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Velocity of Money and Financial Development in BRICS Countries

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Abstract: The manner in which the velocity of money behaves is very influential when determining how much financial resources an economy can produce. An unpredicted velocity of money and unstable demand for money results in a spineless and ineffective management and control of monetary policy. The study determined the "impact of financial development on the velocity of money in Brazil, Russia, India, China and South Africa (BRICS) countries for the period 1996 to 2019". The study employed a panel autoregressive distributive lag (PARDL) to estimate the relationship between financial development and velocity of money in BRICS countries. In addition, "panel fully modified least squares and panel dynamic least squares were employed to supplement PARDL". A long run relationship between financial development and the velocity of money in BRICS countries was confirmed. A positive and statistically significant long run relationship was found between liquid liabilities to GDP and velocity of money, while a negative and statistically significant relationship was found with stock market capitalisation. The speed of adjustment indicted that about 68.5% of disequilibrium would be rectified in the next year in the BRICS countries. It can be concluded that financial development has a strong significant impact on the velocity of money particularly when liquid liabilities were considered. Therefore, financial institutions should promote people to hold liquid portfolios such as a savings or checking account at their local bank or credit union, a money market account or/ and short-term certificates of deposit. The study therefore, makes recommendations that since stable financial development, both globally and within countries, have the potential to generate jobs and improve productivity more should be done in ensuring an effective and sound developed financial sector system as it can influence the velocity of money channel.

Keywords: BRICS, Financial development, Panel autoregressive distributive lag, Velocity of money

1. Introduction

The velocity of money is essential and debatable in monetary theory as it intrigued attention over years mainly because of its role in setting sound monetary programs (Gill, 2010; Roberts, 2011; Aggarwal, 2013). However, very few systematic analyses have focused on how financial development affects the velocity of money across nations. The velocity of money is a rate at which money interchanges hands in a specified period or the rate at which money flows (Okafor & Shitile, 2013). In practice, money velocity is taken as the average number of times that a national currency is disbursed annually. Hence, it can be defined as the ratio of nominal GDP to the money supply (Akhtaruzzaman, 2008). An observation made by Gill (2010) suggests the quantity of money and the rate at which money circulates determine the quantity of money supply in an economy. The velocity of money is very influential in determining the necessary forthcoming stock of money in the economy. Rami (2010) is of the view that the velocity of money has an essential role in macroeconomic examinations and has intense repercussions for economic steadiness.

It is stated in O'Neill (2001) that Goldman grouped Brazil, Russia, India, and China as BRIC in 2001. Patrick (2012) indicated that South Africa was officially invited to join the BRIC's annual summit in December 2010 in Beijing and the group's name was altered to BRICS spanning four continents. These emerging countries were predicted to release accelerated growth in the economy and be greater than some of the established economies. BRICS played a conclusive role concerning the reforms of international financial institutions. Massive volumes of petroleum products, metals and chemicals are produced and exported by the BRICS countries (Peace & Crimes, 2016).

There are several measurements for financial development that appear in literature and most of them based on two categories namely monetary aggregates and stock market aggregates (Khan & Gill, 2013; Peace & Crimes, 2016). Earlier literature on financial development suggested different monetary aggregates were used, such as M1 (currency and demand deposits) and M2 (M1 plus short and medium-term demand deposits (Khan & Senhadji, 2000). However, it has been found that monetary aggregates tend to be poor proxies for financial development with underdeveloped financial systems (Hassan, Sanchez & Yu, 2011). This is because monetary aggregates, M1 and M2, are more linked to the ability of a financial system to provide a medium of exchange as opposed to the ability to allocate funds efficiently between savers and borrowers (Khan & Senhadji, 2000). But it must be noted that for developing countries, such as South Africa, M2 is used as a proxy to measure financial depth (Peace & Crimes, 2016).

The velocity of money and financial development indicators are classified under the financial system and their effects can spill over to the real sector. A functional financial system mobilizes savings from depositors and then provides investment opportunities through credit lines to entrepreneurs. According to the Kynveld Peat Marwick Goerdeler (KPMG, 2015), a functional financial system in developed countries promotes growth and drives entrepreneurial innovation, technological progress, and facilitates human as well as physical capital accumulation. It is thus expected that the country's economy will demonstrate vigorous growth similar to other middle-income countries with a similar financial structure and economic development history.

There have been fluctuations in the trends of the velocity of money in the BRICS countries, giving a V-shaped trend. For instances, in Brazil was 35.12 in 1996 increased to 58.41 in 2001 decline to 56.43 in 2004 reached a peak of 93.70 in 2015 (World Bank, 2018). The discrepancies in the velocity of money for BRICS countries have inferences for monetary policy especially for the reserve banks that utilise the monetary targeting framework. Unsteady velocity creates challenges in the forecasting of ideal monetary aggregates and thereby affecting the foundation of monetary policy verdicts. Developed economies are associated with more challenges in distinguishing between money and money substitutes (Okafor & Shitile, 2013). Kannapiran (2001) stressed that velocity is not only vital in determining the extent to which monetary policy is effective but also very fundamental in assessing whether the short-term policy is effective. Additionally, several studies such as Akhtaruzzaman (2008), Gill (2010), Akinlo (2012), Okafor and Shitile (2013), Ng'imor and Muthoga (2015) and Aruna (2016) amongst others, have examined the relationship between financial development and velocity of money in different countries and yielded contradicting results. It should be noted that the novelty of this study is its contribution assessing the impact of financial development on the velocity of money in BRICS countries particularly by incorporating liquid liabilities to GDP as a proxy of financial development. The paper is structured as follows; review of literature, methodology, results and discussions and conclusion and recommendations.

2. Literature Review

2.1 Theoretical Literature

This section discusses the theories that emanated regarding money and these comprise amongst others quantity theory of money: Classical view, Cambridge approach to money demand and Friedman money demand theory/ modern quantity theory. An assessment of the theoretical and empirical literature on financial development and velocity of money indicates that most studies adopted the velocity of money function based on the modern quantity theory, which accommodates institutional and opportunity cost factors in its analysis (Akinlo, 2012; Okafor & Shitile, 2013; Ng'imor & Muthoga, 2015; Aruna, 2016). According to Ng'imor and Muthoga (2015), the classical, Keynesian and modern quantity of money support the contention that real income, interest rate, and institutional factors are the major aspects that affect the velocity of money. The outcomes of this study are based on the modern quantity of money and the Cambridge money demand theories.

The classical quantity theory is relevant as it gives us the expected relationship between the velocity of money and the stock of money at a given time. This theory established an inverse relationship between the two, implying that we might find a negative relationship between the velocity of money and stock market capitalisation (Kannapiran, 2001). The Cambridge money demand theory suggested the

direct relationship between the velocity of money and liquid liabilities. This theory advocated that citizens do not hold money for transaction costs only but also for the conveniences and security of having cash on hand. This portion of the money is usually denoted as a portion of nominal income and is viewed as wealth by many.

The quantity theory of money preserved velocity as a constant with the inference that an expansionary monetary policy needs no interrogations, as it would affect nominal output levels (Okafor & Shitile, 2013). According to Okafor and Shitile (2013), the Chicago school steered by Milton Friedman argued that the velocity of money is highly affected by demand management policies and as a result, it is a non-stationary variable. Inconsistency in the values of velocity has verified the theory to be invalid. Concerning steadiness in money velocity, the literature allied with established economies has revealed that money velocity is neither faultlessly steady nor completely foreseeable (Rami, 2010). This is confirmed by the fluctuations in the trends of the velocity of money measured by the velocity of broad money (M2) in the BRICS countries from 1994 to 2015.

2.2 Empirical Literature

Among studies that researched financial development and the velocity of money is a study by Ng'imor and Muthoga (2015) using quarterly data in Kenya. The findings of the study revealed a weak impact from both interest rate and inflation towards income velocity of money. Akinlo (2012) investigated the impact of financial development on the velocity of money in Nigeria and discovered statistically significant relationship. Liu and Chen (2016) found a positive and significant association between velocity of money and financial systems on banking and capital markets of developed countries in OECD and developing countries in APEC. Higher stock market turnover increased the demand for money and therefore increasing the velocity ratio. The results are consistent with the findings of Khan, Gill, and Haneef (2013) whose analysis revealed a positive association between financial development and the velocity of money in Pakistan. Furthermore, Altayee and Adam (2012) examined the impact of financial development on the velocity of money under interest-free financing in Sudan over the period 1992 to 2012. A positive long-run relationship was found between financial development and the velocity of money. These studies suggest that financial development has a vital role in determining the income velocity of money.

Most studies are looking at the relationship between economic growth and velocity of money, hence the novelty of this study with its objectives to contribute to literature. For instance, Mohamed (2020) confirmed a long-run equilibrium relationship between the velocity of money and economic growth, validating the quantity theory of money in Sudan. Khan and Gill (2013) identified the determinants of the velocity of money (VM) in Pakistan by using the cointegration technique and found a positive association between the velocity of money and economic growth. Still, in Pakistan, Ahad (2017) investigated the relationship between financial development and money demand function and found a long-run association. Ndubuisi (2017) assessed the link between financial development and economic growth in Nigeria by employing annual time series data for the sample period 1981 to 2014. The study used a multivariate VAR framework approach to co-integration to assess the long-run relationships between financial development and economic growth. Jung (2016) also assessed the issue of money demand stability by estimating a portfolio demand approach for broad money M3 in the euro area.

Okpara, Onoh, Ogbonna, and Iheanacho (2018) assessed the interaction between financial development and economic growth in Nigeria using data for the period 1981-2014. The results revealed a positive long-run relationship between the variables. In Russia, Krinichansky and Sergi (2019) assessed the effects of financial deepening on the sources of economic growth using panel data from 75 regions. The study utilised the system generalised method of moment technique to test the proposition from previous empirical studies which evidenced that in developing countries financial development affects accumulation more than productivity growth. The results obtained by Krinichansky and Sergi (2019) are contrary to the proposition as they revealed that the impact of finance on output growth happens mainly through productivity and the positive effect of finance on capital accumulation is less significant. This could mean that structural problems in Russia and developing countries are somewhat the same.

3. Methodological Approach

In order to determine the relationship between financial development and the velocity of money

in BRICS countries, the annual secondary time series data is collected covering the period 1996 to 2019. The sample period is determined by the availability of data. Data is sourced from the Federal Reserve Bank of ST. Louis, Data Market, World Bank, IMF, and the Global Economy. The study also adopts and modifies the empirical model based on reviewed literature (Akkhtaruzzaman, 2008; Ng'imor & Muthoga, 2015; Liu & Chen, 2016) specified as follows:

$$VM_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 LL_{it} + \beta_3 SMC_{it} + \varepsilon \quad (1)$$

Where VM is the velocity of money and employs velocity of broad money M2 as a proxy for the velocity of money; I is the real effective interest rate, LL is Liquid liabilities to GDP and SMC is stock market capitalisation to GDP, LL and SMC are proxy for financial development, β_0 is intercept, β_{1-3} are slope coefficients, *it* represent BRICS panel and ε is the error term.

The paper employed four unit root tests namely Levin, Lin, and Chu (LLC), Im, Pesaran and Shin (IPS), and Fisher-ADF and Fisher-PP. It is alluded in Ncanywa and Mabusela (2019) that LLC test apply a panel unit root test for each cross-section data than executing individual unit root tests. While the LLC test assumes homogeneous autoregressive coefficients, IPS test on the other hand allows for heterogeneous autoregressive coefficients. According to Ndoricimpa (2014), the IPS test permits for concurrent stationary and non-stationary data series and also operates on stable panels. Baltagi, Bresson and Pirotte (2008) compared the Fisher-ADF, and Fisher-PP with the LCC and the IPS. Both IPS and Fisher test combine data centred on the individual unit test. The Fisher test, however, has the advantage over the IPS in that it does not entail a balanced panel. The Fisher test is also not limited to one lag length for individual ADF regressions and can be implemented in various unit root tests. However, the Fisher test can only be implemented when the p-values are derived by the Monte Carlo simulations.

The paper tested long run effects using the cointegration tests such as the Pedroni and the Kao cointegration test. To test for the null hypothesis of no cointegration in a panel data model, Pedroni (2004) endorses a set of seven tests from which four are panel statistics and three are grouped panel statistics. The Pedroni test is categorised into two major sections being the Within Dimensions and the Between Dimensions. Pedroni (2004) is an extension of the Engle and Granger of 1987 two steps. Kao (1999) established a residual-based panel cointegration test. The test is founded on a homogenous panel and assumes a common co-integrating vector.

To determine the long-run and the short-run estimates between financial development and the velocity of money, the Panel Autoregressive Distributive Lag (PARDL), Panel Fully Modified Least Squares (FMOLS) and Panel Dynamic Least Squares (DOLS) were employed. The choice of the PARDL research technique is based on the following reasons: *Firstly*, the procedure is appropriate for a small or limited sample size, which is more suitable to this study due to limitations in the availability of data. *Secondly*, the procedure permits long-run equilibrium to be established through OLS once the lag order of the model is identified. Lastly, ARDL permits for the mixture of *I*(0) and *I*(1) variables as regressors. ARDL models standard least square regressions which include lags of dependent and explanatory variables. The FMOLS and DOLS were employed to reinforce the results.

4. Results and Discussion

The study conducts a formal unit root testing in order to confirm whether the variables are stationary or non-stationary. Table 1 on the next page presents the formal panel unit root test results starting with Levin Lin and Chu (LLC), Fisher ADF, Fisher PP Unit root test results and lastly IM, Pesaran and Shin (IPS) for the BRICS countries.

Table 1 presents the formal unit root tests for the variables starting with the velocity of broad money (M2), real effective interest rate, liquid liabilities to GDP, and stock market capitalisation to GDP respectively. The velocity of broad money is non-stationary at levels under both specifications in the tests of LLC and IPS; and stationary at levels in the intercept and trend of Fisher ADF and PP. This implies that the null hypothesis can be rejected particularly under Fisher ADF and PP intercept and trend. It can be concluded that the velocity of money displayed different orders of integration at levels I (0) and after first differencing I (1).

Real effective interest rate (I) was also tested for unit root as represented in Table 1. The test results obtained have shown that I is non-stationary at levels in the LLC and IPS tests conducted. Real

Table 1: Panel Unit Root Results for BRICS Countries

Variable	Test	Test Equation	Level	1st Difference
The velocity of broad money (M2)	Levin, Lin, and Chu	Intercept	-0.9549	-4.2785***
		Intercept and trend	-0.5560	-3.2967***
	Fisher-ADF	Intercept	3.4544	36.0700***
		Intercept and trend	11.7653***	-
	Fisher -PP	Intercept	4.4844	24.3996***
		Intercept and trend	21.0333***	-
	IM, Pesaran, and Shin	Intercept	1.2402	-4.2934***
		Intercept and trend	-0.4892	-2.9110***
Real effective interest rate (I)	Levin, Lin, and Chu	Intercept	0.4395	-3.3944***
		Intercept and trend	-0.2442	-4.304***
	Fisher-ADF	Intercept	11.3493***	-
		Intercept and trend	17.3970**	-
	Fisher -PP	Intercept	7.2184**	-
		Intercept and trend	9.3112**	-
	IM, Pesaran and Shin	Intercept	0.4655	-3.1129***
		Intercept and trend	-0.8893	-2.1532**
Liquid liabilities to GDP	Levin, Lin and Chu	Intercept	-0.0414	-3.8082***
		Intercept and trend	-1.078	-3.582***
	Fisher-ADF	Intercept	6.2884	30.6497***
		Intercept and trend	10.8236	22.3150***
	Fisher -PP	Intercept	7.1226	42.2472***
		Intercept and trend	6.2989	35.9791***
	IM, Pesaran, and Shin	Intercept	1.8734	-3.5643***
		Intercept and trend	-0.4118	-2.5070***
Stock market capitalisation to GDP	Levin, Lin, and Chu	Intercept	-1.1148	-5.772***
		Intercept and trend	-0.7812	-4.0984***
	Fisher-ADF	Intercept	7.4756	39.6761***
		Intercept and trend	7.9245	30.0491***
	Fisher -PP	Intercept	6.9714	58.6592***
		Intercept and trend	5.7812	42.4877***
	IM, Pesaran, and Shin	Intercept	-0.0050	-4.7115***
		Intercept and trend	0.7923	-3.5838***

** 5% statistically significant; *** 1% statistically significant; ADF Augmented Dickey Fuller; PP Phillips Perron; GDP gross domestic product

Source: Own compilation

effective interest rate became stationary in these tests after first differencing. Table 1 indicated that real interest rates have different orders of integration. Another variable tested for the presence of unit is liquid liabilities to GDP (LL). At levels, LL is not stationary in all the tests. A stationary condition is observed only after first difference.

Stock market capitalisation to GDP (SMC) was tested for the presence of unit root using the four tests. SMC proved to be I (1) as it became stationary after first difference. The results obtained are statistically significant with probabilities less than 5%. At levels, all the statistic test values are less than the critical values with probabilities more than five percent.

Following the panel unit root test is the panel cointegration test, which applies various techniques namely Pedroni panel cointegration test, Kao panel cointegration, and lastly Johansen-Fisher panel cointegration test. This study uses three models, to determine the impact of financial development on the velocity of money in BRICS countries. The study also applies panel autoregressive distributed lag to provide for the estimates of both the long-run and short-run relationship between the variables. Before running the panel cointegration tests, it is vital to conduct the lag length selection criteria in order to optimally select the number of lags to be utilised during the analysis.

Various lag length criteria are provided in E-views, and they include among others Schwarz Information Criterion, Final Prediction Error, Akaike Information Criterion, and Human-Quinn Information. The study conducted the lag length selection criterion, and the results obtained that one lag can be selected as shown by the majority of the criteria. The results for Pedroni cointegration tests indicated the null hypothesis that there is no cointegration between the variables. The results for each model are represented in Table 2 for BRICS countries.

Table 2 presents Pedroni panel cointegration results for all the test statistics. The results indicate that the variables are cointegrated and statistically significant at 1% significant level except for panel rho-statistics in both the within and between dimension under no deterministic trends. Five out of seven test statistics confirmed the existence of cointegration. Under

Table 2: Pedroni Panel Cointegration Results for BRICS Countries

No Deterministic Trends		
Within Dimension Statistics	**Panel t-statistics**	**Panel p-value**
Panel v-Statistic	1.111148	(0.1333)
Panel rho-Statistic	-2.551028	(0.0054)
Panel PP-Statistic	-9.075518	(0.0000)
Panel ADF-Statistic	-5.183317	(0.0000)
Between Dimension Statistic	**Panel t-statistics**	**Panel p-value**
Group rho-Statistic	0.442513	(0.6709)
Group PP-Statistic	-6.938341	(0.0000)
Group ADF-Statistic	-6.706304	(0.0000)
Deterministic Intercept and Trend		
Within Dimension Statistics	**Panel t-statistics**	**Panel p-value**
Panel v-Statistic	0.056034	(0.4777)
Panel rho-Statistic	-1.526648	(0.0634)
Panel PP-Statistic	-11.92570	(0.0000)
Panel ADF-Statistic	-5.186772	(0.0000)
Between Dimension Statistic	**Panel t-statistics**	**Panel p-value**
Group rho-Statistic	1.452267	(0.9268)
Group PP-Statistic	-7.930666	(0.0000)
Group ADF-Statistic	-4.107082	(0.0000)
No Deterministic Intercept or Trend		
Within Dimension Statistics	**Panel t-statistics**	**Panel p-value**
Panel v-Statistic	0.719602	(0.2259)
Panel rho-Statistic	-2.417474	(0.0078)
Panel PP-Statistic	-50855647	(0.0000)
Panel ADF-Statistic	-2.920574	(0.0017)
Between Dimension Statistic	**Panel t-statistics**	**Panel p-value**
Group rho-Statistic	0.010444	(0.5042)
Group PP-Statistic	-4.751250	(0.0000)
Group ADF-Statistic	-2.707486	(0.0034)
Notes: Values in () are p-values; P<0.05 is significant at 1% level		

Source: Own compilation

deterministic intercept and trend, the variables are cointegrated and statistically significant at 1% level in both dimensions except for panel v-statistic, panel rho-statistic, and group rho-statistic. Four out of seven test statistics confirmed the existence of cointegration. It has also been recognized that under no deterministic intercept or trend, in the first dimension panel v-statistic is not statistically significant while group rho-statistic is not statistically significant in the second dimension. Five out of seven test statistics confirmed the existence of cointegration. The majority of the Pedroni cointegration test results revealed the existence of cointegration amongst the variables and therefore the study rejects the null hypothesis of no cointegration and accepts the alternative hypothesis. These results designate a long-run relationship in the series.

Another panel cointegration technique adopted by this study is the Kao panel cointegration test. The null hypothesis for this test is that there is no cointegration between the velocity of money and financial development in BRICS countries. Table 3 represents the results obtained for BRICS countries.

Table 3 shows that cointegration exists between the variables with the ADF t-statistics of -2.4251 and the probability of 0.77% which is less than 5%. These results mean that the study rejects the null hypothesis. The results indicate that velocity of broad money, real effective interest rate, liquid liabilities to GDP, and stock market capitalisation to GDP are cointegrating and therefore have a long-run relationship.

Table 3: Kao Panel Cointegration Results for BRICS Countries

Statistic Methods	t-statistic	P-value
ADF Residual variance HAC variance	-2.425104 37.75063 15.94209	(0.0077)

Source: Own compilation

Since the panel unit root tests obtained have excluded the possibility of I (2) variables and confirmed the variables to be stationary at levels and first difference, panel autoregressive distributed lag (PARDL) is therefore implemented to provide for the estimates of both the long-run and short-run relationship between the variables. The study used one lag as selected by lag length selection.

The long-run influence of financial development on the velocity of money is presented in Table 4 for BRICS countries as well as the short-run analysis from differenced variables and the speed of adjustment at which the model converges towards the equilibrium.

The results shown in Table 4 show that the real effective interest rate has a negative sign and statistically significant. The implication is that higher levels of interest rate are linked with lower levels of the velocity of money which shows a negative influence of interest rate towards the velocity of money. The results are contrary to the theory and the works of Omer (2010), Okafor & Shitile (2013), and Rami (2010)

Table 4: Panel Autoregressive Distributed Lag (PARDL) Test Results for BRICS Countries

Variables	Coefficients	Probability
Long run Equation		
I	-0.1924	0.0000
LL	1.1705	0.0000
SMC	-0.0376	0.0052
Short-run Equation		
Speed of adjustment	-0.6854	0.0310
D(I)	0.0623	0.3692
D(LL)	-0.0636	0.8958
D(SMC)	0.0703	0.0749
Notes: I, real effective interest rate; LL, Liquid liabilities to GDP; SMC, stock market capitalisation to GDP; D(I), differenced real effective interest rate; D(LL), differenced Liquid liabilities to GDP; D(SMC), differenced stock market capitalisation to GDP		

Source: Own compilation

amongst others where a positive impact was found toward velocity of money from the interest rate. The results depict that in the long run, a 1% increase in real effective interest rate will result in a decrease of 19.24% in the velocity of broad money. However, results correspond to the results attained by Akinlo (2012) where interest rate had a significant negative influence on the velocity of money implying that an increasing interest rate leads to an increase in money demand which then leads to a decrease in the velocity of money. Ng'imor and Muthoga (2015), however, found a weak impact from both interest rate and inflation towards income velocity of money.

As for liquid liabilities to GDP (LL) a positive and statistically significant relationship is found towards the velocity of money in the long run. Table 4 depicts that a unit change in liquid liabilities to GPD will result in an increase of 117% in the velocity of money. The results are consistent with the findings of Khan et al (2013), Gill (2010) and Altayee & Adam (2012) whose analysis revealed a positive association between financial development and velocity of money in Pakistan. Akhtaruzzaman (2008) argued that at fundamental stages of financial development should have a positive impact on the velocity of money so that the velocity of money increase with financial development which corresponds to the results obtained by this study. This is also shared in the Cambridge money demand theory that liquid liabilities can positively influence velocity for money.

Furthermore, a long-run negative and significant relationship exists between velocity of broad money and stock market capitalisation. A unit increase in stock market capitalisation would result in a 3.76% decrease in the velocity of broad money. Investment in stock market capitalisation is an opportunity cost of holding money particularly when the return on investment is high. The implication is that an increase in stock market capitalisation would lower the amount of money and therefore reducing the velocity of money. The results conform to the existing literature and correspond to Okafor & Shitile (2013) where a negative impact was found towards the velocity of money from stock markets capitalisation. This is also in line with the classical quantity theory that supports the negative relationship in the velocity for money and stock market capitalisation nexus.

The speed of adjustment indicates the speed at which the equilibrium will be restored in the next period. As illustrated in Table 4 a negative and statistically significant speed of adjustment of -0.6854 has been obtained which indicates that about 68.54% of disequilibrium is rectified per annum if changes are made to indicators of financial development about their effects. This means that if there are financial development inequities in the economy in a year, 68.54% of those inequities will be rectified in the next year.

In the short run, a positive but insignificant influence from both the real effective interest rate and stock market capitalisation to GDP is observed towards the velocity of money. Regarding Liquid liabilities to GDP, a negative and insignificant impact toward the velocity of money is revealed.

Table 5 shows a negative and statistically significant estimated coefficient for effective interest rate towards the velocity of broad money. This means that the real effective interest rate has a negative impact on the velocity of money. On the other hand, both liquid liability and stock market capitalisation estimated coefficients are positive and statistically significant towards M2. The interpretation is that the two variables have a positive impact on the velocity of money and are essential factors of the velocity of money in BRICS countries. The sign displayed by liquid liability in the model of FMOLS is different from the panel autoregressive distributed lag.

Table 5: Panel Fully Modified Least Squares (FMOLS) for BRICS Countries

Variables	FMOLS	t-statistic & P-value
Real effective interest rate (I) Liquid Liabilities to GDP (LL) Stock market capitalisation to GDP (SMC)	-0.0036 1.03327 0.1727	-3.4772 (0.0008) 16.4487 (0.0000) 6.1663 (0.0000)
Dependent variable: Velocity of broad money (M2)		

Source: Own compilation

Table 6: Panel Dynamic Least Squares (DOLS) for BRICS Countries

Variables	DOLS	t-statistic & P-value
Real effective interest rate (I) Liquid Liabilities to GDP (LL) Stock market capitalisation to GDP (SMC)	-0.2571 0.9394 0.2454	-2.4694 (0.0214) 8.9941 (0.0000) 9.0120 (0.0000)
Dependent variable: Velocity of broad money (M2) Adjusted R-Squared 0.9974 P < 0.05 is statistically significant at 5%		

Source: Own compilation

Table 6 presents the findings of the panel DOLS estimates, and the results indicate a negative impact of interest rate towards the velocity of money. The coefficient is negative and statistically significant with a probability of 0.2% which is less than 5%. As for liquid liability and stock market capitalisation, a positive impact towards the velocity of money exists and the estimated coefficient is positive and statistically significant with the probability of 0%.

5. Conclusion and Recommendations

The study aimed to investigate the impact of financial development on velocity of money in Brazil, Russia, India, China and South Africa (BRICS) countries for the period 1996 to 2019. The study employed a panel autoregressive distributive lag (PARDL) to estimate the relationship between financial development and velocity of money in BRICS countries. In addition, panel fully modified least squares and panel dynamic least squares were employed to supplement PARDL.

A long run relationship between financial development and velocity of money in BRICS countries was confirmed. A positive and statistically significant long run relationship was found between liquid liabilities to GDP and velocity of money, while a negative and statistically significant relationship was found with stock market capitalisation to GDP. The speed of adjustment indicted that about 68.5% of disequilibrium would be rectified in the next year in the BRICS countries. It can be concluded that financial development has a strong significant impact on velocity of money particularly when liquid liabilities were considered.

The positive significant influence of liquid liabilities on the velocity of money in the long run could have significant effects on the economy, especially on household and bank's policymakers. The key for policymakers is to ensure that banks better their unique position among financial intermediaries through their function of availing money. The financial sector needs to increase liquidity especially in times of hardship like in recession or shocks due to diseases so that investors are not left with illiquid portfolios that cannot bring a valuable return. This could be beneficial in the current global COVID-19 pandemic era. People can safely store their assets in liquid portfolios such as a savings or checking account at their local bank or credit union, a money market account, or/and short-term certificates of deposit. This should be accompanied by institutional reforms as they enable the potential of the financial to contribute to the ultimate goal of economic growth. The reforms will enhance the confidence of the population to save more in the short term and therefore generating more money for banks to lend to the private sector and this will ultimately result in increased economic growth. The study, therefore, makes recommendations that since financial stability, both globally and within countries, generates jobs and improves productivity more should be done in ensuring an effective and sound developed financial sector system.

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