Unraveling the Impact of Institutions on Stock Market Performance in Nigeria

Martins Iyoboyi

Department of Economics and Development Studies,
Federal University Dutsin-Ma, Katsina State, Nigeria.

Abstract

Quality institutions exemplified by better governance environments can leverage shareholders' returns by reducing transaction and agency costs. Thus improvement in financial market development is underscored on the institutions which govern the process of exchange. In this study covering 1996 to 2019, and using the Ordinary Least Squares technique, six stock market performance proxies (including all share index, market capitalization (equities only), market capitalization (total), number of deals (equities), number of deals (total) and total value of stocks traded) were each regressed on institutions, proxied by the World Governance indicators including control of corruption, government effectiveness, political stability and absence of violence/terrorism, regulatory quality, rule of law, and voice and accountability, while controlling for macroeconomic factors. The findings indicate that control of corruption and government effectiveness have a direct impact on stock market performance, with the former being significant for all stock market performance indicators and the latter being significant for all share index. Political stability and absence of violence/terrorism, regulatory quality, rule of law and voice and accountability have a negative impact on stock market performance. Interest rate was found to have an indirect impact on stock market performance but not statistically significant. Real income has a positive and statistically significant impact on the performance of the stock market. The impact of macroeconomic instability on stock market performance was unraveled to be negative and statistically significant. The study recommended policies that enhance institutional structures that improve the performance of the stock market.

Keywords: institutions; governance; macroeconomic factors; stock market performance; Nigeria.

1. Introduction

Several studies have emphasized the role of a country's governance and institutional quality on the financial and capital markets' operations due to the influence it has on the availability of external financing, valuation of markets, cost of financing, and investment quality (see, Chen et al., 2009; Giannetti & Koskinen, 2010; Chiou et al., 2010). Institutions are critical to market efficiency (Black, 2013). Poor institutional control mechanisms may lead to the exposure of investor's wealth (La Porta et al., 1998). This can be particularly endemic in developing countries which suffer from weak regulatory institutions (Hearn & Piesse, 2010). Additionally, on transition economies, rule of law, regulatory framework and judicial efficiency have been emphasized (Hooper et al., 2009). Access to external funds is made easier with better legal processes that protect outside shareholders (La Porta et al., 1997). The imperative of a sound legal system in promoting a robust the corporate sector in order to secure external funding is stressed (Demirgüç-Kunt & Maksimovic, 1998). By affecting finance costs and lowering financial risk by reducing transaction and agency costs, a sound legal process and rule of law has an important role to play in the performance of stock markets (Gungoraydinoglu et al., 2017).

In terms of returns and development as reflective of the how well the stock benefits from strong institutions (political, legal and regulatory), some studies have reported that strong regulation, can hinder the growth of private investment through stronger policy enforcement (Guo et al., 2020). Institutional quality in the form of improved property right can boost investment confidence (Kemboi & Taru, 2012). Some previous investigations have been on various institutional risks including country risk (Kaminsky & Schmukler, 2002), economic freedom (Blau, 2017), and political risk (Bekaert et al., 2016). When there is additional risk, a negative relationship between the quality of governance and stock returns has been found (Low et al., 2011).

Several empirical investigations have been undertaken on the impact of institutions on stock market performance (deploying different proxies). Utilizing a cross-section of stock market indices from both developed and emerging markets, and different measures of return on equity, encompassing the total return on equity, dividend yields and earning-price ratios (accounting-based measures of return), Lombardo and Pagano (2000) examined the correlation between institutional quality and the return on equity, and found a positive correlation between return on equity (risk adjusted) and institutional quality measures. Hooper et al. (2009) examined the link between the quality of government institutions and the performance of global stock markets. A significant positive relationship was found between stock market performance and the quality of the institutions. Based on eight economies in Asia, Gani and Ngassam (2008) investigated the nexus between stock market performance and institutional factors, and reported that the performance of the capital market is enhanced by economic growth, technology, rule of law and political stability while poor institutional quality negatively affects it.

From the foregoing, stock market performance is linked to the nature and quality of institutions (Bekaert et al., 2016; Boadi & Amegbe, 2017). Although Jensen and Meckling (1976), a seminar contribution provided the early literature on governance with a focus on

firm-level agency costs, the governance-stock market literature is scanty and thus still emerging. Three comprehensive studies can be identified which examined the relationship between World Governance Indicators and stock market performance, including Hooper et al. (2009), Low, Kew and Tee (2011) and Low et al. (2014). Whereas Hooper et al. (2009), found a negative impact of World Governance Indicators on stock market access returns, Low et al. (2011) and Low et al. (2014) found the reverse. Thus, investigation into the impact of institutions or governance quality on stock market performance remains an empirical question.

Following the introduction, the rest of the paper is organized as follows. In Section 2, data sources and the methodological design are presented. The empirical results are presented in Section 3 and discussed in Section 4. The paper is concluded in Section 5.

2. Methods

There are two broad classifications of the determinants of stock market development in the literature. These are institutional determinants and macroeconomic determinants. Of the institutional determinants, three main measures are identified by Yartey (2008), encompassing: (i) quality of governance (which encapsulates such factors like corruption, political rights, public sector efficiency, and regulatory burdens); (ii) protection of private property rights and enforcement of law: and (iii) Measures relating to constraints on executive/political leaders. The macroeconomic determinants include level of income, inflation, interest rate, savings/investments and financial development (Garcia & Liu, 1999; Naceur et al., 2007; Cherif & Gazdar, 2010; Kemboi & Tarus, 2012).

There are two competing hypotheses on better governance quality on the performance of the stock market. In the first hypothesis, better governance quality is viewed as increasing the stock returns as it reduces transaction and agency costs. The second hypothesis considers that an environment that better protects investor will entail equity premium in the international financial markets that are competitive, leading to a reduction in stock returns (Hooper et al., 2009). The current study estimates the impact of institutions on stock market performance in Nigeria. To achieve this objective, we consider World Governance Indicators as proxies of institutions, and stock market performance is proxied by all share index, market capitalization (equities only), market capitalization (total), number of deals (equities), number of deals (total) and total value of stocks traded. Consequently, the Ordinary Least Squares technique is deployed on the each model which is anchored on the literature and specified as a function of institutions and a set of macroeconomic variables as follows:

$$\text{Stock market performance} = f(\text{Institutions, macroeconomic variables}) \quad (1)$$

The econometric form of equation (1) is specified as:

$$SMP = \beta_0 + \beta_1 COC + \beta_2 GE + \beta_3 PSAV + \beta_4 RQ + \beta_5 ROL + \beta_6 VA + \beta_7 IR + \beta_8 RGDP + \beta_9 INF + \mu \quad (2)$$

where SMP denotes stock market performance . The variables used are described in table 1.

Table 1: Variable and description

Acronym		Source
	Dependent variables (SMP)	
ASI	All Share Index	CBN
MCAPE	Market Capitalization (Equities only) on The Nigerian Stock Exchange (₦' Billion)	CBN
MCAPT	Market Capitalization (Total) on the Nigerian Stock Exchange (₦' Billion)	CBN
NODE	Number of deals, equities (Transactions at the Nigerian Stock Exchange)	CBN
NODT	Number of deals, total (Transactions at the Nigerian Stock Exchange)	CBN
STTV	Stocks traded, total value (current US$)	World Bank
	Independent variables	
	(1) Institutional indicators	
COC	Control of Corruption	World Bank
GE	Government Effectiveness	World Bank
PSAV	Political Stability and Absence of Violence/Terrorism	World Bank
RQ	Regulatory Quality	World Bank
ROL	Rule of Law	World Bank
VA	Voice and Accountability	World Bank
	(2) Macroeconomic indicators	
IR	Interest rate	World Bank
RGDP	Real GDP per capita (constant 2010 US$)	World Bank
INF	Inflation (Consumer Price Index)	World Bank

Source: Central Bank of Nigeria (2020), World Bank (2021)

From the foregoing, six models were estimated, each corresponding to one of the six stock market performance indicators. On the data on institutions, figures for 1997, 1999, 2001 and

2019 are missing. 3-year backward moving average was used to generate the values for 1997, 1999, 2001 while 3-year forward moving average was used to generate the values for 2019. SSTV figures for 2000, 2002 and 2003 were obtained using 3-year forward moving averages.

3. Results and Discussion

The descriptive statistics and the correlation matrix are presented in appendix 1. The correlation matrix indicates that the independent variables in the estimated models do not have excessively collinearity. The coefficients of the estimated models are presented in table 2.

Table 2: Estimated Results

	Stock manyrket performance indicators (Dependent variables)					
	ASI	MCAPE	MCAPT	NODE	STTV	NODT
COC	1.491247**	1.779931***	1.735291*	4.846421***	5.323860*	4.905950***
GE	2.138499**	1.319299	1.297832	3.270651	1.823604	3.274881
PSAV	-0.567974	-0.900033*	-0.832340**	-1.129920	-0.672675	-1.107571
RQ	-1.068233**	-0.757450	-0.792003***	-0.581644	-0.763169	-0.587535
ROL	-0.313124	0.197298	0.621754	-2.872803	-1.565445	-2.977805
VA	-0.722435***	-0.410529	-0.274679	-1.165950	-2.254846*	-1.110556
IR	-0.035025	-0.013660	-0.000780	-0.206508	-0.028186	- 0.204182
RGDP	2.717635*	4.936806*	5.539852*	7.821297*	4.386615*	7.844008*
INF	-0.500934***	-0.333416	-0.249252	-1.358066***	-1.562221*	-1.340670***
C	-8.989037	-27.69357*	-31.36290*	-44.92634**	-4.766578	-45.06514**
Diagnostics						
R^2	0.89	0.98	0.98	0.88	0.922772	0.88
Adjusted R^2	0.82	0.97	0.97	0.80	0.873125	0.80
F-stat	12.38729*	75.39387*	99.13637*	11.50664*	18.58673*	11.47190*
DW	2.17	2.40	2.25	1.80	2.43	1.79
BG [χ^2, 2]	2.470615	4.095866	1.954791	1.830766	1.934372	2.07325
JB	1.309663	1.129166	0.019632	1.307085	3.009223	2.31005
White [χ^2]	5.089403	8.189524	8.354518	6.010337	7.549425	5.927969
RESET (F-stat)	0.569188	1.842004	1.024143	0.044217	1.191643	0.064402

*Note: The indeptendent variables are in log form, including RGDP and INF. *, ** and *** represent 1%, 5% and 10% level of significance respectively. DW: Durbin-Watson stat test for serial correlation; JB: Jarque-Bera test for normality of residuals; BG: Breusch-Godfrey Serial Correlation LM Test; White: Test for heteroskedasticity; RESET: Ramsey's Residual error*

Source: Author's computations

Results in table 2 indicate that two of the institutional indicators, control of corruption and government effectiveness are directly related to stock market performance. Whereas the impact of control of corruption is significant for all stock market performance indicators, it is only in the case of all share index that government effectiveness is significant. The result of the relatioship between control of corruption and stock market performance is especaily relevant for Nigeria, given the country's international ratings over the years. It is consistent with the findings by Lee and Ng (2004) who reported that corruption significantly reduces the values of equity. This may be due to lower investments by international investors where a country records low transparency, as shown by Gelos and Wei (2006).

Four of the institutional indicators are negatively related to stock market performance, including political stability and absence of violence/terrorism (PSAV), regulatory quality (RQ), rule of law (ROL) and voice and accountability (VA). This suggests that these indicators tend to undermine the performance of stock market in Nigeria. The results tend to be consistent with what is reported in Pajuste (2002) which examined the impact of corporate governance on stock market performance in Central and Eastern Europe, where the effectiveness of financial regulations was found to have the highest impact on stock market returns in the selected countries. The results linking the rule of law to poorer stock market performance for Nigeria might be connected to the view that when the legal system is robust and provides mechanisms that protect investors, the amount of funds wthat investors who are risk-averse are willing to commit to firms rises. It is for this reason that a country with poor legal environments and low corporate governance standards attracts less investment by fund managers (Aggarwal et al., 2002).

The interest rate coefficients are inversely related to stock market performance indicators and consistent with theoretical postulation. However, interest rate is not a statistically significant factor impacting the performance of the stock market. The theoretical expectation is that interest rate has an inverse relationship with stock prices. Because interest rate is an opportunity cost of investing in stocks, its rise implies that bonds become a more attractive investment alternative, leading to a rise in equity capitalization rates and consequently to a fall in stock prices. The present value model predicts a decline in stock prices and the value of future dividends when there is a higher interest rate. Conversely, a lower interest rate results in an increase in the present value of future dividends and stock prices (Fama, 1981, 1990; Ratanapakorn & Sharma, 2007). Lower interest rate induces the financing of corporate investment through borrowings, leading to expansion which consequently increases stock prices. On the other hand, the prices of stocks can fall when borrowing is used to finance significant amount of stock purchases, so that a rise in interest rate would make stock transactions more expensive. Further investment would imply an expectation of a higher rate of return, leading to a fall in the demand for stocks and consequently to a fall in stock prices.

The coefficients of RGDP or real income are positively related to the stock market performance indicators and statistically significant. A rise in real income is believed to exert a positive influence on the stock market performance through, among others, the mobilization and allocation of savings, improvement in corporate governance, diversifying risks and creating liquidity in the economy. Candra (2004) considers the growth rate of gross domestic product (GDP) and the stock market returns to have a positive relationship. This is underscored on the view that with a growing GDP, the real sector of the economy is expected to be robust, so that it exerts positive impact on firms' future profits and dividends. The results also corroborate the earlier findings by Hsing et al. (2012) on Mexico which showed that the stock market index is positively related to real GDP.

Finally, inflation tends to adversely impact stock market performance. This adverse impact is uniform for all the performance indicators and statistically significant. This is not surprising given that inflation erodes real value of money. Thus in real terms, the performance of the stock market is negatively impacted, even though there may be a rise (in nominal terms) in figures reported. In the theoretical literature, there is no consensus on the inflation-stock returns relationship. What appears to dominate economic thinking however is that bonds which are "fixed income" securities are vulnerable to the eroding effects of inflation. This is because at maturity the real value of the payoff is dependent on current or prevailing price level. Because stocks do not have maturity dates, equity investors worry less over repayment and or default, since equities' future returns can adjust for changes in the price level (Maxfield, 1997). The results are consistent with an earlier finding by Şukruoğlu and Nalin (2014) which reported a statistically significant negative effects of inflation on stock market development. It needs to be noted that the empirical findings on the relationship between inflation and stock returns are conflicting. The inverse relationship between stock returns and inflation is explained by Fama's proxy effect and the dividend discount model. From the point of view of the money demand theory, Fama (1981) asserts that the real activity has a positive relationship with stock returns but is inversely related with inflation. Again, since stock price can be viewed as the discounted value of expected dividend, a rise in the price level is capable of boosting the nominal risk free rate and consequently the discount rate which can make stock prices to fall. The positive relationship that may exist has been used to suggest that equity acts as a hedge against inflation and empirical evidence has been provided by Ratanapakorn and Sharma (2007). Alagidede and Panagiotidis (2010) in a study of the relationship between inflation and stock price for selected stock markets in Africa found a transitory negative response to inflation for South Africa in the short run while in the long run the response is positive. The results of the current study are consistent with Siklos and Kwok (1999), Laopodisi (2006) and Hsing et al. (2012) which reported a negative association between inflation rate and stock market index. On a general note, results from the study agree with Matadeen (2017) who reported that stock market development is determined by macroeconomic factors including real income, inflation and interest rate, as well as institutional factors including corruption, regulatory burdens, law enforcement. From the diagnostic statistics, it can be seen that the models have a high predictive ability, given the range of figures of the adjusted R^2, the lowest being 80% of the total variation in the stock market performance indicator.

In addition, all the regressors (based on the F-statistics) are significant at 1%, suggesting joint significance of the explanatory variables in explaining the variation in the stock market performance indicators. Both the Durbin-Watson (DW) and Breusch-Godfrey (BG) statistics indicate that the models estimated are free from autocorrelation. The normality assumption is also satisfied, judging by the Jarque-Bera test statistic which is not significant. The estimated White statistic indicates that none of the models estimated suffer from heteroskedasticity. Finally, the models do not suffer from misspecification, based on the residual error specification (RESET) tests. Finally, the study also evaluates the stability of the estimated coefficients for each of the 5 models, using the cumulative sum of recursive (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) tests. The results are presented in appendix 2. In each case, both the CUSUM and CUSUMSQ plots are within the 5% critical lines, an indication that there is stability in the estimated coefficients over the period of investigation, lending credence to their use for policy formulation.

4. Conclusion

This paper investigated the impact of institutions on stock market performance in Nigeria from 1996 to 2019, using six stock performance indicators. Five indices of stock market performance were used, namely all share index, market capitalization (equities only), market capitalization (total), number of deals (equities), number of deals (total) and total value of stocks traded. Institutions were proxied by the World Governance indicators. The study also controlled for macroeconomic factors (interest rate, real income proxied by real GDP per capita and macroeconomic instability proxied by Consumer Price Index).

Among the institutional indicators, control of corruption and government effectiveness were found to have a positive impact on stock market performance, while political stability and absence of violence/terrorism, regulatory quality, rule of law and voice and accountability have a negative impact. Whereas, interest rate and macroeconomic instability were found to have a negative impact on stock market performance, real income has a positive impact on stock market performance.

The major implication of the results in the study is that institutions matter for stock market performance, without prejudice to macroeconomic factors. Based on the findings, it is recommended that policies that enhance institutional structures that improve the performance of the stock market be implemented. In light of this, the government should ensure and maintain a sound regulation framework and an environment devoid of violence and political instability, including mechanisms that ensure respect for the rule of law.

Acknowledgment

The author wishes to thank the Tertiary Education Trust Fund (TETfund) for the award of an international conference sponsorship.

References

Aggarwal, R., Klapper, R. and Wysocki, P. D. (2002). Portfolio preferences of foreign institutional investors (MIT Sloan Working Paper 4328-03). http://documents.worldbank.org/curated/en/984761468764046884/103503322_20041117165 00/additional/wps3101.pdf

Alagidedea, P., Panagiotidisb, T. (2010). Can common stocks provide a hedge against inflation? evidence from African countries, *Review of Financial Economics,* vol. 19, pp. 91-100.

Bekaert, G., Harvey, C.R., Lundblad, C.T. and Siegel, S. (2016). Political risk and international valuation, *J. Corp. Finance*, vol. 37, pp. 1–23. https://doi.org/10.1016/j.jcorpfin.2015.12.007.

Black, J. (2013). Reconceiving financial markets–from the economic to the social. *J. Corp. Law Stud.*, 13(2), 401. https://doi.org/10.5235/14735970.13.2.401.

Blau, B.M., (2017). Economic freedom and crashes in financial markets, *Journal of International Financial Markets, Institutions and Money*, vol. 47(C), pp. 33-46.

Boadi, I. and Amegbe, H. (2017). The link between quality of governance and stock market performance: international level evidence, *Eur. J. Govern. Econ.*, vol. 6(1), pp. 78–101. https://doi.org/10.17979/ejge.2017.6.1.4324.

Central Bank of Nigeria (2020). Statistical Bulletin. Abuja: Central Bank of Nigeria.

Demirgüç-Kunt, A. and Maksimovic, V. (1998). Law, finance, and firm growth, *J. Finance* vol. 53(6), pp. 2107–2137.

Fama, E.F. (1981). Stock returns, real activity, inflation, and money, *American Economic Review*, vol. 71(4), pp. 545-565.

Fama, E.F. (1990). Stock returns, expected returns and real activity, *J. Finance*, vol. 45, pp. 1089–1108. http://dx.doi.org/10.1111/j.1540-6261.1990.tb02428.x

Gani, A and Ngassam, C. (2008). Effect of institutional factors on stock market development in Asia, *American Journal of Finance and Accounting*, vol. 1(2), pp. 103-120.

Garcia, F.V. and Liu, L. (1999). Macroeconomic Determinants of Stock Market Development. *Journal of Applied Economics* , vol. 2, pp. 29-59.

Gelos, R. G. and Wei, S.-J. (2006). Transparency and international investor behavior. *IMF Working Paper 02/174.*

Giannetti, M. and Koskinen, Y. (2010). Investor protection, equity returns, and financial globalization, *Journal of Financial and Quantitative Analysis*, vol. 45(1), pp. 135-168.

Gungoraydinoglu, A., Colak, G. and Oztekin, O. (2017). Political environment, financial intermediation costs, and financing patterns, *J. Corp. Finance*, vol.44, pp. 167–192. https://doi.org/10.1016/j.jcorpfin.2017.03.007. Elsevier B.V.

Guo, M., Kuai, Y. and Liu, X. (2020). Stock market response to environmental policies: evidence from heavily polluting firms in China, *Econ. Modell*., vol. 86, pp. 306–316. https://doi.org/10.1016/j.econmod.2019.09.028.

Hearn, B. and Piesse, J. (2010). Barriers to the development of small stock markets: A case study of Swaziland and Mozambique, *J. Int. Dev*. vol. 22, pp. 1018-1037.

Hooper, V., Sim, A. B. and Uppal, A. (2009). Governance and stock market performance. *Economic Systems*, vol. 33(2), pp. 93–116. https://doi.org/10.1016/j.ecosys.2009.03.001

Hsing,Y., Phillips, A.S. and Phillips, C. (2012). Effects of macroeconomic and global variables on stock market performance in Mexico and policy implications, *Research in Applied Economics*, vol. 5, pp. 107-115.

Chen, C.W., Chen, Z., & Wei J.K.C. (2009). Legal protection of investors, corporate governance, and the cost of equity capital, *Journal of Corporate Finance*, vol. 15, pp. 273-289.

Cherif, M. and Gazdar, K. (2010). Macroeconomic and Institutional Determinants of Stock Market Development in MENA Region: New Results from a Panel Data Analysis. *International Journal of Banking and Finance*, vol. 7, pp. 138-159.

Chiou, W.J.P., Lee, A.C. and Lee, C.F. (2010). Stock return, risk, and legal environment around the world, *International Review of Economics and Finance*, vol. 19(1), pp. 95-105.

Kaminsky, G. and Schmukler, S.L. (2002*). Emerging Market Instability: Do Sovereign Ratings Affect Country Risk and Stock Returns*, Oxford University Press.

Kemboi, J.K. and Taru, D.K. (2012). Macroeconomic determinants of stock market development in emerging markets: Evidence from Kenya, *Research J. Financ. Account*., vol. 3(5), pp. 57-68.

Kemboi, J.K. and Tarus, D.K. (2012). Macroeconomic Determinants of Stock Market Development in Emerging Markets: Evidence from Kenya. *Research Journal of Finance and Accounting*, vol. 3, pp. 57-68.

La Porta, R., Lopez-de Silanes, F., Andrei, S. and Robert, V. (1998). Law and finance, *J. Polit. Econ*., vol. 106, pp. 1113-1155.

La Porta, R., Lopez-de Silanes, F., Andrei, S. and Robert, V. (1997). Legal determinants of external finance, *J. Financ.*, vol. 52, pp. 1131-1150.

Laopodisi, N.T. (2006). Dynamic interactions among the stock market, federal funds rate, inflation, and economic activity, *The Financial Review*, vol. 30, pp. 513-545.

Lee, C. and Ng, D. (2004). Corruption and international valuation: does virtue-pay. *Cornell University working paper.*

Lombardo, D. and Pagano, M. (2000). Legal determinants of the return on equity. *CSEF Discussion Paper 24, Naples*. https://doi.org/10.2139/ssrn.209310

Low, S., Kew, S. and Tee, L. (2011). International evidence on the link between quality of governance and stock market performance, *Global Econ. Rev*. vol. 40(3), pp. 361–384. https://doi.org/10.1080/1226508X.2011.601646.

Low, S.W., Tee, L.T. and Kew, S.R. (2014). Does the quality of governance matter for equity market risk? Evidence from emerging and developed equity markets, *Journal of Business Economics and Management*, vol. 16(3), pp. 660–674. https://doi.org/10.3846/16111699.2012.720595

Matadeen, S.J. (2017). The macroeconomic determinants of stock market development from an African perspective, *Theoretical Economics Letters,* vol. 7, pp. 1950-1964

Maxfield, S. (1997). *Gatekeepers of Growth: The International Political Economy of Central Banking in Developing Countries*, Princeton: Princeton University Press.

Naceur, S.B., Ghazouani, S. and Omran, M. (2007). The Determinants of Stock Market Development in the Middle-Eastern and North African Region. *Managerial Finance*, vol. 33, pp. 477-489. https://doi.org/10.1108/03074350710753753

Pajuste, A. (2002). Corporate governance and stock market performance in Central and Eastern Europe: A study of nine countries, 1994–2001, Stockholm School of Economics. https://ssrn.com/abstract=310419

Ratanapakorn, O. and Sharma, S.C. (2007). Dynamics analysis between the US stock return and the macroeconomics variables, *Applied Financial Economics,* vol. 17(4), pp.369-377.

Siklos, P. and Kwok, B. (1999). Stock returns and inflation: A new test of competing hypotheses, *Applied Financial Economics*, vol. 9, pp. 567-581.

Sukruoglu, D. and Nalin, H.T. (2014). The macroeconomic determinants of stock market development in selected european countries: dynamic panel data analysis. *International Journal of Economics and Finance*, vol. 6, 64. https://doi.org/10.5539/ijef.v6n3p64

World Bank (2021). World Development Indicators. Washington DC: The World Bank.

Yartey, C.A. (2008). Determinants of Stock Market Development in Emerging Economies: Is South Africa Different? IMF Working Paper No. 08/32.

Appendix 1: Descriptive Statistics

	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
ASI	23695.80	57990.20	5266.400	13027.56	0.459321	3.223282	0.893759	0.639621
MCAPE	5859.222	13609.47	256.8000	4890.284	0.191120	1.513199	2.356684	0.307789
MCAPT	9056.565	25890.22	262.6000	8361.378	0.430904	1.827761	2.116856	0.347001
NODE	608171.2	2349866.	6916.800	626250.0	1.031081	3.568834	4.576080	0.101465
STTV	3.58E+09	1.74E+10	1.13E+08	4.54E+09	2.182424	7.118278	36.01211	0.000000
NODT	611335.4	2350876.	6979.600	626315.1	1.021679	3.557147	4.485724	0.106154
COC	-1.170097	-0.891883	-1.431231	0.135874	-0.17419	2.345324	0.549968	0.759584
GE	-1.023698	-0.892764	-1.214644	0.082998	-0.809307	2.924331	2.625638	0.269060
PSAV	-1.774567	-0.586373	-2.211123	0.388499	1.475011	4.962305	12.55327	0.001880
RQ	-0.912234	-0.659629	-1.351967	0.192766	-0.889494	2.877794	3.179734	0.203953
ROL	-1.159354	-0.871539	-1.427206	0.171517	-0.058279	1.980506	1.052955	0.590682
VA	-0.680799	-0.320183	-1.553702	0.263864	-1.364394	6.233689	17.90303	0.000130
IR	18.27542	24.77083	15.13583	2.409156	1.185180	3.854944	6.349540	0.041804
RGDP	1976.042	2550.470	1343.907	443.0484	-0.233205	1.511365	2.433571	0.296181
INF	12.32313	29.26829	5.388008	5.090075	1.504929	6.160010	19.04490	0.000073
OBSERVATION	24	24	24	24	24	24	24	24

Correlation Matrix

	ASI	MCAPE	MCAPT	NODE	STTV	NODT	COC	GE	PSAV	RQ	ROL	VA	IR	RGDP	MINST
ASI	1.00	0.80	0.71	0.75	0.71	0.75	0.48	-0.10	-0.73	0.34	0.57	0.34	-0.59	0.72	-0.28
MCAPE	0.80	1.00	0.98	0.76	0.45	0.76	0.57	-0.29	-0.75	0.51	0.82	0.52	-0.69	0.92	-0.22
MCAPT	0.71	0.98	1.00	0.66	0.34	0.66	0.56	-0.26	-0.70	0.47	0.84	0.57	-0.68	0.89	-0.18
NODE	0.75	0.76	0.66	1.00	0.65	1.00	0.46	-0.19	-0.62	0.54	0.56	0.23	-0.57	0.72	-0.27
STTV	0.71	0.45	0.34	0.65	1.00	0.64	0.58	-0.13	-0.41	0.37	0.38	0.00	-0.52	0.36	-0.33
NODT	0.75	0.76	0.66	1.00	0.64	1.00	0.46	-0.19	-0.62	0.54	0.56	0.24	-0.57	0.72	-0.27
COC	0.48	0.57	0.56	0.46	0.58	0.46	1.00	-0.26	-0.33	0.64	0.75	0.14	-0.75	0.54	-0.06
GE	-0.10	-0.29	-0.26	-0.19	-0.13	-0.19	-0.26	1.00	0.22	-0.33	-0.26	-0.08	0.22	-0.37	0.28
PSAV	-0.73	-0.75	-0.70	-0.62	-0.41	-0.62	-0.33	0.22	1.00	-0.33	-0.51	-0.57	0.41	-0.80	0.24
RQ	0.34	0.51	0.47	0.54	0.37	0.54	0.64	-0.33	-0.33	1.00	0.59	0.06	-0.65	0.54	-0.27
ROL	0.57	0.82	0.84	0.56	0.38	0.56	0.75	-0.26	-0.51	0.59	1.00	0.55	-0.70	0.70	-0.31
VA	0.34	0.52	0.57	0.23	0.00	0.24	0.14	-0.08	-0.57	0.06	0.55	1.00	-0.19	0.50	-0.50
IR	-0.59	-0.69	-0.68	-0.57	-0.52	-0.57	-0.75	0.22	0.41	-0.65	-0.70	-0.19	1.00	-0.68	0.27
RGDP	0.72	0.92	0.89	0.72	0.36	0.72	0.54	-0.37	-0.80	0.54	0.70	0.50	-0.68	1.00	-0.17
MINST	-0.28	-0.22	-0.18	-0.27	-0.33	-0.27	-0.06	0.28	0.24	-0.27	-0.31	-0.50	0.27	-0.17	1.00

Source: Author's computations

Appendix 2: Stability Test Results

Figure 1: Stability Tests for Model 1

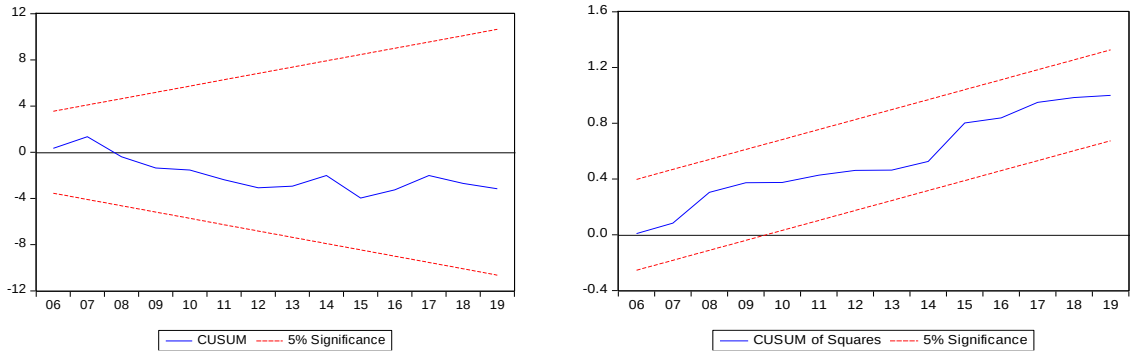


Figure 2: Stability Tests for Model 2

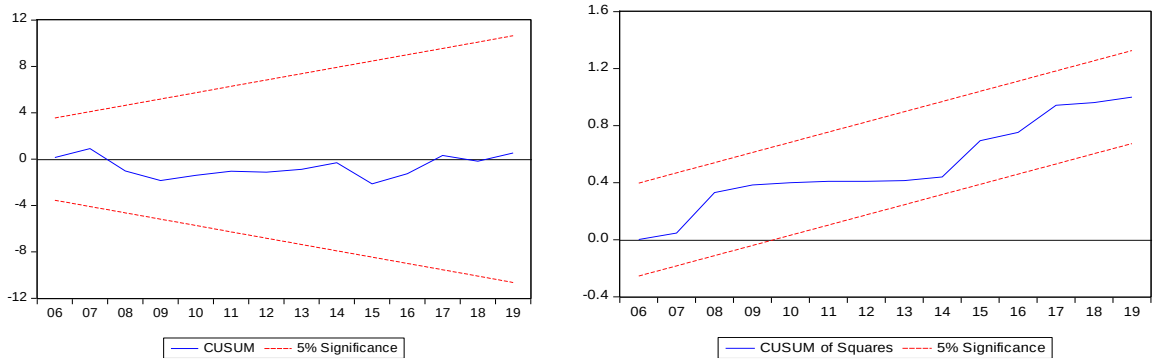


Figure 3: Stability Tests for Model 3

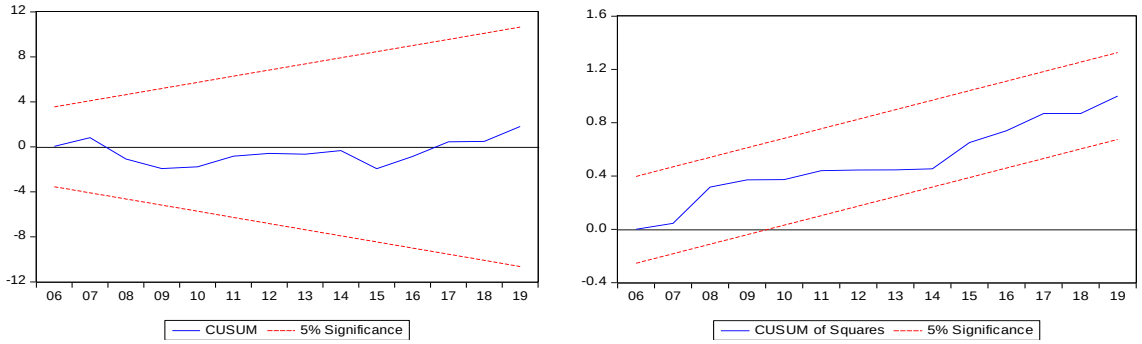


Figure 4: Stability Tests for Model 4

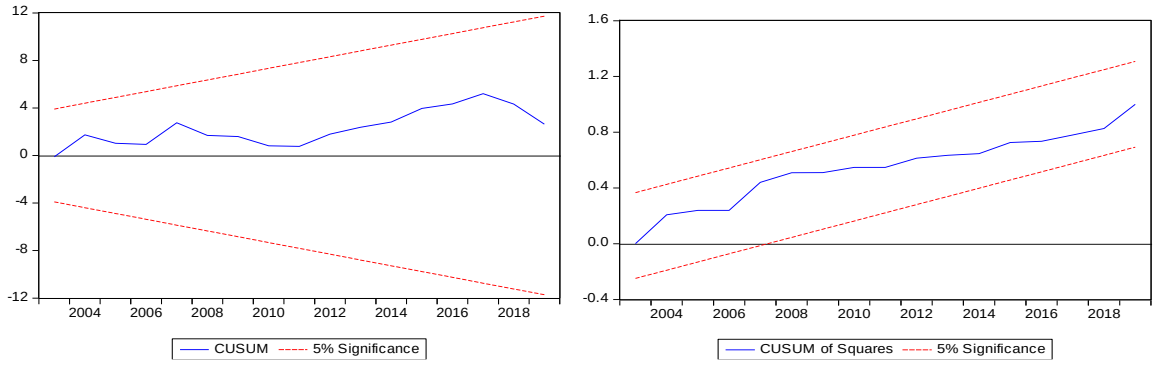


Figure 5: Stability Tests for Model 5

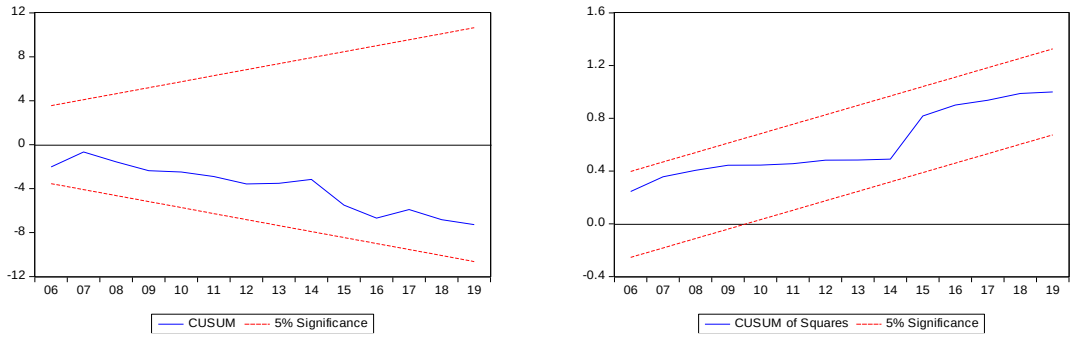
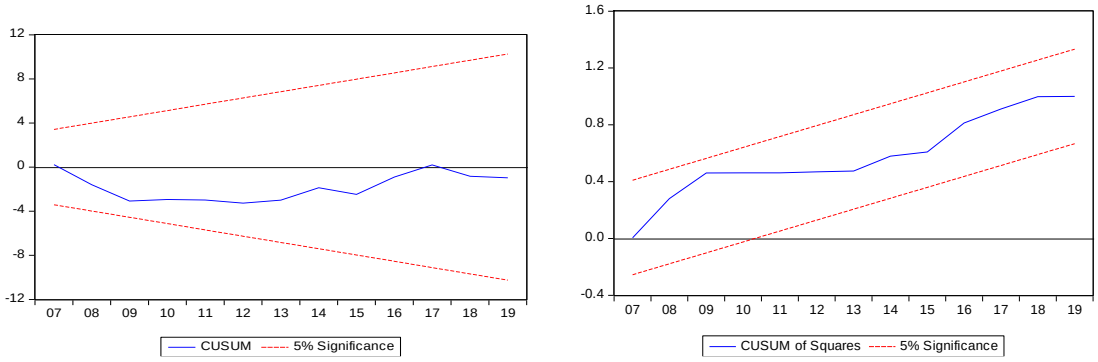


Figure 6: Stability Tests for Model 6



Source: Author's computations