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

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**Abstract**

The dynamic impact of financial market returns on South Africa's unemployment and economic growth is empirically explored in this study using the finance-augmented Solow model framework. The South Africa's high rate of structural unemployment and its robust financial market, which at the same standard with those in countries with advanced economies, served as the driving forces for the study. Evidence for the dynamic link was presented by a time series analysis that employed the VECM model. Market capitalisation, foreign direct investment and total value transaction indicate positive impact on economic growth and have a negative impact on unemployment as per VECM estimation results. 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 financial and stock market growth in order to increase employment, while also making sure that other structural issues affecting the labour market are effectively addressed and taken care of.

**Key words:** Financial markets, economic growth, market capitalisation, Granger causality.

1. **INTRODUCTION**

Numerous studies have investigated the relationship between financial market depth and economic growth in recent years, however, there is paucity in 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 was unemployed, 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 in the present. The Quarterly Labour Force Survey (Q2: QLFS, 2019) revealed that South Africa's unemployment rate in 2019Q2 was 29.0%, meaning that it increased by 1.4% from 2019Q1. 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 (Q2: QLFS, 2019). According to these figures, for the past 20 years, the unemployment rate for educated youth has been steadily rising (Khalid et al, 2021).

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 markets expansion affect 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. The ability to move excess funds from surplus units to deficit units is one of the economic functions of financial markets. 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 most 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 prior to the year 2002 (Karwowski and Stockhammer, 2017).

According to Chirila et al. (2015) and Hlongwane et al. (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.

Contrary to related research like 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 economics 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 profitability has no influence on economic growth. The third hypothesis (H2) financialisation has a significant impact on economic growth.

1. **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 and 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 and le Roux, 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 connection between the capital market and economic growth (Didier et al, 2020). 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 and Tobin, 1968).

The premise that financial advancement facilitates economic growth was first put forth by Schumpter in 1911 (Schumpter, 1912). Authors like Goldsmith (1969), Mckinnon (1973), and Shaw (1973), among others, emphasized 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 is contributing 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 and Mongale, 2015).

There has been a lot research done so far on the relationship between financial markets and unemployment, of those that have been done there are 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 amongst 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); Khetsi and Mongale, 2015) 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; 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 was 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. (2013) 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 capitalization and turnover are positively correlated with economic growth.

# **DATA AND METHODOLOGY**

## **Data**

The study will employ annual data for South Africa. The secondary data will be collected from World Bank Development indicators and the South African Reserve Bank. The data will be collected annually between 1993 and 2023.

Table 1: Variable Description

|  |  |  |
| --- | --- | --- |
| **Variables** | **Abreviation** | **Data Source** |
| Gross Domestic Product | GDP | World Bank |
| Market capitalization | MCAP | World Bank |
| Unemployment | UNEM | South African Reserve Bank |
| Total Value Transaction | TVT | World Bank |
| Foreign Direct Investment | FDI | World Bank |

## **Model Specification**

One of the most widely utilised models for conceptualizing economic growth is the Solow model 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, 1957) 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 labor, capital, and total factor productivity are the functions that determine total output (Cobb and 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 and Levine, 1993; Levine and Zervos, 1998; Zhou and Tewari, 2019) 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.

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

$Y\left(t\right)= K(t)^{α}H(t)^{β}[A\left(t\right)L\left(t\right)]^{1-α-β} 1>, α,β<1, α+β<1$ (2)

$Y\left(t\right)= F(t)^{α} K(t)^{β} H(t)^{γ} [A\left(t\right)L\left(t\right)]^{1-α-β} 1>, α,β,γ<1, α+β+γ<1$ (3)

Economic growth is represented by $Y$, the 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:

$lnGDP=β\_{0}+ β\_{mcap}lmcap+ β\_{tvt}ltvt+ β\_{unem}unemp+ε\_{t}$ (4)

Where $LGDP$ represent gross domestic product; $β\_{0}$ represents Intercept coefficient; $lmcap$ represents market capitalisation ;$ ltvt $is total value transactions; $unemp$represents unemployment; $ε\_{t}$ represents disturbance or error term.

## **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 cointegration across variables. Engle and Granger (1987) established the concept of cointegration and error correction. Then, in 1990, Johansen joined forces with Juselius to develop the notion of the VECM model ( Farida et al, 2024).

### **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. Only when I (1) are the variables under consideration are VAR models employed. VAR models are only used in cases when the variables being studied have integrated values of order one, or I(1). 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 (H₀), and it is stationary at level, according to the alternative hypothesis (H₁). 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 get stationarity, the analysis can move on to the next stage, which is determining the proper lag length for the model.

### **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-parameterized 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-noises.

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. In actuality, 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.

### **Vector Error Correction Model**

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, 2010). Barunik (2010) recommends modeling the long-term and short-term relationships together using the error correction model. The following illustrates how to estimate a vector error correcting model:

 $y\_{t}= a\_{0}+ γ\_{0}x\_{t}+ γ\_{1}x\_{t-1}+ a\_{1}y\_{t-1}+ε\_{t}$

where 𝑦𝑡 is the independent variable, 𝑥𝑡 is the dependent variable, and 𝑥𝑡−1 and 𝑦𝑡−1 are the, respectively, lagged values of 𝑥𝑡 and 𝑦𝑡. 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.

$∆y\_{t}= a\_{0}+ γ\_{0}∆x\_{t}+ γ\_{1}∆x\_{t-1}+ γ\_{1}∆y\_{t-1}+ε\_{t}$

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:

$$y\_{t}= a\_{0}+ γ\_{0}x\_{t}+ γ\_{1}x\_{t-1}+ a\_{1}y\_{t-1}+ε\_{t}$$

Subtract $y\_{t}$ on either side, gives,

$∆y\_{t}= a\_{0}+ γ\_{0}x\_{t}+ γ\_{1}x\_{t-1}- (1-a\_{1})y\_{t-1}+ε\_{t}$

Subtract$γ\_{0}x\_{t}$ on either side

$∆y\_{t}= a\_{0}+ γ\_{0}∆x\_{t}+ (γ\_{0}+γ\_{1})x\_{t-1}+ (1-a\_{1})y\_{t-1}+ε\_{t}$

$$∆y\_{t}= γ\_{0}∆x\_{t}- (1-a\_{1}) \left[ y\_{t-1}-\frac{a\_{0}}{\left(1-a\_{0}\right)}-\frac{\left( γ\_{0}+γ\_{1}\right)}{\left(1-a\_{0}\right)}x\_{t-1}\right]+ε\_{t}$$

$β\_{0}$= $\frac{a\_{0}}{\left(1-a\_{0}\right)}$ $β\_{1}= \frac{\left( γ\_{0}+γ\_{1}\right)}{\left(1-a\_{0}\right)}x\_{t-1}$

$$∆y\_{t}= γ\_{0}∆x\_{t}- (1-a\_{1}) \left[ y\_{t-1}-β\_{0}-β\_{1}x\_{t-1}\right]+ε\_{t}$$

This is the ECM, where 𝜀𝑡−1 = 𝑦𝑡−1−𝛽0 − 𝛽1𝑥𝑡−1 is the error mechanism that quantifies the structure's separation from equilibrium, and −(1 − 𝛼1) is the speed of adjustment. In order for the system to converge to equilibrium, the coefficient 𝜀𝑡−1 needs to be negative.

$∆lnGDP\_{t}=α\_{0}+\sum\_{i=1}^{P=5}α\_{1,i}∆lnGDP\_{t-1}+\sum\_{k=1}^{P=5}α\_{2,i}∆lnMCAP\_{t-1}+\sum\_{l=1}^{P=5}α\_{3,i}∆lnTVT\_{t-1}+\sum\_{j=1}^{k}α\_{4,i}∆UNEMP\_{t-1}+\sum\_{m=1}^{p=5}α\_{5,i}∆FDI\_{t-1}+δ\_{1}ECT\_{t-1}+ ε\_{1t}$ (10)

$∆lnMCAP\_{t}=β\_{1}+\sum\_{i=1}^{P=5}β\_{2,i}∆lnGDP\_{t-1}+\sum\_{k=1}^{P=5}β\_{3,k}∆lnMCAP\_{t-1}+\sum\_{l=1}^{P=5}β\_{4,l}∆lnTVT\_{t-1}+\sum\_{j=1}^{p=5}β\_{4,j}∆UNEMP\_{t-1}+\sum\_{m=1}^{p=5}β\_{5,m}∆FDI\_{t-1}+δ\_{1}ECT\_{t-1}+ ε\_{2t}$ (11)

 $∆lnTVT\_{t}=∅\_{1}+\sum\_{i=1}^{P=5}∅\_{2,i}∆lnGDP\_{t-1}+\sum\_{k=1}^{P=5}∅\_{3,k}∆lnMCAP\_{t-1}+\sum\_{l=1}^{P=5}∅\_{4,l}∆lnTVT\_{t-1}+\sum\_{j=1}^{k}∅\_{4,i}∆UNEMP\_{t-1}+\sum\_{m=1}^{p=5}∅\_{5,m}∆FDI\_{t-1}+δ\_{1}ECT\_{t-1}+ ε\_{3t}$ (12)

$$∆UNEMP\_{t}=γ\_{1}+\sum\_{i=1}^{P=5}γ\_{2,i}∆lnGDP\_{t-1}+\sum\_{k=1}^{P=5}γ\_{3,k}∆lnMCAP\_{t-1}+\sum\_{l=1}^{P=5}γ\_{4,l}∆lnTVT\_{t-1}+\sum\_{j=1}^{k}γ\_{4,i}∆UNEMP\_{t-1}+\sum\_{m=1}^{p=5}γ\_{5,m}∆FDI\_{t-1}+δ\_{1}ECT\_{t-1}+ ε\_{4t}$$

$$∆FDI\_{t}=θ\_{1}+\sum\_{i=1}^{P=5}θ\_{2,i}∆lnGDP\_{t-1}+\sum\_{k=1}^{P=5}θ\_{3,k}∆lnMCAP\_{t-1}+\sum\_{l=1}^{P=5}θ\_{4,l}∆lnTVT\_{t-1}+\sum\_{j=1}^{k}θ\_{4,i}∆UNEMP\_{t-1}+\sum\_{m=1}^{p=5}θ\_{5,m}∆FDI\_{t-1}+δ\_{1}ECT\_{t-1}+ ε\_{5t}$$

$∆lnGDP, ∆lnMCAP, ∆lnTVT, ∆UNEMP, ∆FDI$ refers to the respective logarithmic first differences of capital, liabilities, assets, and liquidity. The uncorrelated error terms are indicated by the 𝜀𝑡, whereas the parameters to be evaluated are the 𝛼, 𝛽, 𝜙, and 𝛾. The calculated residual from the cointegration regression is the error correction term, or EC.

### **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.

$Y\_{t}=μ+ G(L)^{-1} e\_{t}$ (17)

Where $μ=G(L)^{-1} G\_{0}$

$Y\_{t}=μ+(I\_{n}+ψ\_{1}L+ψ\_{2}L^{2}+ψ\_{3}L^{3}+…) e\_{t}$ (18)

$Y\_{t}=μ+e\_{t}I\_{n}+ψ\_{1}e\_{t-1}+ψ\_{2}e\_{t-2}+ψ\_{3}e\_{t-3}+… $ (19)

$Y\_{t}=μ+ \sum\_{i=0}^{\infty }ψ\_{i}e\_{t-i}$ (20)

Where $ψ\_{i}=(n\*n)$ matrix of coefficients, $ψ\_{0} $ is 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:

$\left[\begin{matrix}Y\_{t}\\Z\_{t}\end{matrix}\right]=\left[\begin{matrix}\overbar{Y}\_{t}\\\overbar{Z\_{t}}\end{matrix}\right]+ \sum\_{i=0}^{\infty }\left[\begin{matrix}a\_{11}&a\_{12}\\a\_{21}&a\_{22}\end{matrix}\right]^{i}\left[\begin{matrix}e\_{1t-i}\\e\_{2t-i}\end{matrix}\right]$ (21)

###  **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 emphasized 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, 2021).

$X\_{t+n}- X\_{t-n}= ∅\_{0}ε\_{t+1}+∅\_{1}ε\_{t-1}+∅\_{2}ε\_{t-2}+∅\_{1}ε\_{t-3}+…+∅\_{n}ε\_{t+1}$ (22)

$\sum\_{i=0}^{n-1}ε\_{t+n-i}$ (23)

# **RESULTS AND DISCUSION**

The South African Reserve Bank and the World Bank data portal are the sources from which data was gathered. The data utilised spans the years 1994–2023, with an annual frequency. Since democracy didn't 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 is not in percentages (Zhou and Tewari,2019). We exclusively utilised South African data.

## **. Unit Root Test**

The variables are all stationary at I(1), when performing the ADF test, which indicates that the VAR model is applicable.

**Table 4.1. unit root test results**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable |  |  Augmented Dickey-Fuller (ADF) | Order of Integration |
|  |  | **Level** | **1st****Difference** |  |
| Critical value | T statistic | probability | Critical value | T statistic | probability |
| LGDP |  | -2.971853 | -2.193079 | 0.6511 | -2.976263 | -4.484231 | 0.0042 | I(1)\*\* |
| LMCAP |  | -2.968225 | -0.250961 | 0.7625 | -2.986225 | -6.871279 | 0.0001 | I(1)\*\* |
| LTVT |  | -3.012363 | -2.551305 | 0.1149 | -2.981038 | -4.720519 | 0.0029 | (1)\*\* |
| UNEMPL |  | -2.991878 | -.9990438 | 0.7689 | -2.998064 | -5.970719 | 0.0000 | I(1)\*\* |
| FDI |  | -2.967767 | -2.853108 | 0.6132 | -2.976263 | -5.5784473 | 0.0001 | I(1)\*\* |

Source: Researcher’s computations Note: \*, \*\* and \*\*\* indicate significance at the 1%, 5% and 10% levels respectively.

## **4.2. Lag Length Selection**

Lutkepol (1993); 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, auto-correlated errors are produced when the lag length structure is underfitted. According to Maringer and Winker (2014), 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 4.2 shows the results of the lag length selection.

**Table 4.2. Lag Length selection results**

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## **4.3. Co-integration test**

The results in table 4.3. indicate that there is cointegrating link at most variables because the trace statistic at 5% level of significance. The results indicated that variables are cointegrated. Cointegrated rank (trace) test have a maximum of two (2) cointegrating vectors, while the maximum eigen value indicates 1 cointergrating equation.

**Table 4.3. Co-integration test results (Trace ) **

**Table 4.4. Co-integration test results (Max Eigen Value)**



##  **4.4. Diagnostic test results**

The VECM model underwent diagnostic testing for serial correlation, normalcy, and heteroscedasticity (refer to table 4.5).

**Table 4.5. Diagnostic test results**

|  |  |  |  |
| --- | --- | --- | --- |
| **Test for** | **Test** | **p-value** | **conclusion** |
| Normality | JB | 0.9741 | Accept Ho |
| Serial correlation | LM Test | 0.2558 | Accept Ho |
| Heteroskedasticity | White (without cross terms) | 0.7618 | Accept Ho |

## **4.4. Vector Error Correction estimation results**

**Table 4.6. VECM Estimation results**

Dependent variable LGDP

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LMCAP | LTVT | UNEMP | FDI | C | ECT |
| 0.977772(0.05731)[17.0610] | -0.3112368(0.04790)[-6.52095] | -0.028225(0.00745)[-3.78825] | 0.080370(0.02437)[3.29828] | 8.534838 | -0.207264(0.06844)[-3.02840] |

The error correction term (ECT), which corrects the present period at an adjustment speed of roughly -0.207% for the long-run equilibrium divergence from the prior year, is -0.207%, statistically significant, and negative. Error correction term (ECT), which shows how quickly the model will change to return to equilibrium after any disruptions

Market capitalization (LMCAP) and economic growth (LGDP) are positively correlated, per the results of the vector error correction estimation. A 1% in increase in market capitalisation will result in a 0.97% improvement in economic growth. Total value transaction (LTVT) and economic growth (LGDP) have a negative and significant relationship, 1% increase in total value transaction decreases economic growth by 0.31%,

## **4.5. 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 dynamic effects of all the various impacts.

Economic growth(*LGDP*), which attributes 100% of economic growth to domestic innovations from the first period, it seems that domestic innovations are the primary drivers of economic growth. Domestic innovations show a fluctuating decline from the maximum at year 3 to year 10. A 1% standard deviation of market capitalisation (*LMCAP*) shock to economic growth a positive influence. Between period 1 and 2 we see a sharp increase in economic growth that reaches a peak at period 2, which then followed by a sharp decrease level of economic growth. Economic growth (*LGDP*) is negatively affected by total value transactions (*LTVT*), a 1% standard deviation increase in total value transactions leads to a decrease in economic growth (*LGDP*) from period 2 to 10. Economic growth (*LGDP*) is below the steady state for since the beginning of period 2 to period 10. This may be caused by the 2008 financial crisis. Unemployment (*UNEMP*) negatively affect economic growth (*LGDP*) from period 1 to period 2, economic growth is below steady state from period 1 to period 2. At period 2 to 10, economic growth starts to sharply increase above the steady state, this corresponds to the results by (Al-Sawaiea, 2020). Foreign direct investment (*FDI*) negatively impact economic expansion (*LGDP*) from period 1 to period 2, economic growth is below steady state from period 1 to period 2. At period 2 to 10, economic growth starts to sharply increase above the steady state.



## **4.6. Variance Decomposition Results and Analysis**

The table below shows the variance decomposition findings of the panel vector error correction model system over ten years. According to Appendix C Table 6,

The variance decomposition of LGDP, which attributes 100% of economic growth to domestic innovations in the first year, it seems that domestic innovations are the primary drivers of economic growth. Domestic innovations show a gradual decline but not significant. Market capitalisation (*LMCAP*) has a small contribution of 3 percent at year 2, which slightly declines to 2 percent by year 10. Total value transactions (*LTVT*) is the one of the biggest contributor to economic growth (*LGDP*) with a contribution of 21 percent at year 2, we observe a steady decrease which reached 5 percent at year 10. Unemployment (*UNEMP*) has a negative effect on economic growth, it impact is fluctuating contribution which reaches maximum of 70 percent at year 2. Foreign direct invest (*FDI*), have a significant contribution ranging from 64 percent to 84 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 having a steady and increasing contribution in each period reaching a maximum of 84 percent. Total value transaction (*LTVT*) has the second highest contribution on market capitalisation, with contribution of 1.5 percent at the beginning from year 2 decreasing to 0.91 percent on period 10. Unemployment and foreign direct investment has the least contribution.

The variance decomposition of total value transaction (*LTVT*) shows that total value transaction has an endogenous impact in the first period, contributing 77 percent, while market capitalisation (*LMCAP*) is a significant contributor with 46 percent contribution in the first period, economic growth also has a contribution of 9 percent in the first period. Economic growth (*FDI*) and unemployment are the least contributors with a maximum contribution of 1.05 percent and 1.6 in period 10.

The variance decomposition of unemployment (*UNEMP*) shows that unemployment has a significant endogenous impact in the first period, with economic growth being a factor with an influence of 0.22 percent in the first period, market capitalisation (*LMCAP*) and total value transaction (*LTVT*) having an effect of 19 percent and 3 percent respectively in the first period. The impact of economic growth (*LGDP)* is significant on unemployment, the influence increases over time, the maxim reaching 32 percent in the 10th period. Other exogenous factors that influence unemployment significantly are market capitalisation and total value transaction accounting for a impact of 5 percent, while total value transaction affect unemployment by 13 percent on average across the 10 periods. Foreign direct investment accounting for 2 percent on average.

The variance decomposition of unemployment (*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 3 percent in the first period, market capitalisation (*LMCAP*) and total value transaction (*LTVT*) having an effect of 14 percent and 21 percent respectively in the first period. Unemployment having an impact of 14 percent. The impact of economic growth (*LGDP),* total value transaction (*LTVT) and* unemploymentis significant.

**Table 4.7. Variance Decomposition results**











## **4.7. Conclusion**

This article uses annual data from 1994 to 2023 to examine the relationship of how financial market profitability affects economic growth and unemployment, variables employed are as follows, economic growth, market capitalisation, total value transaction and unemployment, for the South African economy. The VECM model has been applied to investigate the dynamic link between the endogenous variables in question. The validity of the relationship among 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 2 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 among 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 an independent relationship between economic growth and market capitalisation at 5 percent level of significance. There is an independent relationship between economic growth and total value transaction, these findings inconsistent with the findings by (Khetsi, and Mongale, 2015) implying that financial market returns do not cause economic growth at 5 perecent significance level, thus findings do not agree with hypothesis (H1) holds that financial market returns significantly and favourably influences economic growth and (*H3)* which states that financialisation has a significant impact on economic growth. The findings of the Grange causality also indicate that there is 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 fulfill the increased economic growth objectives established by the South African government and also incorporate other financial market factors to stimulate the economic growth and increase employment in the economy. Base 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.

# References

Abiad, A., Leigh, D. and Mody, A., 2009. Financial integration, capital mobility, and income convergence. *Economic Policy,* 24(58), pp. 241-305.

Angrist, J.D. and Pischke, J.S., 2009. *Mostly harmless econometrics: An empiricist's companion*. Princeton university press.

Ang, B.W. 2004. Decomposition analysis for policymaking in energy:: which is the preferred method?. *Energy policy,* 32(9), pp. 1131-1139.

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

Al-Sawaiea, K.M., 2020. The relationship between unemployment and economic growth in Jordan: An empirical study using the ARDL approach. *International Journal of Innovation, Creativity and Change*, *14*(2), pp.1068-1083.

Atje, R. and Jovanovic, B., 1993. Stock markets and development. *European EconomicReview,* 37(2-3), p. 632–640.

Ayadi, R., 2013. *Financial Sector Development and Integration in the Southern and Eastern Mediterranean: Towards a long-term sustainable transition,* s.l.: MEDPRO Policy Paper No, 7.

Ayadi, R., Arbak, E., Naceur, S. and Groen, W. D., 2015. *Financial development, bank efficiency, and economic growth across the Mediterranean.* s.l.:Springer International Publishing.

Bangura, Y., 2019. Convergence is not equality. *Development and Change,* 50(2), pp. 394-409.

Barro, R. and Sala-I-Martin, X., 1997. Technological diffusion, convergence, and growth. *Journal of Economic Growth,* Volume 2, pp. -26.

Brainard, W.C. and Tobin, J., 1968. Pitfalls in financial model building. *The American economic review*, *58*(2), pp.99-122.

Ben-David, D. and Kimhi, A., 2004. Trade and the rate of income convergence.. *The Journal of International Trade and Economic Development,* 13(4), pp. 419-441.

Bolbol, A., Fatheldin, A. and Omran, M., 2005. Financial Development, Structure and Economic Growth: The Case of Egypt, 1974-2002. *Research in International Business Finance,* Volume 19, pp. 171-194.

Cobb, C. W. and Douglas, P. H., 1928. A Theory of Production. *The American Economic,* 18(1), p. 139–165.

Cooray, A., 2009. The Financial Sector and Economic Growth. *Economic Record,* Volume 85, pp. S10-S21.

Cooray, A., 2010. Do stock markets lead to economic growth?. *Journal of PolicyModeling,* 32(4), p. 448–460.

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

Chirila V., Turturean, C. and C. Chirila, 2015. Volatility Spillovers between Eastern European and Euro Zone stock markets, *Transformations in Business & Economics,,* Volume 14, pp. 464-477.

Darrat, A., Abosedra, S. and Aly, H., 2005. Assessing the Role of Financial Deepening in Business Cycles: The Experience of the United Arab Emirates. *Applied Financial Economics,* 15(7), pp. 1-17.

Didier, T., Levine, R., Montanes, R.L. and Schmukler, S.L., 2021. Capital market financing and firm growth. *Journal of International Money and Finance*, *118*, p.102459.

Epstein, B. and Shapiro, A., 2018. *Financial Development, Unemployment Volatility, and Sectoral Dynamics,* s.l.: Munich Personal RePEc Archive, MPRA Paper No. 88693.

<http://www.eskom.co.za/AboutElectricity/ElectricityTechnologies/Pages/Understanding_Electricity.aspx>
(Accessed 25 May 2024).

Farida, Y., Hamidah, A., Sari, S.K. and 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), pp.309-322.

Gatti, D. and Vaubourg, A., 2009. *Unemployment and finance: How do financial and labour market factors interact?,* s.l.: No 4075, IZA Discussion Papers, Institute of Labor Economics (IZA). .

Haibo, C., Manu, E. and Somuah, M., 2023. Examining Finance-Growth Nexus:Empirical Evidence From the Sub-Regional Economies of Africa. *SAGE Open,* 13(1).

Harger, K., Young, A. and Hall, J., 2017. Globalization, institutions, and income convergence. *Journal of Regional Analysis and Policy.*

Hlongwane J, T. and 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.*

Kaitila, V., 2013. *Convergence, income distribution, and the economic crisis in Europe(No. 14).* s.l.:ETLA Working Papers.

Kanberoğlu, Z., 2014. Finansal sektör gelişimi ve işsizlik: Turkiye örneği. *Ekonomik ve Sosyal Araştırmalar Dergisi,* 10(1), pp. 83-93.

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. j*ournal of Economics and International Finance,* 5(7), pp. 273-286.

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

Karwowski, E. and Stockhammer, E., 2017. Financialisation in emerging economies:a systematic overview and comparison with Anglo-Saxon economies. *Economic and Political Studies,* 5(1), pp. 60-86.

Khalid, W., Akalpler, E., Khan, S. and Shah, N.H., 2021. The Relationship Between Unemployment and Economic Growth in South Africa: VAR Analysis. *Forman Journal of Economic Studies*, *17*(1).

Khetsi, Q. S. and Mongale, I. P., 2015. THE IMPACT OF CAPITAL MARKETS ON THE ECONOMIC GROWTH IN SOUTH AFRICA. *Journal of Governance and Regulation,* 4(1).

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

King, R. G. and Levine, R., 1993. Finance and Growth: Schumpeter Might Be Right. *The Quarterly Journal of Economics,* 108(3), p. 717–737.

Levine, R. and Zervos, S., 1998. Stock Markets, Banks, and Economic Growth. *The American Economic Review,* 83(3), p. 537–558.

Mabeba, M., 2023. Financialisation and Economic Growth Nexus in South Africa. *Journal of Economics and Financial Analysis,* 7(1), pp. 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), pp. 66-81.

Mankiw, N. G., Romer, D. and Weil, D., 1992. A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics,* 107(2), pp. 407 - 437.

Matallah, S., 2020. Economic diversification in MENA oil exporters: Understanding the role of governance. *Resources Policy, ,* Volume 66, p. 101602.

Minier, J., 2003. Are Small Stock Markets Different?. *Journal of Monetary Economics,* Volume 50, pp. 1593-1602.

Ngcobo, R. and Wet, M. C. D., 2024. The Impact of Financial Development and Economic Growth on Renewable Energy Supply in South Africa. *Sustainability,* Volume 16.

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

Ogbeide, F., Kanwanye, H. and Kadiri, S., 2015. The determinants of unemployment and the question of inclusive growth in Nigeria: Do resource dependence, government expenditure and financial development matter?. *Journal of Economics,,* 11(2), pp. 49-64.

Perilla Jiménez, J., 2020. Testing the impact of technology diffusion and innovation on long-run growth using cointegration techniques. *The Journal of International Trade & Economic Development,* 29(6), pp. 748-773.

Phillips, D., Harris, J., Wit, M. d. and Matchan, E., 2018. Provenance history of detrital diamond deposits, West Coast of Namaqualand, South Africa. *Mineralogy and Petrology,* Volume 112, pp. 259-273.

Prochniak, M. and 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*, pp.295-337.

Sawyer, M., 2013. What is financialization?. *International journal of political economy*, *42*(4), pp.5-18.

SA, S., 2022. *Stats SA.* [Online]
Available at: <https://www.statssa.gov.za/?p=15601>
(Accessed 25 May 2024).

Shabbir, G., Anwar, S., Hussain, Z. and M, M. I., 2012. Contribution of financial sector development in reducing unemployment in Pakistan. *International Journal of Economics and Finance,* 4(1), pp. 260-268.

Sharma, S. and Sharma, S.K., 2020. Financial development and economic growth in selected Asian economies: A dynamic panel ARDL test. *Contemporary Economics*, pp.201-218.

Sims, C.A., 1980. Macroeconomics and reality. *Econometrica: journal of the Econometric Society*, pp.1-48.

Solow, R., 1956. *A Contribution to the Theory of Economic Growth.*
Available online at: [http://piketty.pse.ens.fr/files/Solow1956.pdf](http://piketty.pse.ens.fr/files/Solow1956.pdf%20)

(Accessed 18 May 2022).

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), pp. 337-339.

Usman, M., Fatin, D.F., Barusman, M.Y.S. and 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).

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), p.228.

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

Ziramba, D., 2016. *University of Zululand.*
Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://uzspace.unizulu.ac.za/server/api/core/bitstreams/215d0d1c-3ea2-434a-8dd3-fceb880030aa/content
(Accessed 26 September 2024).

Zhao, R., 2019. Technology and economic growth: from Robert Solow to Paul Romer. *Human Behavior and Emerging Technologies*, *1*(1), pp.62-65.

Zhou, S. and Tewari, D.D., 2019. Shadow banking, risk-taking and monetary policy in emerging economies: A panel cointegration approach. *Cogent Economics & Finance*, *7*(1), p.1636508.