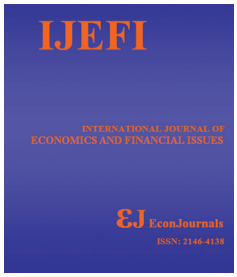

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The Financial Economic Development Agenda of the SADC Region

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ABSTRACT

Financial markets have been used in developing economies to raise and maintain these economies social stability level, and to facilitate economic development. Economic development is about the upliftment of the living standards and freedom of the citizens by upgrading the quality of human lives. The study strove to realise the objective of determining if different forms of financial markets can influence economic development in selected Southern Africa Development Community (SADC) countries. Panel econometric techniques were utilised and periods examined spanned from 2007 to 2021. Economic development may not be quantified using a single indicator. Economic development as the dependent variable was measured by the Economic Development Index (EDI) which was constructed using indicators such as the Human Development Index, Economic Complexity Index and Gross Domestic Product per capita. The money market, stock market and foreign exchange market were found to negatively influence EDI in the long-run. Financial markets can be stated to influence the development and economic performance of the selected SADC countries. Based on the findings, it is recommended that monetary authorities and regulatory authorities ensure that the monetary, fiscal, and financial policies are well managed, and that these policies are implemented to develop the social and economic level of the country.

Keywords: Southern Africa Development Community, Economic Development Index, Financial Markets, Human Development Index, Economic Complexity Index
JEL Classifications: G1, O11, O15, O16

1. INTRODUCTION

For many developing economies, financial markets have been used to raise and maintain their social stability level, and to facilitate economic development (Mosteanu, 2017; Redmond and Nasir, 2020). Economic development is an effort to expand the welfare and standard of living for the entire society, where low-income national economies are transformed (Suryani and Woyanti, 2021; Okoronkwo et al., 2023). Economic development may not be quantified using a single indicator, since it is both positively and adversely correlated with a number of national activities (Singh et al., 2021). Hence, human development index (HDI), Economic Complexity Index (ECI) and Gross Domestic Product (GDP) per capita have been considered in this study to construct an Economic Development index (EDI) to measure economic development. HDI is an important metric that is used to assess a nation's overall achievement in its economic and social dimensions (Suryani and Woyanti, 2021; Mothafar et al., 2022).

Economic development across countries can also be explained by the global trade network structural properties (Mealy et al., 2017). The ECI is one of the network measures. The concept of economic complexity is viewed to support economic ideas such as that education, technology advancements, knowledge and institutions are a requirement for an economy to experience economic development and growth (Albeaik et al., 2017). A country's growth rate can further be reflected in the value of the GDP per capita (Elistia and Syahzuni, 2018). GDP per capita, is the most widely used method of measuring people's quality of life and total economic welfare (Dědeček and Dudzich, 2022). Economic growth

is stated to be one of the components of economic development. Growth can only result into economic development when combined with the structural change of the society (Redmond and Nasir, 2020). The direction of the link between the development of financial markets and economic expansion can also be assessed by the stages of economic development. Financial development is closely linked to the expansion of financial markets (Nasir et al., 2021). Thus, domestic financial markets and conditions do influence the aspects of economic progress (Arif and Khan, 2019). The stock market, foreign exchange (forex) market and money market are the financial markets used in the study.

Stock markets have a major influence on capital allocation, investment, funds, and business opportunities and, this will eventually create paths for economic development. The stock market's role in the performance of economic development has a significant effect on economic growth. Financial markets were created to broaden the number of financial services offered. Stock markets can increase liquidity and invest in efficient ways which can raise economic progress and development, this is referred to as the supply-leading hypothesis (Borteye and Peprah, 2022). Forex markets had more interdependence over the years due to sustained international diversification and financial integration. The forex market is viewed as part of the largest financial markets in the universe (Yang et al., 2019; Aslam et al., 2020). The money market exists not only to enhance investors' financial status, but also contributes to economic stability and development (Orugun et al., 2020; Olulu-Briggs, 2021). According to Ehiedu et al. (2023), economic development and growth can be promoted by money markets through the provision of short-term liquidity to banks, governments, and other organisations.

In Southern Africa Development Community (SADC) countries, financial increase and economic development have been recognised as a key to removing poverty and attaining prosperity inside the vicinity. The SADC countries are primed to pursue economic development. SADC has been in existence since 1980 and was formed by Southern African governments of Tanzania, Mozambique, Angola, Botswana, Swaziland (also known as Eswatini), Malawi, Zambia, Lesotho, and Zimbabwe. SADC later included countries such as Madagascar, Mauritius, South Africa, Namibia, Democratic Republic of Congo (DRC), Seychelles and further added Comoros in 2017, as sixteen-member area integrated trade group. This study focused on some selected SADC countries, namely; Tanzania, Mauritius, South Africa, Namibia, and Botswana. Economic development comprises numerous economic concerns. Most of the SADC member states have not been able to maintain steady economic development. SADC nations are developing and underdeveloped due to problems of illiterate citizens, overburdened health systems and illnesses (Kapingura et al., 2022). High rates of unemployment and underemployment are some of the problems in the SADC region. Hence, developed countries have high values of HDI, while developing countries have medium and low values (Yumashev et al., 2020).

In the study of Yameogo et al. (2014) it was found that African economies are not complex, and that exports were weakly diversified and sophisticated. Namibia is one of the SADC countries that is relatively less complex and with a low ECI (Hausmann et al., 2022). Ashraf et al. (2023) states that a country with a low ECI limits the country from participation in the global value chain (GVC) and other potential benefits that are associated with a higher ECI. The country's trade and financial markets can be opened through globalisation as it can assist innovators to commercialise products exportation. It can also assist innovators to get external finance from international investors. Efficiency in markets and financial institutions contribute positively to economic development, by enabling the reduction in inequality which is prompted by economic deprivations (Redmond and Nasir, 2020). Hence, it was imperative to find out if financial markets can enhance economic development in the SADC region.

The rest of the article proceeds as follows; the literature review is presented next, followed by the research methodology, empirical results and discussion, the conclusion, and recommendations, the contribution and limitations of the study, and lastly acknowledgements and declarations.

2. LITERATURE REVIEW

This section discusses the theoretical literature and empirical literature. The theoretical literature focuses on theories linking to the financial markets and economic development.

2.1. Theoritical Literature

The Linear stages of growth theories and the supply-demand leading hypothesis were adapted.

2.1.1. Linear stages of growth theories

The Classical economic development theory was adapted, namely; the Linear stages of the growth model. There is a variety of linear stages of growth theories, i.e., the Rostow Stages of Growth and the Harrod-Domar Growth Model (Todaro and Smith, 2014).

2.1.1.1. Rostow stages of growth

For an economy to develop, a country had to go through several development stages (Kesgingöz and Dilek, 2016). Rostow classified the economic development stages into five different categories, the traditional society, precondition take-off (transitional stage), take-off, the drive to maturity and the high mass consumption stage (Kesgingöz and Dilek, 2016; Khan and Slavador, 2017; Gumbis, 2019). A country commences with the traditional society, where agriculture plays a big part in the overall economy. The transitional stage was emphasised by Rostow between the traditional stage and the take-off stage. A phase during which nations created the preconditions essential for the take-off, including better technologies, increased social mobility for individuals, and higher investment rates (Costa et al., 2016). In the transitional stage, there is an increase in the efficiency of agricultural production and therefore leading to an increase in trade activities (Gumbis, 2019). At the same time, more business sectors emerge. The growth rate of investments and savings also increase at this second stage (Khan and Slavador, 2017). Financial markets coordinate savings, investments, and the funnelling of funds among investors, firms, and individuals at this stage.

When the conditions for rapid economic growth have occurred, where the society has entered the take-off stage moving towards industrialisation, labour gradually shifts from the agriculture field to manufacturing. The drive to the maturity stage, is attained when the economy diversifies into new sectors. A wide variety of investment opportunities can be created through technological innovation. Thus, investment increases income, which in turn generates more savings to finance additional investment (Khan and Slavador, 2017; Gumbis, 2019). In the high mass consumption stage, the economy is orientated towards mass consumption. Industries that produce consumer durables expand, and the service sector gradually takes over (Gumbis, 2019). It is evident from the Rostow's growth theory that financial markets can start to develop when the economy approaches an intermediate stage in the development process (Taddese Bekele and Abebaw Degu, 2023).

2.1.1.2. Harrod-Domar growth model

The modern economic theories started in 1939, with the Harrod-Domar model as an integration of both Harrod (1939) and Domar (1946) growth models. The Harrod-Domar model seeks to achieve full employment by establishing an equilibrium between saving, income, investment, and production. According to Kesgingöz and Dilek (2016), and Adhikari (2018), economic development means an increase in savings and investment, which is a main source of capital accumulation. Thus, investment and savings are fundamental for the model (Anthony et al., 2015; Coccia, 2019). To promote development and growth in an economy, there should be mobilisation of savings and generation of investments (Todaro and Smith, 2014; Anthony et al., 2015; Adhikari, 2018). Hence, the prominent models to analyse economic development and growth are the Harrod-Domar models. Propositions from the Harrod-Domar model are that savings entail a proportion of national income.

$$\frac{\Delta Y}{Y} = \frac{s}{k} \quad (1)$$

In equation (1), Y denotes total income or output, s the savings rate and k the capital-output ratio/investment. Equation (1) implies that the national income growth rate is directly and positively linked to the savings ratio, in the absence of government. The more the economy saves and invests, that will lead to an increase in economic development (Todaro and Smith, 2014).

$$g = \frac{s}{k} \quad (2)$$

In equation (2), g denotes economic growth rate. Equation (2) implies that economic growth is a direct function of the savings ratio and an inverse function of the capital-output ratio/investment ($g = f(s,k)$)(Anthony et al., 2015; Adhikari, 2018). The Harrod-Domar model states that growth is sustainable when all three growth rates are equal, specifically, the actual growth, guaranteed growth, and natural growth. Such a situation was referred to as the golden age, where an efficient utilisation of capital and labour was ensured by the attained macroeconomic balance. The savings rate is determined outside the model as it is exogenous (Piętak, 2014; Anthony et al., 2015). Equilibrium, though, necessitates the equalisation of savings, which depend on households, and investments, which are often controlled by capitalists (Piętak, 2014; Kesgingöz and Dilek 2016).

2.1.2. Supply and demand leading hypothesis

There have been debates in literature on the financial growth nexus that effectively established that financial systems contribute to economic development. Some scholars believed that financial deepening does not cause any economic development. Both arguments led to the supply and demand leading hypothesis. The supply leading hypothesis was brought forth by Mckinnon (1973) and Shaw (1973); whereas Friedman and Schwartz put forth the demand leading hypothesis in 1963 (Pan and Mishra, 2018). The supply leading hypothesis assumes that financial development improves economic growth (Pan and Mishra, 2018; Opoku et al., 2019; Taddese Bekele and Abebaw Degu, 2023). Thus, the development of financial markets positively influences economic development (Adeyeye et al., 2015; Pan and Mishra, 2018).

According to the supply leading hypothesis, the financial institutions' actions that involve intermediation activities make the real sector to increase its capacity of production, which will lead to the enlargement of the economy's productive base (Taddese Bekele and Abebaw Degu, 2023). When financial markets are well-developed and interest rates liberalised, this could lead to increased real interest rates, further leading to increased savings and investment, and in return, enhancing capital accumulation efficiency and eventually economic development and growth.

The demand leading hypothesis, which postulated that there is a casual connection between economic growth and financial sector development, is contrary to the supply leading hypothesis (Adeyeye et al., 2015; Taddese Bekele and Abebaw Degu, 2023). Economic expansion thus forces the real sector to boost its demand for financial services to handle the rise in productivity and assist in developing better financial markets. Economic growth results in the presence and formation of the financial sector (Pan and Mishra, 2018). Adeyeye et al. (2015) state that the demand leading hypothesis usually prevails when the economy continues growing.

2.2. Empirical Literature

This section of the literature review encapsulates relevant studies pertaining to the financial markets and economic development in SADC countries and other countries.

Nguyen et al. (2020) study examined how financial development and patents affected economic complexity in 20 middle- and 32 high-income economies. The panel cointegration test proved that a long run association existed between financial development, patents and ECI. Bi-directional relationship was found between financial development, patents and ECI. It was, however, found that patents had a significant positive influence on the ECI, while financial development negatively influenced ECI.

Adoms et al. (2020) investigated the kind of relation capital markets and economic development might have in three Sub-Saharan countries, namely; South Africa, Nigeria, and Kenya. The ex-post facto research design was used, looking at periods from 1990 to 2018. Economic development as a dependent variable was measured in terms of the HDI, while the stock market standing for capital markets, was unbundled into independent variables such as stock market turnover ratio, stock market capitalisation and value

of stock traded. Inflation was also another included variable. The study revealed a significant connection between stock market and HDI in South Africa and Nigeria, excluding Kenya, which confirms the finance-led growth hypothesis theory. The variables were of *I*(0) and *I*(1), mainly for Kenya and Nigeria, while for South Africa all variables were of *I*(1), thus showing the variables to be stationary, giving procession to the autoregressive distributed lag (ARDL) bounds test that showed that in Nigeria, there is no cointegrating relation between stock market variables and HDI. For South Africa and Kenya, there was a long run association between stock markets variables and economic development.

Olulu-Briggs (2021) analysed the influence that the money and capital market had on Nigeria's economic performance, data from 1981 to 2019 were employed. Performance of the economy was measured by HDI as the dependent variable. The money market was proxied by its instruments, namely; commercial papers, treasury bills, certificate of deposits, and bankers' acceptance, while capital market was measured by bonds, equities, and government securities. A cointegrating relationship was found among the money market, capital market and HDI. The estimated ECM, which links the HDI short run movements to its long run estimates, revealed that equilibrium status can be reached during the financial institutions' 1 year period of uncertainty. A unidirectional causal relationship between bankers' acceptance and HDI, commercial papers and HDI, and HDI and treasury bills was found. Furthermore, there was a unidirectional relationship between government securities and HDI, implying that when HDI increases, there will more trading activities in bankers' acceptance, government securities, treasury bills and commercial papers.

Pan and Mishra (2018) investigated the interplay between stock market development and economic growth in China. The study looked at various channels in which financial markets drive economic growth. The findings of the study revealed that there was a long run negative association between the Shanghai A share market (stock market) and economic growth. The negative relationship was stated to be due to the existence of irrational prosperity on stock markets. Furthermore, the causality test proved that economic growth spurs development of stock markets as supported by the demand driven hypothesis. Pradhan et al. (2020) used panel data to study the development of the stock and bond market, and economic growth, including two macroeconomic variables. The focus was on the G-20 countries from 1991 to 2016, using the panel VAR model to analyse the nature of any causal link. It was found that a cointegrating relationship was present, between the stock and bond market development, and economic growth, the real interest rate and inflation. The causality test found that economic growth in the long run was Granger caused by stock and bond market development, inflation, and real interest rate.

Babarinde et al. (2021) analysed the country of Nigeria's money market and economic development between 1981 and 2018. It was found in the study that there was a strong and significant positive correlation between the money market and economic growth. Furthermore, that the money market positively and significantly affected economic growth in Nigeria. However, the causality results presented a unidirectional relationship, which flowed from the money market to economic growth.

Sahoo (2014) empirically evaluated the role of India's financial intermediation and economic development, looking at the bank and market-based systems. The study makes use of data from 1982 to 2012. Economic development was proxied by real GDP, for bank-based financial development the private sector credit to GDP ratio was used. The market based financial development was represented by the market capitalisation to GDP ratio. The ARDL test was conducted in the study. It revealed that the bank and market-based financial deepening contribute positively to India's economic development, the former was found to have a greater influence on the country's economic growth. The Granger causality test confirmed the supply-leading hypothesis, as the was causation from the private sector to real GDP. No causal link was found between stock market capitalisation and real GDP.

Haguiga and Amani (2019) made use of panel data from 2005 to 2014 to analyse the effect of financial development on economic growth in 13 Algerian commercial banks. In the analyses it was found that economic growth was positively affected by the development of financial markets in Algeria. Mosteanu (2017) investigated how financial markets played a key role in influencing a country's economic and social life. The years analysed ranged from 2000 to 2016. The study utilised data from countries with strong financial market activity using conventional financial systems, namely; Germany, United Kingdom, United States and France, including those using Islamic finance systems such as Saudi Arabia and United Arab Emirates and emergent economies whose financial markets are at an incipient level like Italy, Spain, Hungary, Greece, Bulgaria, Poland, Czech Republic, and Romania. This was used to show that indeed financial markets contributed to social development, economic development, and growth, including investments.

The panel Granger causality test was utilised by Bara et al. (2016) to explore whether there is a link between financial innovation in SADC and economic growth. The outcome indicated that there is no causality in any path both inside the short and lengthy run between financial innovation and growth. There have been debates on whether financial development results in economic growth or economic growth results in financial development, or maybe a two-way relationship exists. Several studies located that there exists a bi-directional relationship and at the same time, a handful supplied evidence of neutrality of financial development and economic growth.

3. RESEARCH METHODOLOGY

This section presents the adopted research methods based on the reviewed literature and objective of the study. The section further sheds insight on how this study's data collecting, model specification and model estimation processes worked.

3.1. Data

Panel annual data from 2007 to 2021 were used, from selected SADC countries namely Botswana, Tanzania, Namibia, South

Africa, and Mauritius. Data for the following variables: Financial markets (forex markets index, stock markets index and money markets), and economic development that is measured in terms of the economic development index (EDI) were obtained from secondary sources, namely, the World Bank, Our World in data, the Observatory of Economic Complexity and Atlas Economic Complexity databases. For stock markets the stock market return data was used, which is the annual stock market index growth rate. The financial markets are expected to have a positive and significant influence on economic development. The EDI which is a proxy for economic development was constructed making use of HDI, ECI and GDP per capita. To accomplish the objectives of the study, an EDI was constructed through the principal component analysis (PCA). According to Lindman and Sellin (2011), and Jolliffe and Cadima (2016) the PCA is an old and frequently used tool for index creation because its primary goal is to reduce the dimensionality of data without losing important information.

The PCA based EDI is a good proxy for economic development. HDI combines all the major economic and social indicators that are responsible for economic development (Yumashev et al., 2020; Mothafar et al., 2022). To understand economic development and to predict the level of income, the ECI is a very useful index (Mao and An, 2021). Elistia and Syahzuni (2018) states that GDP per capita serves as an indicator of a country's welfare, as a country's human development relates to an influence on economic growth which is seen in the GDP per capita.

3.2. Theoretical Framework

Following the background of the theories used in the study, they are adopted under the theoretical framework, especially the framework brought forth in the Harrod-Domar model, which showed that economic growth is a function of the saving growth rate and investment (Anthony et al., 2015; Adhikari, 2018). The functional form of the model was stated as:

$$G = f(s,k) \tag{3}$$

The equation (3) perfectly illustrates how there is a link between financial markets and economic development. By the channelling of savings and investments through financial markets.

3.3. Model Specification

From the theories and theoretical framework, the functional modified mathematically model for the role of financial markets on economic development in some selected SADC countries was presented as:

$$EDI = f(Financial\ Markets) \tag{4}$$

The above equation (4) can further be presented in a dynamic in terms of a panel series:

$$EDI_{it} = \beta_0 + \beta_1 StockMINDX_{it} + \beta_2 MMINDX_{it} + \beta_3 ForexM_{it} + \varepsilon_{it} \tag{5}$$

$$EDI_{it} = \beta_0 + \beta_1 StockMINDX_{it} + \beta_2 LMMINDX_{it} + \beta_3 LForexM_{it} + \varepsilon_{it} \tag{6}$$

Where EDI = the economic development index, $StockMINDX$ = the stock markets index, $LMMINDX$ = logged money markets index and $LForexM$ = logged forex markets index in the selected SADC countries. β_0 is the constant and, β_1, β_2 and β_3 represent the coefficient estimates. Where ε_{it} represents the error term.

3.4. Estimation Techniques

To investigate the role of financial markets on economic development in selected SADC countries, various panel econometric techniques were employed.

3.4.1. Descriptive statistic

Mothafar et al. (2022) postulate that for factual qualities of a dataset to be depicted and perfectly summarised, the descriptive statistic test can be used. The descriptive statistical test results are therefore provided based on the selected variables used in the study. Each variable can be a good single input variable for decision-making (Bennett et al., 2019). Given that descriptive statistics summarises a set of observations, it is possible to present most information in the most comprehensible way (Mishra et al., 2019). The variables underlying calculations are indicated by the descriptive statistic (Koondhar et al., 2021).

3.4.2. Correlation matrix

The correlation test assists to determine the type of relationship and impact between economic development, stock market, forex market, and the money market, whether there is positive or negative correlation between the variables used in the model (Bennett et al., 2019; Mohammed, 2022). Basically, the correlation test in the study determines the linear association between the distinct variables used.

3.4.3. Panel unit root tests

Frameworks have been established in recent years for implementing stationarity tests in panel data. Panel unit root tests offer the likelihood of improving some existing vital weaknesses of single time series tests, low power, and large size distortions. For every country in the panel, the panel unit root tests have a unit autoregressive root as the null hypothesis (Perman and Stern, 2003). According to Mothafar et al. (2022), the cross section and time series' econometric methods are less efficient as compared to the panel method. In the empirical analysis of panel data, the study of unit roots has played a vital role since the influential work of Quah (1994), as it enables a researcher to deal with more complicated models.

Panel data that is nonstationary combines the method of dealing with data that are nonstationary in time series and the increase in data including power from the cross section (Baltagi and Kao, 2000; Hurlin and Mignon, 2007). This study used the Levin et al. (LLC) (2002) test, Im et al. (IPS) (2003), and Fisher type tests based on the Augmented Dickey–Fuller (ADF) and Phillips-Perron (PP) tests.

The LLC unit root test is applicable for homogenous tests (Baltagi et al., 2007). According to the LLC (2002) test, to add more power to the stationarity test, correctional data must be pooled (Yahaya and Jalingo, 2021). LLC panel unit root test assumes that every individual unit has the same autoregressive coefficient, the test

considers for time effects, time trends and individual effects (Budiono and Purba, 2022).

3.4.3.1. Im et al. (2003) test

The IPS (2003) relaxes the restriction of homogeneity in the alternative hypothesis that is imposed by the LLC test (Yahaya and Jalingo, 2021). The IPS panel stationarity test is based on a heterogeneous model that entails testing whether the *N* independent test results of a hypothesis are significant (Maddala and Wu, 1999). This is an alternative strategy for testing that builds on the observed individual test significant levels, although the IPS test uses an average statistic (Hurlin and Mignon, 2007).

3.4.3.2. Fisher type tests (ADF and PP)

Another panel unit root test is the Fisher test that is based on joining different test significance levels. The panel Fisher type test was developed by Maddala and Wu (1999) (Kalymbetova et al., 2021). The Fisher test is nonparametric and with two degrees of freedom distributed as a Chi-squared variable (Maddala and Wu, 1999). A balanced panel is not necessary for the Fisher test unlike the IPS panel unit root test. The test can be conducted for any stationarity test derived, as various lag lengths in the individual ADF regression can be used. The Fisher ADF panel unit root test combines the probability values (P-values) of the test statistic for a unit root in each cross-sectional unit (Narayan et al., 2008).

The ADF test is the most commonly used stationarity test; however, the test is biased towards the acceptance of the alternative hypothesis of a unit root, in the presence of a structural change in the mean of a stationary variable. The ADF and PP tests are applied to test the null hypothesis that the model is non-stationary against the alternative hypothesis of stationarity.

3.4.4. Lag length selection criteria

The optimal lag must be determined after the unit root testing and before the panel cointegration tests can be performed. To select the optimal lag in the analysis to determine cointegration, the vector autoregression (VAR) lag order selection criteria is used (Tursoy, 2019; Pachiyappan et al., 2021). The most used minimum statistical criterions in selecting the lag length are the Akaike information criterion (AIC) (Akaike, 1974) and Schwarz Bayesian Information Criterion (SIC). The VAR lag order selection criteria consists of the sequential modified LR test statistic, final prediction error (FPE), AIC, SC, and Hannan-Quinn information criterion (HQ) (Ula, 2023).

3.4.4.1. Panel cointegration tests

Panel cointegration test is used vastly in empirical literature for its increased power that is usually gained by accounting for both the cross-sectional and time series dimension (Persyn and Westerlund, 2008). In panel data, residual based tests for cointegration were proposed by Kao (1999) and Pedroni (1995). Cointegration methods for univariate analysis include the Engle and Granger (1987) and Phillips and Hansen (1990) fully modified ordinary least squares (OLS) approach. With regards to the multivariate cointegration analysis, the well-known method is the maximum likelihood procedure of Johansen (1988), and Johansen and Juselius (1990).

Two types of panels' cointegration tests were presented by Kao (1999), namely; the Dickey–Fuller (DF) and ADF type tests. The Kao test is stated to have a higher power than the Pedroni's test when a modest number of observations are present in a panel (Chong et al., 2016). The Kao cointegration test accepts the heterogeneity among cointegrating vectors. However, due to the asymptotic equivalence, the independent variables endogeneity is violated. When there is an individual constant, the Kao (1999) cointegration test is usually estimated using the Newey-West estimator and Schwarz criterion (Kalymbetova et al., 2021). The Kao and Pedroni panel cointegration tests are residual based (Camba and Camba Jr., 2020).

The Johansen cointegration test can be used to assess the cointegrating vectors between the non-stationary variables of the model, making use of a maximum likelihood technique that tests for cointegrating ranks (Sultan, 2012). According to Pachiyappan et al. (2021), the presence of causality among the variables can be revealed by the Johansen cointegration method, although the Johansen cointegration method fails to indicate the direction of the casual relationship.

Dritsakis (2012) mentions that the Pedroni cointegration test has a similar approach as the Kao cointegration test. Pedroni's (1995) test allows for considerable heterogeneity and tests the null hypothesis of cointegration (Baltagi and Kao, 2000). The panel Pedroni residual-based cointegration test is established on seven criteria's, namely; the panel v -statistic, panel ρ-statistic, panel t-statistics (non-parametric), panel t-statistics (parametric), group ρ-statistic, group t-statistics (non-parametric) and group t-statistics (parametric). According to Shobande and Asongu (2021), the panel t and panel ρ are referred to as within the dimension residual-based cointegration tests, with group t and group ρ as panel group dimensions. The decision and hypothesis rule for the seven statistics under the Pedroni cointegration are the same.

The Fisher cointegration test is nearly a combination of the Johansen and Juselius test (Dritsakis, 2012). Once stationarity and the variables' order of integration has been identified, the presence of cointegration can be determined. The Johansen Fisher cointegration test was also conducted to check the presence of the long run equilibrium link between financial markets and economic development (Aderemi et al., 2019). This study conducted the panel Johansen cointegration test, Pedroni cointegration test, Kao cointegration test and the Johansen-Fisher cointegration test.

3.4.5. Panel autoregressive distributed lag (PARDL)

To estimate the long-term cointegrating relation among the variables, the ARDL approach is proposed by Pesaran et al. (2001) (Sanusi et al., 2019). The ARDL is advantageous because it increases the number of observations and allows to solve the lower power issue of unit root tests in small samples. The technique decreases problems of endogeneity and all variables used in the study were assumed to be endogenous (Molefhi, 2021). The ARDL is also advantageous in producing estimates of the long run coefficients that are consistent, which are asymptotically normal (Pesaran et al., 2001).

The ARDL is utilised when the variables in the empirical model are a mixture of $I(0)$ and $I(0)$, as the ARDL approach is flexible enough to be used when the variables are integrated of different orders (Nkoro and Uko, 2016; Molefhi, 2021). The approach does not include variable pre-testing. It is impossible for the standard cointegration test to have different optimal lags for different variables in the model unlike the ARDL approach. The approach is used to examine the existence of the long-run equilibrium relationship in the economic development financial market series.

3.4.6. Engle-Granger causality test

The Engle-Granger causality test is performed after cointegraton has been determined between economic development and the financial markets. The Engle-Granger causality test is frequently conducted in applied research to determine the direction of causality, to check if there is a bi-directional or uni-directional relationship among the variables (Gujarati, 2004). The causality test makes it simpler to understand the relationship dynamics among the variables in the short and long run. It makes possible for the speed of adjustment to return to equilibrium (Shobande and Asongu, 2021). In the Engle Granger causality test, the *X* variable causes *Y* in Granger's sense and one is able to check if the lagged values of *X* can assist improving the forecast of *Y* (Kisaka and Mwasaru, 2012). When the predictability of *Y* increases when *X* is considered, then variable *X* causes *Y* (Granger, 1969). If past values of *X* can explain *Y*, therefore Granger causes *Y* (Ndlovu, 2013).

3.4.7. Impulse response function and variance decomposition

The IRF and the variance decomposition methods are utilised to estimate the response of one shock to a specific variable in the model.

3.4.7.1. Impulse response function

The IRF can analyse the time-based profile of how shocks may affect financial markets and economic development in the future (Brahmasrene et al., 2014). The IRF will be performed to estimate how the response variable will respond to a shock in the error term directed to one or more equations included in the VAR system (Gujarati, 2004; Brooks, 2008). The evolution of economic shocks can be tracked through the system (Ula, 2023). The IRF also investigates the short run impact caused by the VAR model when it receives impulses and can also be used to explain the response to the error by the endogenous variables (Pilinkus and Boguslauskas, 2009).

3.4.7.2. Variance decomposition

The variance decomposition test is employed to analyses the VAR system dynamics while dividing the change of the endogenous variable into the component shocks to the VAR. Rafiq et al. (2009) state that the variance decomposition also provides information on the proportion of the dependent variables movements that take place because of their own shocks against shocks to other variables. The test allows the identification of the percentage proportions in the variance of the variables (Kurbanov, 2020). The test also estimates how much of a particular variable's *n-step-ahead* forecast error variation is explained by each variable innovation (Tursoy, 2019). It further indicates the degree a variable change under the impact of its own shocks and the impact of other variables' shock (Kurbanov, 2020).

3.4.8. Diagnostic test

Diagnostic test is performed, namely; the Jarque-Bera normality test. The diagnostic tests assist in detecting if the model has any misspecifications and to provide guidance for model improvements (Molefhi, 2021).

3.4.8.1. Jarque-Bera normality test

In econometric analysis, it is crucial to investigate to what extent the regression errors exhibit departures from normality (Pesaran, 2015). The normal distribution can be evaluated graphically and numerically. The graphic interpretation of the normality test has the advantage of allowing good judgement to assess normality when the numerical test might turn to be over or under-sensitive (Mishra et al., 2019). It is stated that when the $P > 0.05$ the null hypothesis is accepted, data will be referred to as normally distributed. Normally distributed data is assumed when the graph is bell-shaped and symmetric along the mean.

4. EMPIRICAL RESULTS AND DISCUSSION

The empirical analysis captured the role of financial markets on economic development. In this section, the panel findings were presented first. The objective is to find if the different forms of financial markets can influence economic development in selected SADC countries.

4.1. Empirical Results

The empirical estimation, presentation of the panel results obtained from the estimated model and interpretation are presented in this section.

4.1.1. Descriptive statistic results

The descriptive statistic result presents the summary statistics of the study's series, as the aim is to have prior information of the series past behaviour before conducting any other analysis. The measures of central tendency such as the mean, mode and median, including measures of dispersion are summarised in the test (Gashiten and Mutepfa, 2021). Table 1 shows the descriptive statistics results.

Descriptive statistics results provided in Table 1 indicate that EDI has a mean of −8.6%, with a standard deviation of 0.66, where the values lie between −1.18% and 1.54%. The mean value of −8.6% implies that the selected SADC countries are not performing well in terms of economic development. Economic development is sought after by every country (Tuhin, 2021). EDI has a Kurtosis of 2.41, which is <3, suggesting the series is not normal distributed. The stock market has a mean of 6.12%, a standard deviation of 17.37, where the values lie between −24.4% and 82.8%. The stock market has a higher Kurtosis of 7.36, which is >3, suggesting the series is normal distribution. The money market has a mean of 1.73%, a standard deviation of 0.23, where the values lie between 1.3% and 2.2%. The money market, just like EDI and the forex market, has a lower Kurtosis. Lastly, the forex market has a mean of 1.6%, a standard deviation of 0.88, where the values lie between

0.79% and 3.36%. It also has a lower Kurtosis of <3. From the descriptive statistic results the standard deviation shows that the stock market is more volatile than EDI, forex market and money market, which is the least volatile. The stock market has the highest mean, followed by the money market, however, only the stock market possesses the highest Kurtosis. Not all the variables are positively skewed, only the EDI, stock market and forex market are positively skewed. While the money market is negatively skewed.

4.1.2. Correlation matrix results

To discover the kind of relationship between the money markets, forex markets, stock markets and EDI, the correlation matrix was conducted. The decision rule according to Gujarati (2004) is that if the pair wise or zero order correlation coefficient between two regressors is high, more than 0.8, it is stated that multicollinearity is a serious problem. The outcome of the results is presented in Table 2.

The correlation results are provided in Table 2, the stock market and EDI show a positive correlation of 0.05, meaning a 1% increase in the stock market will result in a increase of 5% in EDI. The EDI and the money market have a negative correlation of 0.17. According to this, EDI will decline by 17% for every 1% increase in the money market. This finding is in contradiction with the study of Babarinde et al. (2021). The EDI and the forex market have a correlation of 0.07, which indicates that EDI and the forex market have a positive correlation. If the forex market increases by 1%, EDI will increase by 7%. Among the other variables, the money market has the highest adverse effect on EDI, while the stock market and forex market are beneficial contributors to economic development. It is evident from the findings that there is correlation among financial markets and economic development.

4.1.3. Panel unit root results

Before confirmation of the appropriate model specifications, the unit root tests have to be carried out first (Molefhi, 2021). Since spurious data are not likely to provide reliable estimates, the unit root test is conducted. Hence, the panel data analysis requires the data to be stationary. The stationarity of each variable used in the model was checked at the level and first difference. The LLC, IPS, ADF and PP Fisher Chi-square panel stationarity tests were used for checking the stationarity of EDI, stock market, money market and forex market. The null hypothesis in the stationarity test is that there exists a unit root, and the alternative hypothesis is that there is no unit root; therefore, the series is stationary. Table 3 presents the panel formal unit root results.

Table 3 shows the formal panel unit root tests and that not all the variables are of $I(0)$ or $I(1)$. The EDI shows that at levels it is stationary at the LLC, IPS, ADF and PP-Fisher Chi-square at the individual intercept and trend, and at None. The null hypothesis is rejected, and the alternative hypothesis is accepted at 1% and 5% levels of significance. To reach stationarity at the individual intercept, EDI was differenced once and the null hypothesis was of no stationarity was rejected at 1% significance level at the LLC, IPS, ADF and PP-Fisher chi-square. The EDI is thus found to be of $I(0)$ and $I(1)$. The stock market is of $I(0)$, meaning it is stationary at levels for all the tests, namely; all the tests at the IPS, ADF-Fisher, PP-Fisher, and LLC unit root tests. Under the stock market the P-values are all <0.01, hence the null hypothesis will be rejected and the alternative hypothesis that there is stationarity is accepted at 1% significance level. The money market is of $I(1)$ for all the formal panel unit root tests. The money market had to be differenced once to induce stationarity and the alternative hypothesis was accepted at 1% significance level. The forex market is of $I(1)$ just like the money market, for all tests, the LLC, IPS, ADF- and PP-Fisher Chi-square unit root tests.

From the findings, it is evident that the financial markets, and economic development are stationary at various levels. The results allow progression to the panel cointegration and PARDL as the approaches can only be conducted when the variables are integrated at different orders, which is $I(0)$ and $I(1)$. To capture the long run cointegration and short run dynamics the PARDL is to be conducted (Pan and Mishra, 2018). The PARDL model is stated to be the appropriate approach to use to determine if the various financial markets can influence economic development in

Table 1: Descriptive statistics results

	EDI	STOCKMINDX	LMMINDX	LFOREXM
Mean	−8.59E-17	6.124372	1.728799	1.552097
Median	−0.108786	5.915360	1.760633	1.159821
Maximum	1.539705	82.76039	2.203982	3.361305
Minimum	−1.183798	−24.38906	1.295353	0.788127
Standard deviation	0.658447	17.36719	0.233097	0.882473
Skewness	0.446155	1.504230	−0.383239	1.282706
Kurtosis	2.414997	7.359210	2.446132	2.964388
Jarque-Bera	3.557645	87.66730	2.794555	20.57064
Probability	0.168837	0.000000	0.247269	0.000034

Author's own computations

Table 2: Correlation matrix results

Variables	EDI	STOCKMINDX	LMMINDX	LFOREXM
EDI	1	0.05348394177285021	−0.1669400872770055	0.07488993100068552
STOCKMINDX	0.05348394177285021	1	0.02137819492297349	−0.06215683036985195
LMMINDX	−0.1669400872770055	0.02137819492297349	1	−0.6863207205461449
LFOREXM	0.07488993100068552	−0.06215683036985195	−0.6863207205461449	1

Author's own computations

Table 3: Formal panel unit root results

Series	Techniques	Model	Level	1st difference
EDI	LLC	Individual intercept	0.2821	0.0000***
		Individual intercet and trend	0.0019***	
		None	0.0017***	
	IPS	Individual intercept	0.5893	0.0000***
		Individual intercept and trend	0.0017***	
	ADF-fisher Chi-square	Individual intercept	0.7429	0.0000***
		Individual intercept and trend	0.0040***	
		None	0.0220**	
	PP-fisher Chi-square	Individual intercept	0.7330	0.0000***
		Individual intercept and trend	0.0124**	
		None	0.0060***	
StockMINDX	LLC	Individual intercept	0.0000***	
		Individual intercept and trend	0.0000***	
		None	0.0000***	
	IPS	Individual intercept	0.0000***	
		Individual intercept and trend	0.0000***	
	ADF-fisher Chi-square	Individual intercept	0.0000***	
		Individual intercept and trend	0.0000***	
		None	0.0000***	
	PP-fisher Chi-square	Individual intercept	0.0000***	
		Individual intercept and trend	0.0000***	
		None	0.0000***	
LMMINDX	LLC	Individual intercept	0.5607	0.0000***
		Individual intercept and trend	0.4290	0.0000***
		None	0.7462	0.0000***
	IPS	Individual intercept	0.8620	0.0000***
		Individual intercept and trend	0.7359	0.0000***
	ADF-fisher Chi-square	Individual intercept	0.4275	0.0000***
		Individual intercept and trend	0.7951	0.0001***
		None	0.9552	0.0000***
	PP-fisher Chi-square	Individual intercept	0.4541	0.0000***
		Individual intercept and trend	0.8446	0.0000***
		None	0.9120	0.0000***
LForexM	LLC	Individual intercept	0.1744	0.0000***
		Individual intercept and trend	0.1951	0.0000***
		None	0.9998	0.0000***
	IPS	Individual intercept	0.9346	0.0011***
		Individual intercept and trend	0.5295	0.0126**
	ADF-fisher Chi-square	Individual intercept	0.9887	0.0033***
		Individual intercept and trend	0.5818	0.0178**
		None	1.0000	0.0000***
	PP-fisher Chi-square	Individual intercept	0.9839	0.0003***
		Individual intercept and trend	0.8963	0.0011***
		None	1.0000	0.0000***

*Reject the null hypothesis only at 10%, **at both 5% and 10%, ***at 1%, 5% and 10%
Author's own computation

some selected SADC countries, as some variables were stationary at levels and others at first difference (Molefhi, 2021).

4.1.4. Lag selection criteria results

The suitable lag length for the study must be determined first before the cointegration results can be computed. Table 4 shows the number of lags to be selected. The lag selection helps with avoiding the misspecification problems in the analysis.

According to the results in Table 4, the use of five lags is justified by FPE and AIC criteria. However, the LR suggests four lags, the SC and HQ one lag. The AIC specifies that five lags must be used, as the criteria with the lowest value (−0.434876*) were selected to determine the number of lags to be used. The arbitrary or default lag might not always be the best, choosing the ideal lag for each of the study's models becomes crucial (Babarinde et al., 2021). The FPE and AIC as compared to the SC and HQ, are better criteria's at selecting lag orders when dealing with smaller samples. As justified by their ability, the SC and HQ are consistent criteria as they are better in selecting the correct order in larger samples (Lutkepohl, 2005). The AIC is usually used in the lag length selection (Tursoy, 2019).

4.1.5. Panel cointegration test results

Progression to conduct cointegration tests is allowed as the lag length criteria have been determined. It is important to check whether the series used in the study will be able to converge back to their long-term mean. When there is cointegration between the variables, it is an indication that the variables are significant and able to return to equilibrium. The null hypothesis is that there is no cointegration and the alternative hypothesis is that there is cointegration.

Table 4: Lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	−285.7956	NA	1.271677	11.59182	11.74479	11.65007
1	18.37861	547.5136	1.26e-05	0.064855	0.829665*	0.356099*
2	38.10985	32.35923	1.10e-05	−0.084394	1.292263	0.439845
3	49.62870	17.04790	1.36e-05	0.094852	2.083356	0.852086
4	75.67507	34.38121*	9.68e-06	−0.307003	2.293349	0.683226
5	94.87191	22.26833	9.49e-06*	−0.434876*	2.777322	0.788347

*shows the lag order selected
Author's own computations

Table 5: Panel Johansen cointegration results

Null hypothesis	Trace Statistic	Critical value at 0.05	Max-Eigen Statistic	Critical value at 0.05
None	48.07315	47.85613*	25.35694	27.58434
At most 1	22.71620	29.79707	13.69429	21.13162
At most 2	9.021911	15.49471	9.021184	14.26460
At most 3	0.000727	3.841465	0.000727	3.841465

*rejection of the null hypothesis at 5%
Author's own computations

4.1.5.1. Panel Johansen cointegration test results

The panel Johansen cointegration test is performed first to check if the financial markets are cointegrated with economic development. The outcomes are presented in Table 5.

Five lags were used in this test in accordance to the AIC lag length criteria. The panel Johansen cointegration outcome in Table 5 indicate that according to the trace statistic, there is one cointegrating equation. However, the maximum-eigenvalue test indicates no cointegrating equation. At a 5% significance level, the null hypothesis of no cointegration is rejected. The alternative hypothesis that there exists a long run relationship between the financial markets and economic development is accepted at 5% level of significance. When two or more variables in the study have a random walk component or are individually integrated, the variables are then cointegrated (Pesaran, 2015; Colmenares et al., 2021).

4.1.5.2. Panel Pedroni cointegration results

The panel Pedroni cointegration test results are indicated in Table 6, showing both the panel and group statistic. The panel statistic consists of four statistics, namely; the Panel v-Statistic, rho-Statistic, PP-Statistic and ADF-Statistic, while the group statistic consists of the group rho-Statistic, PP-Statistic and ADF-Statistic.

Table 6 provides that there are two cointegrating equations at panel ADF-statistic and group ADF-statistic under the panel and group statistics, where the P-values are 0.0116 and 0.0256. The P-values are <0.05, therefore we cannot accept the null hypothesis of no cointegration. Hence, 0.0116 < 0.05 and 0.0256 < 0.05 and P-values show that we reject the null hypothesis at 5% significance level. The alternative hypothesis is approved that there exists a long run cointegrating relationship between the financial markets, and economic development. This is supported by Salameh and Ahmad (2022), that financial markets are cointegrated with economic development. On contrary, panel v-statistic, panel rho-statistic, panel PP- statistic, panel group rho-statistic, and panel group PP- statistic report the absence of cointegration. However, it can be concluded that there exists a cointegrated relationship based on the findings reported by the panel ADF-statistic and group ADF-statistic. Shahbaz et al. (2021) study found the variables to be cointegrated in their study, however, under the panel v-statistic.

Table 6: Panel Pedroni cointegration results

Panel statistics	Probability	
Panel v-Statistic	0.4459	0.5560
Panel rho-Statistic	0.9089	0.8965
Panel PP-Statistic	0.4874	0.5790
Panel ADF-Statistic	0.0116	0.0883
Group statistics	**Probability**	
Group rho-Statistic	0.9927	
Group PP-Statistic	0.7166	
Group ADF-Statistic	0.0256	

Author's own computations

4.1.5.3. Panel Kao cointegration results

The panel Kao cointegration test was also performed to confirm and support the findings from the panel Johansen and panel Padroni cointegration results that there exists a cointegrating relationship. The panel Kao cointegration results are illustrated in Table 7.

The ADF test outcome in Table 7, in the panel Kao cointegration test, the P < 1% significance level. This is an indication that there is cointegration between the variables as 0.0016 < 0.01, meaning at 1% level of significance we accept the alternative hypothesis and reject the null hypothesis of no cointegration. Spurious regression can thus be avoided as cointegration is evident among the explanatory and response variables. There is a long run cointegrating relationship between the forex market, money market, stock market and EDI (economic development) in some of the selected SADC countries.

4.1.5.4. Panel Johansen Fisher cointegration results

To assess cointegrating vectors and to check the robustness, the panel Johansen Fisher cointegration test can be performed. The panel Johansen Fisher cointegration results are provided in Table 8.

According to the panel Johansen Fisher cointegration results in Table 8, the trace test shows four cointegrating equations and the

maximum-eigen test also shows four cointegrating equations. The Fisher trace test and Fisher maximum-eigen test indicates that all its P-values are <1%, meaning at all the cointegrating equations, we reject the null hypothesis and accept the alternative hypothesis of cointegration at 1% level of significance. The results show that there is a long-run relationship between the variables. This long run relation confirms the reliability and consistency of the empirical findings (Shahbaz et al. 2021).

4.1.5.4.1. Panel individual cross section results (panel Johansen Fisher cointegration test)

Findings from the panel individual cross section come from the panel Johansen Fisher cointegration results. Outcomes from the hypothesis of no cointegration and at most 1 cointegration relationship were interpreted in this study.

The individual cross section in Table 9 shows results from five selected SADC countries. The results from the hypothesis of no cointegration show that the P-values for the trace test statistic are all significant for the selected SADC countries. Unlike the max-eignvalue test statistics which provided that Tanzania is not significant with a P-value (0.0849) >0.05. Thus, only four cointegrating equations under the max-eignvalue test, under the country of Botswana, Mauritius, Namibia, and South Africa. These implies there are nine cointegrating equations. Therefore, the null hypothesis of no cointegration is rejected at 1% significance level. Under the hypothesis of at most 1 cointegration relationship, the results all show eight cointegrating equations as the P-values for the trace test and max-eignvalue test are <0.01 and 0.05. The country of Mauritius consists of P-values which are >0.05 at both the trace test (0.6088) and max-eignvalue test statistic (0.8290). In this case, the P-values for South Africa, Botswana, Namibia and Tanzania are all significant. The alternative hypothesis of cointegration in the model is accepted and the null hypothesis is rejected at both 1% and 5% significance levels. These findings illustrate that in the selected SADC countries there is cointegration between the financial markets, and economic development. Countries which have active financial markets with high volume of transactions can lead to an increase in investment volumes. The existence of active financial markets can further accelerate social and economic development. In such countries exist financial and fiscal stability (Mosteanu, 2017).

Table 7: Panel Kao cointegration results

ADF	T-statistic	Probability
ADF	−2.940621	0.0016
Residual variance	0.081428	
HAC variance	0.037843	

Author's own computations

Table 8: Panel Johansen Fisher cointegration results

Hypothesized No. of CE (s)	Fisher stat* (from trace test)	Probability	Fisher stat* (from max-eigen test)	Probability
None	163.8	0.0000	136.1	0.0000
At most 1	74.35	0.0000	49.52	0.0000
At most 2	40.07	0.0000	24.10	0.0073
At most 3	34.93	0.0001	34.93	0.0001

**rejection of the null hypothesis at 1% and * at 5%

Author's own computations

4.1.6. Panel autoregressive distributed lag results

To investigate the role of financial markets on economic development, the PARDL model was employed, showing the extent to which, EDI is influenced by the forex market, money market and stock market. The PARDL results show both the long and short run results. The PARDL approach was chosen as the variables are integrated of different orders, namely $I(0)$ and $I(1)$, as indicated in Table 3. in the panel unit root results. The PARDL long run outcome are provided in Table 10.

Long run equation:

The following long-run equation is derived using the estimated parameters that indicate the long-run elasticities:

$$EDI = -0.024667StockMINDX - 3.119732LMMINDX - 3.063479LForexM \quad (7)$$

It is evident from the outcome in Table 10 and the long-run equation that (7) stock market have an adverse impact on EDI. A 10% increase in the stock market will lead to a 0.2% decline in EDI, this finding is not line with the prior expectations of the study. The stock market influence on EDI has a P = 0.0000 which is <1% significance level, better performance of the stock markets in the selected SADC countries is required as it could be beneficial

Table 9: Panel individual cross section results (Panel Johansen Fisher cointegration test)

Cross section	Trace test statistics	Probability**	Max-Eign test statistics	Probability**
Hypothesis of no cointegration				
Botswana	155.2648	0.0000	88.8677	0.0000
Mauritius	63.4327	0.0009	46.0101	0.0001
Namibia	116.1618	0.0000	76.6863	0.0000
South Africa	118.8939	0.0000	61.7543	0.0000
Tanzania	60.7625	0.0020	25.7210	0.0849
Hypothesis of at most 1 cointegration relationship				
Botswana	66.3971	0.0000	29.7678	0.0024
Mauritius	17.4226	0.6088	9.0428	0.8290
Namibia	39.4755	0.0028	31.7906	0.0011
South Africa	57.1396	0.0000	35.7097	0.0002
Tanzania	35.0415	0.0113	22.4607	0.0323

Author's own computations

Table 10: PARDL long run results

Variables	Coefficient	Probability
STOCKMINDX	−0.024667	0.0000
LMMINDX	−3.119732	0.0000
LFOREXM	−3.063479	0.0000
SHORT RUN (SPEED OF ADJUSTMENT): −0.663944		0.0398

Author's own computations

Table 11: PARDL short run results

Variables	Coefficient	Probability
D (STOCKMINDX)	0.014905	0.0014
D (LMMINDX)	−1.060926	0.6556
D (LFOREXM)	4.832599	0.0720
(Speed of adjustment): −0.663944		0.0398

Author's own computations

to the development of economies. These findings are supported by the study of Pan and Mishra (2018), where it was found that the stock markets had an adverse effect on economic development. The possible explanation for such a relationship it might be that the government may use the stock market as a tool to accomplish certain objectives rather than as a true reflection of the economic development and the possibility of irrational prosperity on share markets that may cause financial bubbles

The money market has a negative influence on EDI, which means that a 10% increase in the money market will lead to an 31% decrease in EDI. The money market has a P = 0.0000, which indicates significance as it is <0.01 significance level. The results are in contradiction with the findings of Babarinde et al. (2021). The money market bears the greatest percentage in influencing EDI negatively of 31%, as compared to the stock market and forex market. Issoufou (2019) stipulates that money markets play a greater role in the development of the economy. The money market is stated to be a specialised exchange market where individuals can lend and borrow short-term (Orugun et al., 2020). In the study of Olulu-Briggs (2021) an association was found between the money markets and economic performance. Notable development has taken place in many economies as money markets provide funds to short term projects, including investments (Issoufou, 2019).

The EDI is also found to be negatively influenced by the forex market. The results confirm that a 10% increase in the forex market will result to 30% decrease in EDI. The forex market also shows a significant P = 0.0000 that is <0.01 significance level. The forex market has been stated to one of the biggest and oldest financial marketplaces in the world (Obura and Anyango, 2016). It is an indication that forex markets play a crucial role in economic development and stability as it can assist the economy to perform better in the global markets. Hence, the involvement of central banks in the forex market to accumulate foreign exchange reserves (Mminele, 2013).

The results of the financial markets negatively affecting economic development is not consistent with the prior expectations of the study. In the panel analysis of Haguiga and Amani (2019), development of financial markets was found to have a positive impact on the economy. It is evident that during the periods under consideration of some selected SADC countries in this study, the money market has the most significant adverse influence on EDI, followed by the forex market. Furthermore, that financial markets influence economic development in some of the selected SADC countries. The existence of active financial markets does accelerate economic development (Mosteanu, 2017). In the PARDL short run, the speed of adjustment is presented, determining at what rate or speed economic development will return to equilibrium. In the short run, the focus of this study was on the speed of adjustment also referred to as the ECT.

It is noticeable from the short-run PARDL results (Table 11) that the money market bears a negative sign. The money market also bears an insignificant P = 0.6556 which is >0.1 significance level. Unlike, the stock market and forex market, which has a P = 0.0014 and 0.0720, that is <0.01 and >0.05 level of significance. From the short-run results, it is indicated that the estimated speed of adjustment bears a negative sign and is significant. The estimated speed of adjustment is −0.66 and with a P = 0.0398 which is <0.05 significance level. These results imply that there is a relationship between the forex market, money market, stock market, and EDI. In addition, approximately 66% of disequilibrium will be corrected each year. It will take EDI 66% each year to return to equilibrium. This means previous year's shock disequilibria will converge back in the current year to equilibrium (Belloumi, 2014).

4.1.7. Panel Engle-Granger causality results

The panel Engle Granger causality test is conducted to examine which variables used in the model have statistical significance effects on other variables used in the study (Brooks, 2008; Rafiq et al., 2009). Thus, the Granger casualty has been used to estimate causality. Although the Granger causality test may provide misleading results it is helpful in determining whether there is a unidirectional or bidirectional relationship between the variables (Kisaka and Mwasaru, 2012). The null hypothesis is that Granger does not cause and the alternative hypothesis is that Granger does cause.

The Granger causality test uses the significance level of 5% in this study. From the results indicated in Table 12, it is evident that the stock market does Granger cause EDI as the P = 0.0149 is <0.05, however EDI does not Granger cause the stock market as the P = 0.0940 is >0.05 level of significance. This indicates a unidirectional relationship and significance, as we reject the null hypothesis and accept the alternative hypothesis at 5% significance level that the stock market does Granger cause economic development. The result is in line with that of Pradhan et al. (2020) that in the long run economic growth is Granger caused by the stock markets. However, the finding is in contradiction with that of Sahoo (2014), that there is no causal link between stock markets and economic development. Asari et al. (2011) stipulate that a unidirectional causal relationship comes to existence when changes in the explanatory variable Granger causes changes in the response variable, vice versa. It is evident from the unidirectional relationship between EDI and the stock market, that economic development in some of the selected SADC countries is driven by the stock markets. Development of

Table 12: Panel Engle-Granger causality result

Null hypothesis	PROBABILITY
STOCKMINDX does not Granger cause EDI	0.0149
EDI does not Granger cause STOCKMINDX	0.0940
LMMINDX does not Granger Cause EDI	0.0526
EDI does not Granger cause LMMINDX	0.0050
LFOREXM does not Granger cause EDI	0.9090
EDI does not Granger cause LFOREXM	0.1978
LMMINDX does not Granger cause STOCKMINDX	0.8831
STOCKMINDX does not Granger cause LMMINDX	0.1398
LFOREXM does not Granger cause STOCKMINDX	0.7915
STOCKMINDX does not Granger cause LFOREXM	0.0011
LFOREXM does not Granger cause LMMINDX	0.5838
LMMINDX does not Granger cause LFOREXM	0.2470

Author's own computations

financial markets is important in the development of the economy (Salameh and Ahmad, 2022).

The money market does not Granger cause EDI as 0.0526 > 0.05, implying that we reject the alternative hypothesis and accept the null hypothesis at 5% significance level. Babarinde et al. (2021) found that causality flowed from the money market to economic growth and not vice versa. The EDI does Granger cause the money market as 0.0050 < 0.01, implying significance as the null hypothesis is rejected at 1% significance level. The EDI does influence the money market and thus, indicates there exists a unidirectional association between EDI and the money markets, as the alternative hypothesis is accepted at 1% level of significance that EDI does Granger cause the money market. The forex market does not Granger cause EDI, the null hypothesis is therefore accepted. Any changes in the forex market will not cause any changes in EDI. The EDI also does not Granger cause the forex market. Changes in one of the variables will not influence or have an impact on the other. The money market does not Granger cause the stock market. The stock market, further, does not Granger cause the money market. In this case the null hypothesis is accepted at 5% level of significance. The forex market does not Granger cause the stock market. The stock market, however, does Granger cause forex market as 0.0011 < 0.01, implying that we accept the alternative hypothesis and reject the null hypothesis at 1% significance level. In this case, there exist a unidirectional relationship between the stock market and forex market. In the selected SADC countries, based on this finding, the forex market is driven by the stock market. The forex market and money market also do not influence each other as the P-values are insignificant, 0.5838 and 0.2470 are >0.05 level of significance.

It is evident from the results that there is a unidirectional relationship between stock market and EDI, EDI and money market, and the stock market and the forex market. The unidirectional relationships show that any changes in the stock market will affect economic development; any changes in economic development will influence the money market; any changes in the stock market will affect the forex market. However, the no bidirectional relationship between the variables was found, which would reveal if these variables are effective in forecasting each other. Nguyen et al. (2020) found financial development to have bidirectional relationship with ECI.

4.1.8. IRF and variance decomposition test results

4.1.8.1. Impulse response function

The IRF graphs indicate how responsive the response variable is to shocks of the explanatory variable. EDI is represented by the middle curve or line in the IRF graphs and runs over a period of 10 years.

In the IRF the variable of interest is the EDI. The IRF of EDI describes the reactions of EDI to financial markets variables (stock markets, money markets and forex markets). The IRF analysis results are discussed based on Figure 1, which has plots from the IRF, as many as 10 plots per year in the future to visually explain the response of EDI, stock market, money market, and the forex market. Responses arising from the shocks of each variable and the variables themselves. The response of EDI to EDI in Figure 1 is significant as the EDI line is above zero and positive, and further illustrates own shock. It seems to be declining from year 1 throughout to year 10. The line of the EDI seems to trend above the equilibrium line.

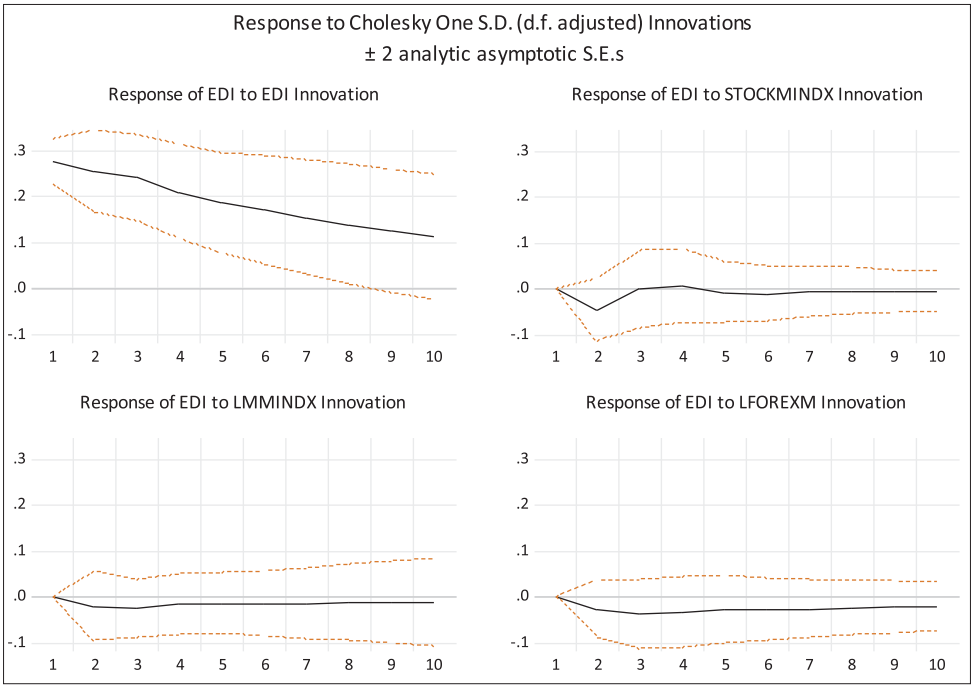
The response of EDI on the stock market suggests that after year 1-year 2, and after year 4-year 10, EDI responded negatively to the shocks of the stock market. As the EDI trends below zero, meaning that any shocks of the stock market influenced EDI negatively during those periods. The response of EDI to the money market graph indicates that shocks in the money market at the beginning of year 1 negatively influence EDI throughout to year 10. The response of EDI to the forex market shows similar results as the response of EDI to the money market, which shows that shocks in forex market have a negative influence on EDI from year 1 to year 10. From the IRF results, it is evident that the shocks of the stock market and forex market, including the money market in some years tends to give a negative response to economic development in the selected SADC countries.

4.1.8.2. Variance decomposition

In the variance decompositions results, period 3 indicates the short run and period 10 the long run. From the variance decomposition results, the total fluctuations become 100%, both in the short and the long run.

The results show the magnitude of the response of one variable as impacted by the shock from the other variable (Ula, 2023). Thus, Table 13 presents the variance decomposition results, which shows the response of EDI arising from own shock and the shock of the stock market, money market and forex market with forecasting from the next 10 years. In period 3, the short run, the innovation to EDI accounts for 97.55% variation of the fluctuation in EDI, which reflects own shock and is significant. EDI is shocked by its own innovations throughout other periods, from period 1 to 10. Shock to the stock market in the short run can cause 1.02% fluctuation in EDI. Shock to the money market can cause 0.47% fluctuation in EDI. Lastly, shocks to the forex markets can cause

Figure 1: IRF graphs



Author's own computations

Table 13: Variance decomposition results of EDI

Period	S.E.	EDI	STOCKMINDX	LMMINDX	LFOREXM
1	0.278983	100.0000	0.000000	0.000000	0.000000
2	0.383143	97.84507	1.439961	0.251152	0.463821
3	0.455612	97.54792	1.018315	0.465350	0.968414
4	0.503668	97.48211	0.859832	0.467634	1.190424
5	0.538623	97.47547	0.766092	0.466202	1.292238
6	0.566232	97.41144	0.723974	0.485932	1.378655
7	0.588019	97.35918	0.679152	0.505507	1.456165
8	0.605028	97.32251	0.644824	0.517358	1.515310
9	0.618472	97.28941	0.622328	0.527123	1.561135
10	0.629253	97.25561	0.606699	0.537279	1.600408

Author's own computations

0.97% fluctuation in EDI. The stock market is the financial market that is most responded to by EDI, in this case economic development, in the short run.

In the long run, period 10, shocks to EDI can contribute 97.26% variation of the fluctuation in EDI, that is own shock. Shock in the stock market can cause 0.61% fluctuation in EDI in the long run. Shock in the money market can cause 0.54% fluctuation in EDI. Shock to the forex market can cause a 1.60% fluctuation in EDI. Over the 10 years, the forex market is the variable that is most responded to by EDI, in this case economic development. The variance decomposition results show that the forex market and stock market are the factors that contribute the most to economic development in the selected SADC countries. Developed, well performing and active financial markets with high volumes of transactions are stated to be linked with economic development (Mosteanu, 2017; Kamalu et al., 2022; Salameh and Ahmad, 2022). From these findings, it can be concluded that financial markets do influence and play a greater role in the determination of economic development in some of the selected SADC countries.

4.1.9. Diagnostic test results

The statistical normality tests are used to ensure that the series is normally distributed.

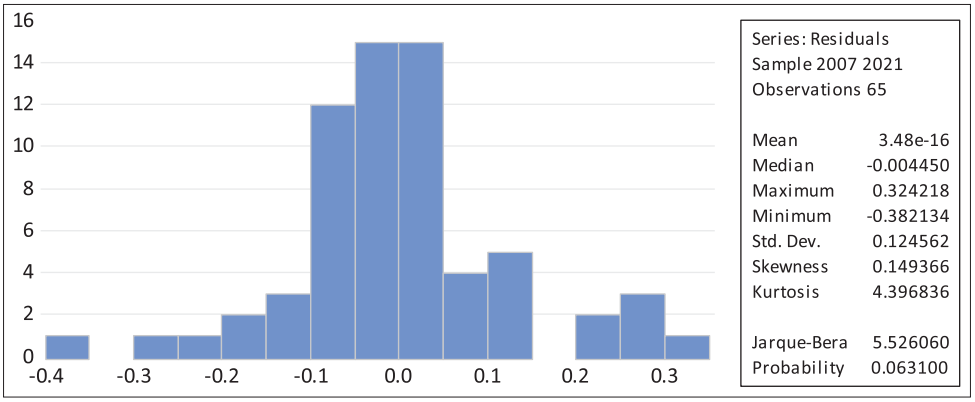
4.1.9.1. Jarque-Bera normality test

Figure 2 provides the normality test results, showing whether the model is normally distributed or not. From the results provided, it is evident that the Kurtosis is 4.396836, the Jarque-Bera is 5.526060 and the probability is 0.06. The Kurtosis is >3 which meets the requirements for a model to be normally distributed. The estimated P > 0.05. Based on the Kurtosis and the P-value, the model is normally distributed as the Kurtosis of 4.983098 is >3 and the P = 6% is >5%

5. CONCLUSION AND RECOMMENDATIONS

The aim of the study was to investigate the role of financial markets on economic development in some selected SADC countries from 2007 to 2021, using the PARDL econometric

Figure 2: Jarque-Bera normality test



methodology. From the adopted theory in the study, that is, the Harrod-Domar theory, economic development is linked directly to investment and savings, while savings is seen as a source of investment in the economy. Thus, an increase in savings will increase investments, which will further lead to an increase in the economic development of a country. Savings and investments are channelled through financial markets. Hence, the aim of the study. A clear understanding of economic development process in the SADC region is crucial, especially given that around 85% of the population around the world does not live in high income countries. In the study, economic development is proxied by EDI, which is an integration of HDI, ECI and GDP per capita. The determination or prediction of financial markets might be tricky. From the objective analysed in the study, it shows that the stock market, money market and forex market can forecast economic development in the future. Although the PARDL long-run findings were in contradiction with the priori expectations. The empirical findings imply that increasing service flows from financial markets are necessary to finance investments in SADC research and development, and thus, economic development. Development of financial markets must be encouraged, considering that financial markets in SADC tend to be underdeveloped and illiquid. This can be done through a suitable balance of legislative, regulatory, and taxation measures to lower obstacles to financial market operations and so improve their effectiveness. Furthermore, based on the findings of this study, it is recommended monetary authorities and regulatory authorities ensure that the monetary, fiscal, and financial policies are well managed and stable. These policies must be implemented to develop the social and economic level of the country, as investments tend to be safe when financial markets are developing in a country, which boosts investment confidence. Regulatory bodies should also ensure openness and fair-trading practices in the market to rebuild public confidence. This will lead to more employment creation and an increase in economic activity.

This study contributes to literature and future research by revealing the possible differential roles of financial markets on economic development in some selected SADC countries. Based on economic development being measured by EDI, which was constructed making use of the PCA, employing indicators such as the HDI, ECI and GDP per capita, future research can be conducted by including other financial markets, such as the bond, commodity, and real estate markets. The study has potential limitations. In some of the SADC member states, the data were not up to date. Hence, only data from some selected SADC countries were used to achieve the aim and objectives of the study.

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