11025	1.475383	11.83263	33.16549

5. Conclusions

This article used annual data from 1990 to 2023 to examine the relationship of how financial market capitalisation affects economic growth and unemployment. The variables employed are as follows: economic growth, market capitalisation, total value transaction and unemployment, for the South African economy. The VECM model was applied to investigate the dynamic link between the endogenous variables in question. The validity of the relationship between the estimated endogenous variables was further confirmed using other pertinent econometric techniques and tests. The variables are I(1), according to the ADF test (1).

The Johansen methodology was recommended in order to investigate the variables' long-term relationship. We chose 1 lag by comparing several lag length selection criteria in order to estimate the standard VECM model since there was long-term evidence of co-integration between the variables under investigation. The fitted VECM model's diagnostic checks all corroborate the findings that the VECM system is stable overall and that the chosen model has no significant problems.

The pairwise Granger causality provides definitive evidence of a unidirectional relationship between economic growth and market capitalisation at a five percent level of significance. There is a unidirectional relationship between the net acquisition of financial assets and economic growth; these findings are inconsistent with the findings by

(Khetsi & Mongale, 2015), implying that financial market capitalisation causes economic growth at the five percent significance level, thus the findings agree with hypothesis (H1), which holds that financial market capitalisation significantly and favourably influences economic growth, and with (H2) which states that financialisation has a significant impact on economic growth and unemployment. The findings of the Granger causality also indicate that there is a long term causal relationship between economic growth and unemployment.

The results of this empirical study significantly advance macroeconomics, especially in the field of finance, and improve policymakers' understanding of how to fulfil the increased economic growth objectives established by the South African government and also incorporate other financial market factors to stimulate economic growth and increase employment in the economy. Based on the results of this study, the South African financial market is very developed and very liquid, the regulatory policies and taxes are not barriers of entry but enhance their efficiency.

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References

Akyüz, G. (2012). Bulanik VIKOR yöntemi ile tedarikçi seçimi. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergis*, *26*(1), 197–215.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). FDI and economic growth: The role of local financial markets. *Journal of International Economics*, *64*(1), 89–112. [CrossRef]

Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2005). Competition and innovation: An inverted-U relationship. *The Quarterly Journal of Economics*, *120*(2), 701–728.

Atje, R., & Jovanovic, B. (1993). Stock markets and development. *European Economic Review*, *37*(2–3), 632–640. [CrossRef]

Ayadi, R., Arbak, E., Naceur, S. B., & De Groen, W. P. (2015). *Financial development, bank efficiency, and economic growth across the mediterranean* (pp. 219–233). Springer International Publishing.

Arcand, J. L., Berkes, E., & Panizza, U. (2015). Too much finance? *Journal of Economic Growth*, *20*, 105–148. [CrossRef]

Arestis, P., Demetriades, P. O., & Luintel, K. B. (2001). Financial development and economic growth: The role of stock markets. *Journal of Money, Credit and Banking*, 16–41. [CrossRef]

Barunik, J., & Kristoufek, L. (2010). On hurst exponent estimation under heavy-tailed distributions. *Physica A: Statistical Mechanics and Its Applications*, *389*, 3844–3855. [CrossRef]

Bolbol, A., Fatheldin, A., & Omran, M. (2005). Financial development, structure and economic growth: The case of Egypt, 1974–2002. *Research in International Business Finance*, *19*, 171–194. [CrossRef]

Brainard, W. C., & Tobin, J. (1968). Pitfalls in financial model building. *The American Economic Review*, *58*(2), 99–122.

Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, *72*(1), 321–334. [CrossRef]

Cecchetti, S. G., & Kharroubi, E. (2012). *Reassessing the impact of finance on growth*. Available online: https://ssrn.com/abstract=2117753 (accessed on 15 October 2024).

Chen, T. C., Kim, D. H., & Lin, S. C. (2021). Nonlinearity in the efects of fnancial development and fnancial structure on unemployment. *Economic Systems*, *45*(1), 100766. [CrossRef]

Chirila, V., Turturean, C., & Chirila, C. (2015). Volatility spillovers between eastern European and euro zone stock markets. *Transformations in Business & Economics*, *14*, 464–477.

Cobb, C. W., & Douglas, P. H. (1928). A theory of production. *The American Economic*, *18*(1), 139–165.

Cooray, A. (2009). The financial sector and economic growth. *Economic Record*, *85*, S10–S21. [CrossRef]

Cooray, A. (2010). Do stock markets lead to economic growth? *Journal of Policy Modeling*, *32*(4), 448–460. [CrossRef]

Didier, T., Levine, R., Montanes, R. L., & Schmukler, S. L. (2021). Capital market financing and firm growth. *Journal of International Money and Finance*, *118*, 102459. [CrossRef]

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society*, *49*(4), 1057–1072. [CrossRef]

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, *55*(2), 251–276. [CrossRef]

Fedderke, J. W. (2021). The South African–United States sovereign bond spread and its association with macroeconomic fundamentals. *South African Journal of Economics*, *89*(4), 499–525. [CrossRef]

Farida, Y., Hamidah, A., Sari, S. K., & Hakim, L. (2024). Modeling the farmer exchange rate in Indonesia using the vector error correction model method. *MATRIK: Jurnal Manajemen, Teknik Informatika dan Rekayasa Komputer*, *23*(2), 309–322. [CrossRef]

Goldsmith, D. W., Habing, H. J., & Field, G. B. (1969). Thermal properties of interstellar gas heated by cosmic rays. *Astrophysical Journal*, *158*, 173. [CrossRef]

Haibo, C., Manu, E., & Somuah, M. (2023). Examining finance-growth nexus: Empirical evidence from the sub-regional economies of Africa. *SAGE Open*, *13*(1), 21582440231153117. [CrossRef]

Hlongwane, J. T., & Sheefeni, J. P. S. (2023). Financial markets shocks and monetary policy in South Africa: A bayesian var approach. *Journal of Public Administration, Finance and Law*, *11*, 152. [CrossRef]

Kapingura, F. M. (2013). Finance and economic growth nexus: Complementarityand substitutability between the banking sector andfinancial markets in Africa, using South Africa as a case. *Journal of Economics and International Finance*, *5*(7), 273–286. [CrossRef]

Karwowski, E., Fine, B., & Ashman, A. (2018). Introduction to the special section "Financialisation in South Africa". *Competition & Change*, *22*(4), 383–387.

Karwowski, E., & Stockhammer, E. (2017). Financialisation in emerging economies: A systematic overview and comparison with Anglo-Saxon economies. *Economic and Political Studies*, *5*(1), 60–86. [CrossRef]

Khalid, W., Akalpler, E., Khan, S., & Shah, N. H. (2021). The relationship between unemployment and economic growth in South Africa: VAR Analysis. *Forman Journal of Economic Studies*, *17*(1), 1–32. [CrossRef]

Khetsi, Q. S., & Mongale, I. P. (2015). The impact of capital markets on the economic growth in South Africa. *Journal of Governance and Regulation*, *4*(1), 154–163. [CrossRef]

King, R. G., & Levine, R. (1993a). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics*, *108*(3), 717–737. [CrossRef]

King, R. G., & Levine, R. (1993b). *Financial intermediation and economic development* (Vol. 15689). Cambridge University Press.

Law, S. H., & Singh, N. (2014). Does too much finance harm economic growth? *Journal of Banking & Finance*, *41*, 36–44.

Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *The American Economic Review*, *83*(3), 537–558.

Lütkepohl, H. (1993). Testing for causation between two variables in higher-dimensional VAR models. In *Studies in applied econometrics* (pp. 75–91). Physica-Verlag HD.

Lütkepohl, H. (2005). *New introduction to multiple time series analysis*. Springers Science & Business Media.

Mabeba, M. (2023). Financialisation and economic growth Nexus in South Africa. *Journal of Economics and Financial Analysis*, *7*(1), 61–78.

Mabeba, M. (2024). The Effect of financial market depth on economic growth in developing countries with large financial sectors. *Social Science Studies*, *4*(2), 66–81. [CrossRef]

Mankiw, N. G., Romer, D., & Weil, D. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics*, *107*(2), 407–437. [CrossRef]

Minier, J. (2003). Are small stock markets different? *Journal of Monetary Economics*, *50*, 1593–1602. [CrossRef]

McKinnon, R. I. (1973). The value-added tax and the liberalization of foreign trade in developing economies: A comment. *Journal of Economic Literature*, *11*(2), 520–524.

Nyasha, S., Odhiambo, N. M., & Magombeyi, M. (2021). The impact of stock market development on unemployment: Empirical evidence from South Africa. *Journal of Economics and Business*, *71*(1–2), 92–110.

Popov, A. (2018). *Evidence on finance and economic growth* (pp. 63–104). Edward Elgar Publishing.

Pradhan, R. P., & Bagchi, T. P. (2013). Effect of transportation infrastructure on economic growth in India: The VECM approach. *Research in Transportation Economics*, *38*(1), 139–148. [CrossRef]

Prochniak, M., & Wasiak, K. (2017). The impact of the financial system on economic growth in the context of the global crisis: Empirical evidence for the EU and OECD countries. *Empirica*, *44*, 295–337. [CrossRef]

Samargandi, N., Fidrmuc, J., & Ghosh, S. (2015). Is the relationship between financial development and economic growth monotonic? Evidence from a sample of middle-income countries. *World Development*, *68*, 66–81. [CrossRef]

Schumpeter, J. A. (1912). *Theory of economic development*. Routledge.

Shaddady, A. (2023). Unveiling the dynamics of financial institutions and markets in shaping economic prosperity in MENA. *International Journal of Financial Studies*, *11*(4), 148. [CrossRef]

Shaw, E. S. (1973). *Financial deepening in economic development*. Oxford University Press.

Shravani, & Sharma, S. K. (2020). Scrutinising causal relationship between stock market development and economic growth: Case of India. *International Journal of Indian Culture and Business Management*, *20*(4), 429–443. [CrossRef]

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, *70*(1), 65–94. [CrossRef]

Southall, R. (1981). Economic imperialism in theory and practice: The case of South African gold mining finance. *The Journal of Modern African Studies*, *19*(2), 337–339. [CrossRef]

Usman, M., Fatin, D. F., Barusman, M. Y. S., & Elfaki, F. A. (2017). Application of vector error correction model (VECM) and impulse response function for analysis data index of farmers' terms of trade. *Indian Journal of Science and Technology*, *10*(19), 1–14. [CrossRef]

Vrieze, S. I. (2012). Model selection and psychological theory: A discussion of the differences between the Akaike information criterion (AIC) and the Bayesian information criterion (BIC). *Psychological Methods*, *17*(2), 228. [CrossRef]

Wait, C., Ruzive, T., & le Roux, P. (2017). The influence of financial market development on economic growth in BRICS countries. *International Journal of Management and Economics*, *53*(1), 7–24. [CrossRef]

Winker, P., & Maringer, D. (2005). *The convergence of optimization based estimators: Theory and application to a GARCH-model* (Discussion paper, No. 2005, 004E). Universität Erfurt, Staatswissenschaftliche Fakultät.

Zhao, R. (2019). Technology and economic growth: From Robert Solow to Paul Romer. *Human Behavior and Emerging Technologies*, *1*(1), 62–65. [CrossRef]

Zhou, S., & Dev, D. T. (2020). The impact of shadow banking on economic growth: Evidence from cross country data (2006–2018). *Journal of International Commerce, Economics and Policy*, *11*(03), 2050010. [CrossRef]