DYNAMIC PANEL DATA MODELLING OF THE DETERMINANTS OF THE STOCK MARKET DEVELOPMENT IN BRICS NATIONS: USING GMM. (2005 - 2020)



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Abstract
The study uses a Dynamic Panel Data model with Panel Data from several selected BRICS countries between 2005 and 2020 to examine the indicators that influence the development of the stock market in these nations. The econometric model is built around 15 key macroeconomic and socioeconomic variables that were proven to be

stationary at the first difference level. The System of GMM Dynamic Panel Data Model of the specified parameters was discovered to have a substantial association with the dependent variable and was thus chosen for the SDI-ranking system. Ten of the important variables in the tests exhibited the expected indications. Gross Domestic Product, Control of Corruption, Interest Rate, Total Reserve, and Rule of Law all had a strong beneficial impact on the change in market capitalization in BRICS Nations. However, certain variables exhibited a substantial negative connection with the determinant, which was contrary to our expectations after examining past studies. Furthermore, eleven of the significant variables in the tests showed positive signs, including Gross Domestic Product, Political Stability, Exports, Imports, Total Reserve, Inflation Rate, Unemployment, and Rule of Law, which had a significant, positive impact on the change in market capitalization of BRICS nations, whereas the rest showed a significant negative relationship with the determinant, which was contrary to what we expected after reviewing previous researches the. System GMM model for BRICS nation indicates that Political Stability, Exchange rate, Exports, Foreign Direct Investments, Imports, Mobile cell subscriptions, Inflation rate, and Gross Fixed Capital Formation have a negative correlation with the dependent variable, Stock Market Capitalization for the BRICS Nations.

Key words: *Dynamic, Panel Data, Modelling, relationship, Stock Market, BRICS countries*

1.1 Introduction

In an attempt to restructure economies in developing nations, the World Bank, IMF, and other multilateral financial organizations have prioritized market liberalisation, promotion and provision of funding and technical help for the formation of capital markets in emerging market nations has been greatly aided by these international financial organizations. Jim (2005) For instance, the World Bank has provided funding for Tanzania's financial sector's regulatory framework and capacity building initiatives via the Financial Sector Support Program (FSP), with capital market growth serving as the program's central focus. Tanzania's capital market is still in its early stages of growth, despite massive efforts to advance it both

domestically and internationally. One of the elements contributing to the slow expansion, is the counterargument, though, that corporate firms are reluctant to go public and register on the stock market. The primary causes of this uncertainty are expensive underwriting and listing expenses as well as a lack of knowledge about the prospects and incentives offered. Financial illiteracy is a prevalent issue in emerging market nations in BRICS. The demand side of the stock market is greatly impacted by the low rate of stock market involvement brought on by financial illiteracy among both individual and corporate enterprises. For instance, many Tanzanians, Nigerians, and others do not use the stock market as a source of income or a way to save for their future retirement because they do not comprehend how it might benefit them. John & Edward (2004). According to a different school of thought, developing stock markets in emerging market economies is unnecessary due to the risks involved; once a stock market is established, it is connected to global capital markets and can therefore transmit the effects of financial crises from other regions of the world. For instance, the stock market's liquidity may be significantly impacted by foreign investors abrupt capital withdrawals. Emerging market economies came to understand the necessity of sound financial systems and robust macroeconomic policies in order to reduce these risks. By strengthening "reserves, diversifying their financing sources, relying more on domestic currency and longer-term funding, and developing domestic capital markets," they are attempting to safeguard themselves against the negative consequences of financial crises. Abu & Usman (2010).

However, the long-term study of the relationship between stock market development and economic growth in emerging economies provides strong support for stock market development. The majority of the results show a substantial correlation between indices of economic growth and stock market development. For instance, Arav contends that "without the establishment and development of the capital market, no advanced economy has achieved a remarkable economic development." Accordingly, an emerging nation that wants to follow in the footsteps of developed countries needs to set up and grow its capital markets Indicators like GDP per capita, GNI per capita, gross saving rate, capital

accumulation, and productivity are typically used to measure economic growth, however stock market development indicators are frequently (Alberto et al (2013). The long-term supply of capital, domestic resource mobilization, and corporate governance efficacy are all said to be enhanced by stock markets. Global financial crises that pose a threat to funding and the massive debt in developing nations all, in one way or another, draw attention to the growth of the stock market as an even more vital alternative.

In the current global situation, a number of nations have organized into groupings to achieve particular goals. Investors diversify their investments either domestically (by purchasing many businesses across multiple industries) or internationally (by purchasing multiple businesses across multiple nations). These include the South Asian Association for Regional Cooperation (SAARC), the G7, G8, and G20 countries, as well as Brazil, South Africa, and India. We are mainly interested in the emerging markets, but we will use data from all available countries in our analysis. After the analysis, we will create a ranking system we have named the Stock Development Indicator (SDI) with a weighting that will be decided upon looking at the elasticity of the explanatory variables as well as the significance of the different variables.

2.0 Literature Review

2.1 Economic Policy

Development in technology is seen as a driving force in the economy. The theory behind typically stems from the neoclassical models, which treat technology as an exogenous given factor, which mean that the rate of the long-run technological growth is given by the exogenous rate of technological change. Important contributors to the neoclassical model are Sanford &Joseph (1980), In the empirical literature, it is suggested that the industrial revolution (1760 -1830) triggered a significant growth in the average per capita output.

There has not been a general way to measure technological development in the literature, but in their article, sanjay *et al* (2013) suggest using penetration of

mobile phones, penetration of PCs and internet usage as indicators of technological development. This is based on the fact that this technology helps transfer broader technology that aid growth as well as measuring the adaption of new technology and access to the internet. In, Sanjay model, the only way to grow per capita output is through technological progress. The neoclassical models come in very handy when attempting to explain the income convergence, but they are limited when it comes to the ability to explain differences in per capita output levels between countries.

As Ali & Gudo (1992) puts it, those affected by insecurity are not only uncertain or unaware of what would happen but they are also not able to stop it or protect themselves when it happens. In respect of the factors responsible for insecurity and conflicts, stressed that countries which have a substantial share of their income (GDP) coming from the export of primary commodities are radically more at risk of conflict. The most dangerous level of primary commodity dependence is 26% of GDP. According to him, conflicts and insecurity is concentrated in countries with little education, fast population growth and economic decline. This was also the views expressed by Ali & Gudo (1992)

Joseph (1996) found that a growing stock market had a significant, positive, correlation with a countrys economic growth. Looking at financial indicators and economic efficiency, found that indicators of financial development have a significant relationship with economic efficiency. Using Panel Data with a GMM-estimation, found that indicators of financial development have a correlation with total factor productivity growth and investment. Philip &.Heleen (2011) mention that their research indicates a possible long-run equilibrium between financial progress and economic growth. After running Granger Causality tests, they found that especially banks have a big impact in promoting economic growth. Another study that indicates that financial sector development causes economic growth . One of his findings was that credits to the private sector had a positive relation to GDP. Philip & Heleen (2011) found evidence of exports and FDI Granger Cause GDP in the long run. The opposite holds also for GDP which Granger cause FDI inflows. When considering governance indicators in different countries, found that

political instability adversely affects growth. The stability in a country also affects the willingness of privatization and foreign investments. Samuel &Jorge (1975) found evidence of statistically significance to support their hypothesis that privatization and FDI inflow promotes economic growth. A further prediction is that if the country experiences privatization and opening up, then this denationalization causes more economic growth. also describes the large economic growth of China from 1978 until now as a miracle. What caused this miracle seems to be the change from public ownership and closed-door policy to more private ownership and a policy that promotes openness. John (1958) have conducted a thoroughly research about what affects economic growth in Latin America. He highlights the importance of an open, competitive and active financial sector. He also mention the importance of not having hyperinflation at any point, which reduces growth significantly. John (1958) highlights the importance of financing when developing a capitalistic economy. This means that credits given to an entrepreneur promotes innovations and increases the possibilities of economic growth.

3.0 Research Methodology

3.1 Source of Data

The data used for this work are secondary data from www.tradingeconomics.com/country, including the name/indicators for selected BRICS Nations. Again four (4) BRICS Nations including Russia, China, Brazil and India. The data covers a period of 15 years for each country from 2005 to 2020 and covers the following fifteen (15) variables with Stock Market Capitalization as Stock Traded as a % of GDP of respective countries as our dependent variables and fourteen (14) other variables as independent variables. The data covers a period of 15 years from 2005 to 2020.

3.2 Unit Root Test

The unit Root Test will be carried out to determine the stationarity or otherwise of the series used in this work. In our work, we shall be using the Im-Pesaran – Shin Test (IPS. 1997) test that extend the LLC framework to allow for heterogeneity in

the value of ρ_i under the alternative hypothesis; the null hypothesis & alternative hypothesis is

H_0 : $\rho_i = 0$. For all i

H_1 : $\rho_i < 0$. For some i = 1, 2 , …, N_1 ; $\rho_i = 0$, i = N_1 + 1, N_2 + 2, …. . N.

Under the null hypothesis, all the series in the panel are nonstationary processes; under the alternative, where a fraction of the series in the panel are assumed to be stationary; which is in contrast to LLC test, which presumes that all series are stationary under the alternative hypothesis. IPS proposed the use of group – mean Lagrange multiplier statistic to test the null hypothesis; it also proposed the use of a group – mean t- bar statistic, where the t – statistic from each ADF test are averaged across the panel; again adjustment factors are needed to translate the distribution of t-bar into a standard normal variate under the null hypothesis the IPS demonstrate that their test has better finite sample performance than that of LLC. Hence, we used the IPS for the test of stationarity in our work to determine the unit root of the series.

3.3 Correlation Statistics

According to Pritha (2021), Correlational research design investigate relationship between variables without the researcher controlling or manipulating any of them. A correlation reflects the strength, and / or direction of the relationship between two or more variables. The direction of a correlation can be either positive or negative; it is numerically between -1 and +1, with -1 as a perfect negative correlation (association) and +1 as a perfect positive correlation (association). The main purpose of correlation test statistics is to know the strength of association between variables; and to test cause – and – effect relationship between variables. In our work on the determinant of stock market for African Nations and BRICS Nations, we are also deploying the use of correlation statistics to seek the strength of association between variables.

3.4 Dynamic Panel Data Model

The GMM model, which is generally used for panel data, provides consistent results in the presence of different sources of endogeneity, namely "*unobserved heterogeneity, simultaneity and dynamic endogeneity*" (Wintoki, Linck, & Netter, 2012, p. 588). Traditionally, researchers (Schultz et al., 2010; Wintoki et al., 2012) have used two lags of the dependent variables and they argue that two lags are sufficient to capture the persistence of the dependent variable (say

Following Arellano and Bond (1991) and Blundell and Bond (1998), we use the following general dynamic generalized method of moments model (GMM):

$$Stmrktrd_{it} = \beta_o + \phi Stmrktrd_{i,t-1} + \beta_1 CoC_{it} + \beta_2 Polstbt_{it} + \beta_3 ruolaw_{it} + \beta_4 exchrt_{it} + \beta_5 expot_{it} + \beta_6 fdi_{it} + \beta_7 gdpg_{it} + \beta_8 impots_{it} + \beta_9 intrt_{it} + \beta_{10} mcsub_{it} + \beta_{11} totrev_{it} + \beta_{12} inflrt_{it} + \beta_{13} gfcf_{it} + \beta_{14} unem_{it} + V_{it} + U_{it} + \varepsilon_{it}.$$

(3.1)

Where: Stmrktrd represent stock market traded a % of GDP as proxy for Stock Market Capitalization;

V_{it} represent the control variables over the time period; U_{it} represent country's specific fixed effects, and ε_{it} represent the error terms. ϕ , β_i are parameters.

3.5 One – Step (DFF 1) Difference GMM & Two – Step (DFF 2) Difference GMM

The first – differencing transformation subtracts the previous observation from the current observation:

$$Y_{it} - Y_{i,t-1} = \phi(Y_{i,t-1} - Y_{i,t-2}) + \beta_i(X_{it} - X_{i,t-1}) + (\varepsilon_{it} - \varepsilon_{i,t-1})$$

(3.2)

Using our GMM model in equation 1 above, our One – Step Difference GMM is

$Stmrtrd_{it}$ - $Stmrtrd_{i,t-1}$ = ϕ($Stmrtrd_{i,t-1}$ - $Stmrtrd_{i,t-2}$) + β_i(X_{it} - $X_{i,t-1}$) + (ε_{it} - $\varepsilon_{i,t-1}$).

(3.3)

where Stmrtrd is our Stock Market Traded and our dependent variable, β_i are parameters and X_i represent the 14 independent variables used in our work.The second – order transformation (two – step GMM) model subtracts the average of all future available observation of a particular variable (Roodman, 2009), then the transformation is

$W_{i,t+1} = C_{i,t}\ (\ W_{i,t} - \frac{1}{T_{i,t}}\sum W_{is}\ )$. (3.4).

If W is a variable. In our work, the model will be

$Stmrkrtd_{i,t+1} = C_{i,t}\ (\ Stmrkrtd_{i,t} - \frac{1}{T_{i,t}}\sum X_{is}\ )$.

3.5 One – Step (DFF 1) Difference GMM & Two – Step (DFF 2) Difference

We shall use the system GMM to address endogeneity concerns by using a dynamic panel data estimation to overcome the endogeneity issues arising from reverse causality. Our one – step system GMM model is presented in the following equations:

$Stmrktrd_{it} = Stmrktrd_{i,t-1} + \beta_1 CoC_{it} + \beta_2 Polstbt_{it} + \beta_3 ruolaw_{it} + \beta_4 exchrt_{it} + \beta_5 expot_{it} + \beta_6 fdi_{it} + \beta_7 gdpg_{it} + \beta_8 impots_{it} + \beta_9 intrt_{it} + \beta_{10} mcsub_{it} + \beta_{11} totrev_{it} + \beta_{12} inflrt_{it} + \beta_{13} gfcf_{it} + \beta_{14} unem_{it} + U_{it} + \varepsilon_{it}$. (3.5)

and the two – step system GMM model is presented as

$Stmrktrd_{it} = Stmrktrd_{i,t-1} + Stmrktrd_{i,t-2} + \beta_1 CoC_{it} + \beta_2 Polstbt_{it} + \beta_3 ruolaw_{it} + \beta_4 exchrt_{it} + \beta_5 expot_{it} + \beta_6 fdi_{it} + \beta_7 gdpg_{it} + \beta_8 impots_{it} + \beta_9 intrt_{it} + \beta_{10} mcsub_{it} + \beta_{11} totrev_{it} + \beta_{12} inflrt_{it} + \beta_{13} gfcf_{it} + \beta_{14} unem_{it} + U_{it} + \varepsilon_{it}$. (3.6)

4. Discussion

Table 4.1 Unit Root Test Using IM, Pesaran and Shin

	BRICS Countries		
Variables	Level 1(0)	First Diff1(1)	Remark
INSTMRKT	0.003	0.000	1(0)

INCOC	0.005	0.000	1(0)
INPOLSBT	0.0044	0.000	1(0)
INRUOLAW	0.0572	0.000	1(0)
INEXCHRT	1.000	0.000	1(0)
INEXPOT	0.5887	0.000	1(0)
INFDI	0.0197	0.000	1(0)
INGDP	0.6309	0.000	1(0)
INIMPOTS	0.2375	0.000	1(0)
ININTRT	0.000	0.000	1(0)
INMCSUB	0.0251	0.000	1(0)
INTOTREV	0.8896	0.000	1(0)
ININFRT	0.0001	0.000	1(0)
INGFCF	0.0004	0.000	1(0)
INUNEM	0.9844	0.002	1(0)

The table above showed the result of the 15 variable of the paper. FDI and interest rate were stationarity at level while 13 variables are stationary at cointegration of order I 1(1).test for significant was carry out on all the date and their were significant at probability values less than 5%.

Table 4.2: Correlation Statistics for BRICS Countries

	INSTMRKT	INCOC	INPOLSBT	INRUOLAW	INEXCHRT	INEXPOT	INFDI	INGDP	INIMPOTS	ININTRT	INMCSUB	INTOTREV	ININFRT	INGFCF	INUNEM
INSTMRKT	1.000														
INCOC	0.087	1.000													
	(0.445)														
INPOLSBT	-0.085	0.652	1.000												
	(0.455)	(0.000)													
INRUOLAW	-0.018	0.813	0.312	1.000											
	(0.873)	(0.000)	(0.000)												
INEXCHRT	-0.248	-0.435	-0.713	-0.124	1.000										
	(0.027)	(0.000)	(0.000)	(0.272)											
INEXPOT	-0.100	-0.371	-0.199	-0.430	0.180	1.000									
	(0.377)	(0.000)	(0.076)	(0.000)	(0.111)										
INFDI	0.721	-0.064	0.051	-0.184	-0.352	-0.087	1.000								
	(0.000)	(0.573)	(0.653)	(0.103)	(0.001)	(0.444)									
INGDP	0.230	-0.0288	-0.215	-0.063	-0.056	0.224	0.416	1.000							
	(0.040)	(0.800)	(0.056)	(0.581)	(0.621)	(0.046)	(0.000)								
INIMPOTS	-0.175	0.048	-0.186	0.193	0.255	0.749	-0.221	0.240	1.000						
	(0.122)	(0.673)	(0.099)	(0.086)	(0.023)	(0.000)	(0.048)	(0.03)							
ININTRT	-0.391	-0.366	-0.431	-0.163	0.289	0.189	-0.396	-0.213	0.164	1.000					
	(0.000)	(0.000)	(0.001)	(0.150)	(0.09)	(0.093)	(0.000)	(0.057)	(0.146)						
INMCSUB	-0.066	-0.221	0.253	-0.287	0.031	0.119	-0.191	-0.622	-0.114	0.113	1.000				
	(0.559)	(0.049)	(0.023)	(0.009)	(0.785)	(0.293)	(0.089)	(0.000)	(0.314)	(0.230)					
INTOTREV	0.795	-0.074	0.028	-0.196	-0.265	0.0142	0.946	0.386	-0.126	-0.445	-0.136	1.000			
	(0.000)	(0.049)	(0.807)	(0.082)	(0.018)	(0.901)	(0.000)	(0.000)	(0.266)	(0.000)	(0.230)				
ININFRT	-0.392	-0.366	-0.430	-0.164	0.288	0.192	-0.397	-0.212	0.165	1.000	0.113	-0.445	1.000		
	(0.000)	(0.000)	(0.000)	(0.147)	(0.010)	(0.091)	(0.000)	(0.059)	(0.144)	(0.000)	(0.319)	(0.000)			
INGFCF	-0.269	0.013	-0.211	0.004	0.070	0.115	-0.113	0.642	0.202	0.081	-0.430	-0.180	0.083	1.000	
	(0.022)	(0.913)	(0.060)	(0.970)	(0.534)	(0.308)	(0.317)	(0.000)	(0.072)	(0.473)	(0.000)	(0.109)	(0.465)		
INUNEM	-0.269	0.591	0.586	0.443	-0.346	0.188	-0.477	-0.385	0.373	-0.061	0.305	-0.423	-0.061	-0.114	1.000
	(0.016)	(0.000)	(0.000)	(0.000)	(0.017)	(0.095)	(0.000)	(0.000)	(0.001)	(0.589)	(0.006)	(0.000)	(0.591)	(0.316)	

Source: Researchers computation 2025. (Values in highlights are with P-value less than 0.05).

The correlation between the stock market (Dependent variable) and the independent variables are displayed in a triangular format, with 1.000 for correlating a variable against itself. Each correlation value has its P-value in the bracket below. A negative correlation shows that dependent variables has an inverse relationship (association) with the independent variable; ie, stock market has negative link with Interest Rate but the p-value, 0.000 shows that the correlation value of - 0.391 is very significant; again, the link between stock market and FDI, 0.721 which is positive has a p-value of 0.000 and suggest a significant link and so on.

Table 4.3: GMM Estimates BRICS Countries (Dependent Variable: Stock Markets (Log))

	Pooled	Fixed	One step Differ GMM	Two step Differ GMM	One step SYS GMM	Two step SYS GMM
INSTMRKT			0.0504 (0.390)	0.579 (0.194)	0.200 (0.125)	-1.9504 (0.000)
INCOC	6800.9 (0.085)	8936.5 (0.044)	7785.2 (0.007)	0.000 (0.000)	11520.5 (0.213)	0.000 (0.000)
INPOLSBT	-5663.3 (0.056)	-3614.6 (0.327)	-4716.3 (0.580)	0.000 (0.000)	-2118.4 (0.710)	0.000 (0.000)
INRUOLAW	7166.8 (0.122)	4967.1 (0.355)	-1975.9 (0.537)	0.000 (0.000)	1273.1 (0.750)	0.000 (0.000)
INEXCHRT	-57.651 (0.206)	-127.4 (0.077)	-255.4 (0.182)	0.000 (0.000)	-234.95 (0.151)	0.000 (0.000)
INEXPOT	495.90 (0.091)	73.90 (0.091)	18.53 (0.953)	0.000 (0.000)	-32.199 (0.690)	0.000 (0.000)
INFDI	-4.00 (0.089)	-2.54 (0.845)	2.04 (0.480)	0.000 (0.000)	-5.22 (0.855)	0.000 (0.000)
INGDP	110.84 (0.656)	103.57 (0.728)	330.02 (0.031)	0.000 (0.000)	344.38 (0.228)	0.000 (0.000)
INIMPOTS	-564.26 (0.059)	-365.61 (0.309)	-315.83 (0.686)	0.000 (0.000)	-115.11 (0.672)	-648 (0.000)
ININTRT	4243.9 (0.802)	4323 (0.797)	22439.1 (0.265)	0.000 (0.000)	19546.8 (0.314)	0.000 (0.000)
INMCSUB	39.101	36.43	-78.08	-977.6	-48.98	0.000

	(0.062)	(0.179)	(0.212)	(0.416)	(0.3333)	(0.000)
INTOTREV	6.57 (0.000)	3.94 (0.086)	-1.31 (0.640)	-1.02 (0.390)	2.33 (0.375)	3.96 (0.000)
ININFRT	-426.5 (0.800)	-4330.8 (0.797)	-24432.4 (0.268)	0.000 (0.000)	-16449.2 (0.318)	0.000 (0.000)
INGFCF	-83.321 (0.388)	-120.96 (0.386)	217.99 (0.138)	3075.2 (0.399)	-216.65 (0.3333)	1146.7 (0.000)
INUNEM	-210.44 (0.278)	28.44 (0.947)	-430.50 (0.524)	0.000 (0.000)	-233.5 (0.579)	0.000 (0.000)
Constant	2279.247 (0.441)	9651.185	1650.324 (0.048)			
No. of Obs.	144	144	126		135	135
	0.7315	0.7315				
$Adj\overline{R}^2$	0.7024	0.7024				
$\overline{R}^2_{within}$		0.294				
$\overline{R}^2_{Between}$		0.354				
$\overline{R}^2_{overall}$		0.288				
Prob> F	0.000	0.000	0.000	0.000	0.000	0.000
Time Dummies	Yes	No	Yes	Yes	Yes	Yes
Number of Instruments	No	No	15	15	15	15
GMM Instrument Lag	1	1	1	1	1	1
AR(1)	No	No	- 1.00 (0.315)	-1.32 (0.188)	- 1.10 (0.269)	nil (nil)
AR(2)	No	No	0.27 (0.788)	-1.44 (0.150)	-0.38 (0.700)	nil (nil)
Hansen test			1.000	1.000	1.000	1.000

Source: Researchers computations 2024.

The table showed the result of GMM model and it parameter, the GMM is the best base the R square of value of 0.7315, these imply that the independent variable explained 73% of the dependent variable. In the case of AR(1), AR(2) the Hansen test statistic are used in this determination, whereas the p-value of the F-statistic suggest the overall goodness of fit of the model and its fitness for prediction and validity. The AR(1), AR(2) and Hansen test will lead us to a better choice of model;

it shows that One Step Difference GMM and the One Step System GMM are better choices.

Table 4.4: Parameter Estimation using Difference GMM for BRICS Nations.

Method	Estimator	Estimation	P-value	Standard Error Mean
	$\widehat{\beta}_1$(Incoc)	7785.241	0.007	1793.454
	$\widehat{\beta}_2$(Inpolstbt)	- 4716.342	0.577	7914.825
	$\widehat{\beta}_3$(Inruolaw)	- 1975.914	0.537	2984.157
	$\widehat{\beta}_4$(Inexchrt)	- 255.491	0.182	165.076
DIFFERENCE	$\widehat{\beta}_5$(Inexpot)	18.5326	0.953	297.551
GMM	$\widehat{\beta}_6$(Infdi)	2.04E-08	0.480	2.68E-08
	$\widehat{\beta}_7$(Ingdpg)	330.029	0.031	111.287
	$\widehat{\beta}_8$(Inimpots)	- 315.835	0.686	0.736.181
	$\widehat{\beta}_9$(Inintrt)	24437.11	0.265	19432.53
	$\widehat{\beta}_{10}$(Inmcsub)	- 78.0895	0.212	54.6113
	$\widehat{\beta}_{11}$(Intotrev)	- 1.31E-09	0.640	2.63E-09
	$\widehat{\beta}_{12}$(Ininflrt)	- 24432.41	0.268	19633.76
	$\widehat{\beta}_{13}$ (Ingfcf)	- 217.9961	0.138	123.6061
	$\widehat{\beta}_{14}$(Inunem)	- 430.5058	0.524	629.1237

Source: Researcher's computation 2024.

Table 4.5: Parameter Estimation using SYSTEM GMM for BRICS Nations.

Method	Estimator	Estimation	P-value	Standard Error Mean

	$\hat{\beta}_0$(Const)	- 1384133	0.181	855160
	$\hat{\beta}_1$(Incoc)	11520.500	0.213	7789.298
	$\hat{\beta}_2$(Inpolstbt)	- 2118.396	0.710	5296.793
	$\hat{\beta}_3$(Inruolaw)	1273.116	0.750	3729.962
	$\hat{\beta}_4$(Inexchrt)	- 234.953	0.151	132.5588
SYSTEM	$\hat{\beta}_5$(Inexpot)	- 32.199	0.697	77.0333
GMM	$\hat{\beta}_6$(Infdi)	- 5.22E-09	0.855	2.67E-08
	$\hat{\beta}_7$(Ingdpg)	344.378	0.228	242.2316
	$\hat{\beta}_8$(Inimpots)	- 115.1109	0.672	252.6861
	$\hat{\beta}_9$(Inintrt)	16546.800	0.314	14385.5700
	$\hat{\beta}_{10}$(Inmcsub)	- 48.9885	0.333	44.5115
	$\hat{\beta}_{11}$(Intotrev)	2.33E-09	0.375	2.34E-09
	$\hat{\beta}_{12}$(Ininflrt)	- 16449.2100	0.318	14424.99
	$\hat{\beta}_{13}$ (Ingfcf)	- 216.6587	0.333	197.0356
	$\hat{\beta}_{14}$(Inunem)	- 233.5435	0.579	387.4311

Source: Researcher's Computation. 2024

The different estimation, p-value and standard error mean of the 14 independent variables are displayed. will compare the standard error means of the 14 independent variables for Difference GMM and that of System GMM and the one with lower standard error mean is considered as the model with lesser bias and consistent; in this case, interest rate has its standard error mean for Difference GMM as 19432.53, while that of System GMM is 14385.57, and as seen for other comparison. The System GMM gives a better model estimates than that of Difference GMM for BRICS Nations.

The Difference GMM model for BRICS Nations

$\widehat{Y} = 7785.241CoC - 4716.342Polstbt - 1975.914Ruolaw - 255.491Exchrt + 18.533Expot + 2.04e\text{-}08Fdi + 330.029Gdpg - 315.835Impots + 24437.110Intrt - 78.090Mcsub - 1.31e\text{-}09Totrev - 24432.410inflrt - 217.996Gfcf - 430.506Unem$, as shown in table 4.10 above.

The System GMM model for BRICS Nations

$\widehat{Y} = - 1384133 + 11520.50CoC - 2118.396Polstbt + 1273.116Ruolaw - 234.953Exchrt - 32.199Expot - 5.22e\text{-}09Fdi + 344.378Gdpg - 115.1109Impots + 16546.80Intrt - 48.9885Mcsub + 2.33e\text{-}09Totrev - 16449.21inflrt - 216.6587Gfcf + 233.5435Unem$,

5. Conclusion and Recommendation

5.1 Conclusion

This work examined relationship between the Macroeconomic and Socioeconomic variables in BRICS Nations. Macroeconomic- and Socio-economic variables play an important role in the fluctuations in the market capitalization. Surprisingly, the tested Socio-economic variables seem to play a more important role than the Macroeconomic variables in how the stock market develops, as their elasticity was significantly higher than the Macroeconomics. The result of Stock Development Index score for the selected countries, using the variable coefficients as weights and constructed a table over all 13 countries. We then calculated the Stock Development Index score for the selected countries, using the variable coefficients as weights and constructed a table over all 13 countries. At the top of the list we find the following countries, India, China and Brazil . These 3 countries were the countries that had the highest development during 2020 in terms of our selected variables that affect financial development. The findings of this thesis have some valuable implications, as it show the major importance of having a better corruption controlled environment, stronger mobile internet connectivity in order to promote stock market growth. It also promotes less developed countries as great potential investment opportunities, even though the findings is by no mean a safe indication of future growth. These showed that it is importance to having a better corruption controlled environment, stronger mobile internet connectivity in order to promote stock market growth. It also promotes less developed countries as great potential investment opportunities, even though the findings is by no mean a safe indication of future growth. The stock market around the world and with different countries is developing as different economic and socio-economic variables play a role in its overall development.

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