The Dynamic Linkage between Money Market, Capital Market and Economic Growth in Ghana: New Lessons Relearned

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ABSTRACT: This study is a comparative analysis of the effects of money and capital markets on the Ghanaian economy covering the period from 1991 to 2017 using the dynamic Auto Regressive Distributed Lag (ARDL) framework. Empirical results confirmed the existence of a unique and stable long-run relationship between the money market, capital market and economic growth. In respect of money market indicators, findings confirmed that monetary policy and treasury bills rate have had negative but significant impact on growth in the short- and long-run respectively. More so, total liquidity negatively and significantly influenced the Ghanaian economy both in the short- and in the long run. Both market capitalisation and total value of stock traded, as proxies of capital market, had positive and significant effects on short-run growth, while both indicators as well as stock market turnover negatively and insignificantly affected long-run growth. This means that capital market exerts a short-run impact on the country's economy, while money market exerts both short- and long-run impacts. The lesson relearned is that the money market propels the Ghanaian economy better than the capital market.

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1 Introduction

One of the key factors in ensuring sustainable growth is the development of financial markets since they are capable of diverting idle financial resources from surplus areas to productive ends (Goldsmith, 1969; Durusu-Ciftci et al., 2017; Mesagan et al., 2018b; Eregha and Mesagan, 2020). Gibson and Tsakalotos (1994) posited that the liberalization of financial markets could improve savings, investments and efficient allocation of financial resources which, in turn, leads to rapid growth of the economy. The theory about the relationship between growth and financial market development originates from Schumpeter (1911), who pointed out that financial institutions played a crucial role in the economy through financial resources' allocation. Moreover, scholars such as McKinnon (1973); Levine and Zervos (1996); Cooray (2010); Beck and Levine (2004); Narayan and Narayan (2013), as well as Isola and Mesagan (2018) posited that the financial sector provided a direct stimulus that is necessary for growth. Other studies by, for instance, Singh (1997); Nili and Rastad (2007); Enisan and Olufisayo (2009); Adusei (2014); Owusu and Odhiambo (2014b); Mesagan and Nwachukwu (2018), as well as Samargandi et al. (2020) confirmed that the situation was quite different in developing countries where financial markets were poorly organised. Hence, their output growth was not substantially enhanced.

Over the past few decades, scholars from developing nations such as Bolbol et al. (2005); Odhiambo (2010b); Acquah-Sam and Salami (2014); Mesagan and Shobande (2016); Mesagan et al. (2019a); Yusuf et al. (2020), among others, have been developing more interest in examining the link between growth and the financial sector in order to verify what studies by, for instance, Levine and Zervos (1996); Shaw (1973), established for developed nations. Although this is interesting, there have only been few studies analysing the comparative impacts of money and capital markets on developing countries'economies. Therefore, the present study empirically investigates these assumptions with respect to the Ghanaian economy using the ARDL framework having confirmed the integration of the variables to be of order zero and one. This method has also been chosen due to its efficiency when dealing with small and finite samples with endogenous regressors (Haug, 2002). It has also been affirmed that ARDL allows dependent and independent variables to have unrestricted numbers of lags (Pesaran et al., 2001).

The study contributes to the body of knowledge by investigating individual contributions of both money and capital markets to the development of Ghana. This is crucial because promoting economic growth through both markets provides means for economic diversification. As noted in Charles et al. (2018), as well as Mesagan et al. (2019b), economic diversification creates an opportunity for a nation to overcome the challenges and problems resulting from being a mono-product economy and launch itself on the path of sustainable growth. To this end, the present study selects three financial market indicators from both money and capital markets in order to conduct the analysis using the ARDL framework. The methodology is also very important as it changes the narratives

from the static analyses, that are often used in the literature, and suggests the short- and long-run adjustments towards introducing appropriate policies. The money market indicators are total liquidity, treasury bills rate, and monetary policy rate while the capital market fundamentals are stock turnover, total values of stock traded and market capitalization. The remaining sections of this research paper are divided into four parts in the following order. The second section reviews literature relevant to this study. The third section discusses the methodology. Section 4 presents the empirical results and discussion of the study, while section 5 presents the conclusion.

2 Literature Review

Empirical literature analysing the linkage between economic growth and financial development leans more towards the stock market indicators while little analysis has been provided regarding how money and capital markets affect overall growth, especially in less developed nations. For instance, the money market provides the means for trading short-term debt instruments such as, among others, Certificate of Deposits (CODs) and Treasury Bills (TBs). Whereas capital market provides the platform for selling long-term instruments, where capital for providing investments that require long gestation periods can be raised (Omojolaibi et al., 2016). Findings of the past literature have been largely mixed and mostly inconclusive. Studies such as Bonfiglioli and Mendicino (2004); Brasoveanu et al. (2008); Vazakidis and Adamopoulos (2009) found a direct connection between growth and financial development, while Echekoba et al. (2013); Owusu and Odhiambo (2014b); Adusei (2014); Mesagan et al. (2018a), and Samargandi et al. (2020) found a negative link. A tabular presentation of relevant and related studies reviewed is presented in Table 1.

Table 1: Tabular Presentation of Literature Review

Authors	Region/ Country/ Scope	Methodology	Major Findings
Levine (1997)	77 countries (1960–1989)	Cross-section regression analysis	Financial market directly enhanced long-run growth through financial intermediaries.
Vazakidis and Adamopoulos (2009)	France (1965-2007)	Granger causality and Vector Error Correction Model (VECM)	Positive impact Causality direction - Economic growth to Stock market development
Mishra et al. (2010)	India (1991: Q1 – 2010: Q1)	Multiple regression-ordinary least square	Positive impact – capital market to output growth

Table 1: Continue

Authors	Region/ Country/ Scope	Methodology	Major Findings
Brasoveanu et al. (2008)	Romania (2000: Q1 – 2006: Q2)	Vector autoregressive (VAR) models	They reported a positive feedback effect between capital market and economic growth. Meanwhile, a stronger link is reported from output growth to capital market.
Bolbol et al. (2005)	Egypt (1974–2012)	Multiple regression analysis	Bank-based financial indicators negatively affected total factor productivity but had positive effect via the income channel. However, net private resource flows positively strengthened the links between market-based indicators and total factor productivity.
Azarmi et al. (2005)	India (1981–2001)	Multiple regression analysis	Stock market positively influenced growth during the pre-liberalization era (1981-1990) while its impact was negative during the post-liberalization (1991-2001).
Shahbaz et al. (2008)	Pakistan (1971–2006)	Auto regressive distributed lag (ARDL)	Positive impact – from market capitalization to economic growth
Owusu (2016)	Nigeria (1987–2014)	Auto regressive distributed lag (ARDL)	Using real stock market capitalization, real stock value traded and stock market turnover ratio as measures of stock market indicators, the study reported that the result was mixed and inconclusive.
Enisan and Olufisayo (2009)	Seven selected sub-Saharan African countries (1980–2004)	ARDL, Granger-causality tests based on vector error correction model	Cointegration was found between stock market and income growth in Egypt and South Africa. The VECM result showed that output growth enhanced stock market development in South Africa and Egypt. While a bidirectional nexus was found for Zimbabwe, Morocco, Kenya, and Cote D'Ivoire. It however found no linkage between growth the Nigerian stock market.
Aboudou (2009)	West African Monetary Union (WAMU) Countries	Granger non-causality test (Toda & Yamamoto, 1995)	Both stocks value and market capitalization strongly determined economic growth in WAMU.

Table 1: Continue

Authors	Region/ Country/ Scope	Methodology	Major Findings
Alimi and Yinusa (2016)	Nigeria (1970–2013)	VAR	Shocks in domestic credit to private sector significantly influenced output growth. Likewise, income responded greatly to shocks in money supply.
Yinusa and Alimi (2014)	Nigeria (1981–2012)	Error correction model	Financial development failed to reduce poverty and inequality. Thus, the Greenwood and Jovanovich hypothesis did not hold in Nigeria.
Churchill et al. (2013)	Ghana (1991–2006)	Co-integration technique and Vector error correction model (VECM)	A unidirectional relationship was reported from economic growth to the stock market capitalization.
Osei (2005)	Ghana (1991: Q1 – 2003: Q4)	Vector autoregressive (VAR) technique	Stock market performance enhanced income growth
Owusu and Odhiambo (2014b)	Ghana	ARDL	No positive impact was found in both in the short- and the long- run. However, private sector credit as a measure of bank-based indices enhanced economic growth.
Dziwornu and Awunyo-Vitor (2013)	Ghana (1990–2012)	Granger causality	Stock market positively impacted income growth.
Asante et al. (2011)	Ghana (1992–2009)	ARDL and dynamic OLS	Bank competition and stock market exerted positive impact on income.
Acquah-Sam and Salami (2014)	Ghana (1991: Q1 – 2011: Q4)	Structural equation modeling	Bi-causal relationship – capital market and income growth.
Adusei (2014)	Ghana (2006: Q1 – 2013: Q2)	ARDL	Negative impact – stock market on long-run income growth. Also, stock market unidirectionally caused output growth.
Mesagan et al. (2019a)	Ghana (1991–2017)	ARDL	In the long-run, long-term financial indices perform better than short-term instruments in boosting output growth, while both measures enhanced growth positively in the short-run.
Mishra (2020)	India (1991–2015)	Regression Analysis	Financial development determined long-run growth.

<center>Table 1: Continue</center>

Authors	Region/ Country/ Scope	Methodology	Major Findings
Yusuf et al. (2020)	Nigeria (1985–2018)	Vector Autoregressive (VAR) Framework	Financial deepening unidirectionally caused stock market returns during democratic era while there existed mutual causal relationship between both during the military regime.
Samargandi et al. (2020)	BRICS (1989: Q1 – 2012: Q4)	Global Vector Autoregressive Framework (GVAR)	Money supply indicators and equity market could not predict financial market impact on growth among the BRICS nations.

Note: Compiled by authors.

3   Methodology

3.1   Data Description and Model Specification

The improvement of financial markets through both capital market and money market is expected to enhance the economic activities of a nation. In to the light of this contention, this study specifies two models to establish the existing links among capital market, money market and income growth. This paper adapts Beck et al. (2000); Owusu and Odhiambo (2014b,a); Mesagan et al. (2019a) growth and stock market models. The real income per capita is assumed to be a function of a vector of money market indicators (i.e. banking rate, total liquidity, and treasury bills rate) and capital market indicators (i.e. market capitalisation, total stock traded values and turnover of stock). In addition, we control for other economic indices (e.g. capital investment and foreign direct investment) because they are essential drivers of economic growth.

$$\text{PCI}_t = \beta_0 + \varphi'\text{MMI}_t + \theta'\text{CMI}_t + \varphi_1\text{CAPY}_t + \varphi_2\text{FDIY}_t + \mu_t \tag{1}$$

Where: PCI = real income per capita; MMI = vector of money market indices represented by banking rate proxy by monetary policy rate (BR), 3-month treasury bills rate (TBRT), total liquidity measured the growth in broad money (BM); CMI = a vector of capital market variables denoted by market capitalization as a ratio to GDP (MCY), total stock traded value to GDP (TSTY), and stock market turnover (SMTR); CAPY = capital investment proxy by gross fixed capital formation to GDP; FDIY = net foreign direct investment inflows to GDP; β_0 = constant; φ' = vector of coefficients of money market indices; θ' = vector of coefficients of capital market indicators; φ_1, φ_2 = parameters of capital and FDI; t = time; μ = error term.

Secondary data covering the period from 1991 to 2017 is analysed in this study. The

period covers the financial liberalization era in Ghana. The various data were sourced from the World Bank's World Development Indicators (World Development Indicators, 2019) as well as the Bank of Ghana (Bank of Ghana, 2019). Figure 1 and 2 present datasets for money and capital markets indices vis-à-vis per capita income growth in Ghana during the period of 1991–2017.

Figure 1: Money Market Instrument and Income Growth in Ghana, 1991–2017
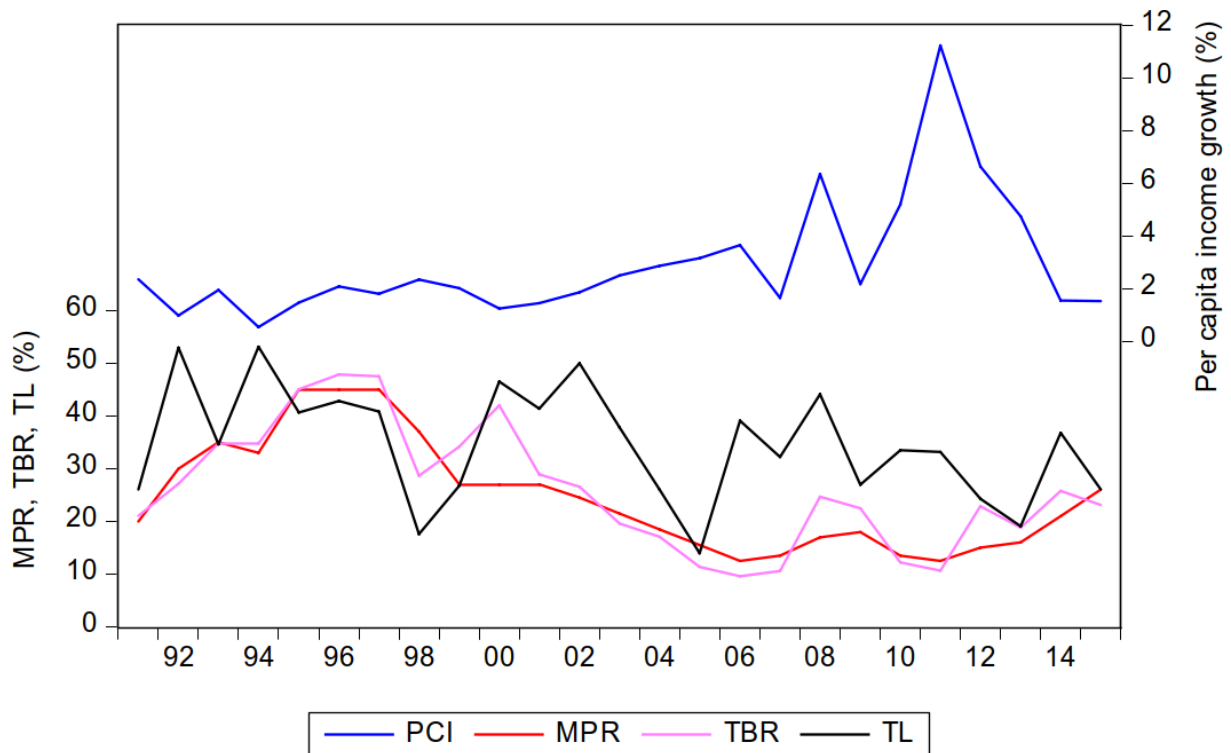

Note: MPR: Monetary Policy Rate; TBR: Treasury Bill Rate; TL: Total Liquidity.
Source: Data are from Bank of Ghana (2019) and World Development Indicators (2019)

The summary statistics of the variables in regards to the mean, standard deviation, maximum and minimum are presented in Table 2. The mean growth value of real per capita GDP stands at 2.96% for the period from 1991 to 2017, which indicates that the rate at which real income per capita grows is low. Meanwhile, for the money market indicators, their average growth rates are 24.64%, 25.91% and 34.66% for bank rate, treasury bills rate and total liquidity respectively. As for the stock market indices, the corresponding mean values for market capitalization, total stock traded value and capital market turnover are 10.72%, 0.42% and 5.43% respectively. The growth rate of capital market variables is low relative to the averages of its counterpart. The results from the correlation matrix presented in Table 3 reveal the absence of multicollinearity problem in the model.

In terms of 'a priori' expectations, we expect an indirect relationship between bank rate and real income per capita. What follows is that a higher bank rate will cause an

Figure 2: Capital Marker Indicators and Output Growth in Ghana, 1991–2017
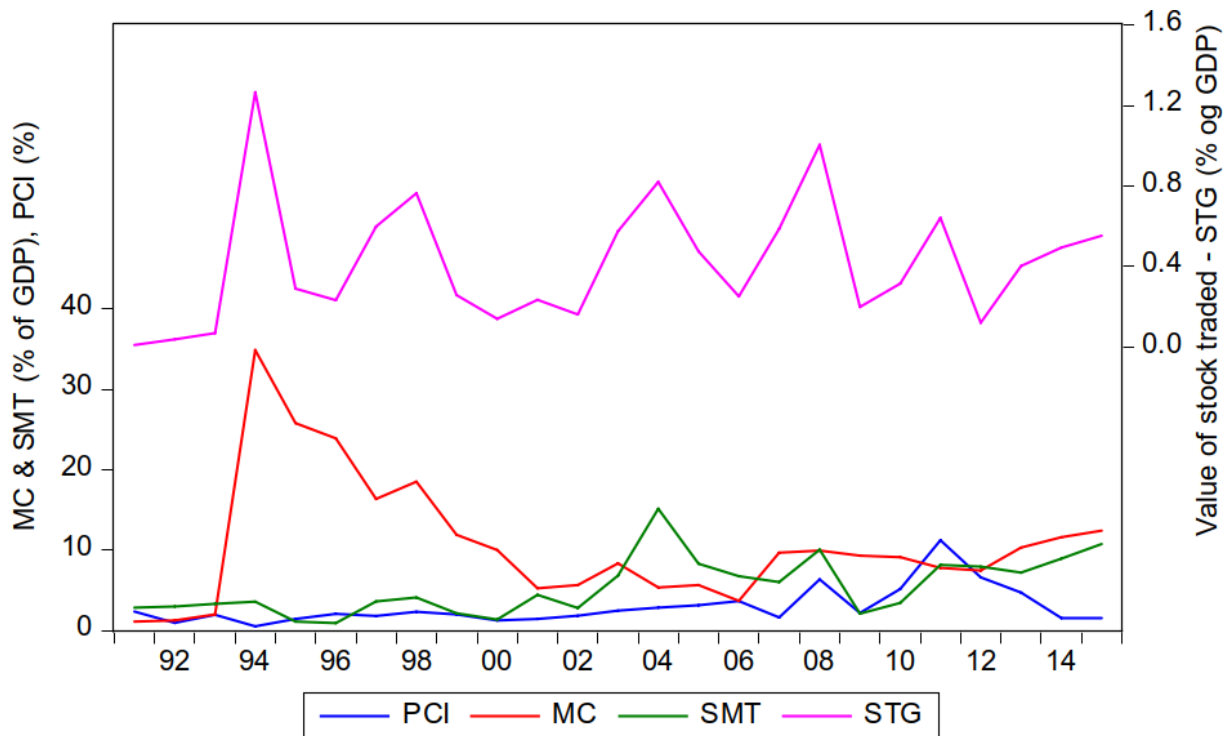
Note: MC: Market Capitalization; SMT: Stock Market Turnover; PCI: Per Capita Income Growth.
Source: Data are from Bank of Ghana (2019) and World Development Indicators (2019)

Table 2: Summary Statistics and Definition of Variables

Regressors	Definition	Mean	Std. Dev.	Max.	Min.
Dependent variable					
PCI	GDP growth Per Capita (PCI, yearly growth %)	2.96	2.34	11.25	0.57
Money market variables					
BR	Bank rate proxy by Monetary policy rate (BR, %)	24.64	10.41	45	12.5
$TBRT$	Treasury Bills Rate (TBRT, %)	25.91	11.50	47.88	9.6
BM	Total liquidity proxy by broad money (BM, %)	34.66	10.77	53.13	13.99
Capital market indicators					
MCY	Market capitalization as % of GDP (MCY)	10.72	7.98	34.89	1.15
$TSTY$	Total stock traded value to GDP (TSTY)	0.42	0.31	1.27	0.01
$SMTR$	Stock market turnover (SMTR)	5.43	3.54	15.18	0.97
Control variables					
$CAPY$	Capital investment proxy by gross fixed capital formation to GDP (CAPY)	22.94	4.08	30.93	12.74
FDI	Net foreign direct investment inflow to GDP	4.12	3.18	9.52	0.30

Source: Authors' Compilation (2020).

increase in the cost of doing business, thereby limiting the effectiveness of fund allocated from the unproductive source to productive sources. Hence, such negative relationship

may retard economic growth. Also, an increase in treasury bills rate may slow down the growth rate of income because it has a contractionary effect on the economy, and the funds might not even be invested in capital projects. On the other hand, it boosts up output growth rate given that the total monetary value of the money market instruments (i.e. purchase amount and interest) is readily accessible to economic resource use geared towards the expansion of economic growth. Also, an increase in total liquidity measured by growth rate of money supply enhances resource allocation which has the capacity of improving the real per capita income.

Table 3: Correlation Analysis

	PCI	*BR*	*TBRT*	*BM*	*MCY*	*TSTY*	*SMTR*	*CAPY*	*FDIY*
PCI	1.000								
BR	−0.537	1.000							
TBRT	−0.484	0.906	1.000						
BM	−0.264	0.353	0.439	1.000					
MCY	−0.233	0.585	0.553	0.231	1.000				
TSTY	0.133	−0.020	−0.102	0.025	0.524	1.000			
SMTR	0.382	−0.535	−0.572	−0.367	−0.274	0.484	1.000		
CAPY	0.379	−0.269	−0.209	−0.454	0.008	0.259	0.559	1.000	
FDIY	0.511	−0.509	−0.353	−0.197	0.050	0.262	0.363	0.314	1.000

Source: Authors' Compilation (2020).

According to Beck et al. (2000), the stock traded value to the economic size of a country measures the liquidity rate in the country's capital market. A high rate of liquidity enhances the investment incentive since it improves the rate upon which economic resources are efficiently allocated, and invariables boost income growth (Owusu and Odhiambo, 2014b,a). As regards the stock market volume, it is captured by total market capitalization as a percentage of total annual monetary income earned in an economy. If the size of the market increases, a boost in the capital base of listed firms is expected, which then provides more growth stimulus in the economy. Again, the stock market is captured with the total stocks traded as a ratio of market capitalization and it is expected to stimulate economic growth by providing firms with more financial resources. In the same vein, the capital market turnover is expected to spur economic growth like other indices. For the control variables, capital investment in the model is proxied by the total value added to existing stock of capital, which enhances growth. In addition, foreign direct investment is expected to enhance income growth as it becomes an effective and efficient channel for transferring technology to the less developed nations.

3.2   Estimation Techniques

The first step is to find the stationarity level of all the times series regressors since it is critical to the estimation process. This is crucial because non-stationary regressors can produce a misleading result and nonsensical conclusion. Again, its result gives credence

to the use of the ARDL framework employed in this study. The Augmented Dickey Fuller (ADF) test from Dickey and Fuller (1979), has been employed for this purpose. Thus, the unit root test results presented in Table 4 suggest that the regressors are stationary at first difference, except total traded stock value, capital investment and total liquidity proxy by broad money to GDP, which are stationary at levels.

Table 4: Stationarity tests of regressors using Augmented Dickey-Fuller (ADF)

	Level				First Difference				
Regressors	**No Trend**		**Trend**		**No Trend**		**Trend**		**Status**
PCI	−2.143(0)	[-2.992]	−3.201(0)	[-3.612]	−6.332**(0)	[-2.998]	−6.270**(0)	[-3.622]	I(1)
BR	−1.537(1)	[-2.998]	−2.067(0)	[-3.612]	−3.648*(0)	[-2.998]	−3.733*(3)	[-3.659]	I(1)
TBRT	−1.714(0)	[-2.992]	−2.562(0)	[-3.612]	−4.923**(0)	[-2.998]	−3.972**(1)	[-3.633]	I(1)
BM	−4.187**(0)	[-2.992]	−4.512**(4)	[-3.659]	−		−		I(0)
MCY	−2.739(0)	[-2.992]	−3.005(1)	[-3.622]	−5.615**(0)	[-2.998]	−5.533**(0)	[-3.622]	I(1)
TSTY	−5.236**(1)	[-2.998]	−5.094**(1)	[-3.622]	−		−		I(0)
SMTR	−2.428(0)	[-2.992]	−3.470(0)	[-3.612]	−5.404**(1)	[-3.005]	−5.289**(1)	[-3.633]	I(1)
CAPY	−3.349*(0)	[-2.992]	−3.759*(0)	[-3.612]	−		−		I(0)
FDIY	−1.026(0)	[-2.992]	−2.350(1)	[-3.622]	−4.089**(0)	[-2.998]	−3.986**(0)	[-3.622]	I(1)

Note: ** and * signifies 1% and 5% significance level correspondingly. The values before the brackets "()" is the ADF test statistics. The brackets "()" signifies the lag length.
Source: Authors' Compilation (2020).

The outcomes of the unit root test, which combine both integration at order zero and one, suggest the use of the ARDL bounds test framework. Additionally, these estimation methods have been adopted due to the following features: (i) its application to empirical study is quite simple and it also brings into play the ordinary least square methods for estimating the cointegration relationship; (ii) the test of cointegration (i.e. long-run relationships) existence among regressors can be conducted even if the unit root outcomes indicate stationarity at levels or first differences or the combination of both; (iii) the method is found as a good and efficient estimator for empirical studies having small and finite samples; (iv) likewise, it is more relevant for studies that have its regressors as an endogenous variable; (v) it allows dependent and independent variables to have unrestricted numbers of lags (Pesaran et al., 2001; Haug, 2002; Sakyi et al., 2015). Based on the unrestricted error correction model, the ARDL bound test approach expresses our empirical model as:

$$\Delta \text{PCI}_t = C_1 + \sum_{i=1}^{p} \delta_i \Delta \text{PCI}_{t-i} + \sum_{i=1}^{p} \pi_i' \Delta \text{MMI}_{t-i} + \sum_{i=1}^{p} \varpi_i' \Delta \text{CMI}_{t-i} +$$

$$\sum_{i=1}^{p} \eta_i \Delta \text{CAPY}_{t-i} + \sum_{i=1}^{p} \lambda_i \Delta \text{FDIY}_{t-i} +$$

$$\rho_1 \text{PCI}_{t-1} + \vartheta' \text{MMI}_{t-1} + \sigma' \text{CMI}_{t-1} + \rho_2 \text{CAPY}_{t-1} + \rho_3 \text{FDIY}_{t-1} + \nu_t \quad (2)$$

The change operator sign Δ denotes the first difference operator. The ϑ', σ' and ρ_{1-3}

represent both vector and parameter long-run multipliers related to the long-run relation-
ships. The parameter C_1 denotes drifts, whereas, the short-run dynamic parameters of the
fundamental bound testing approach in equation (2) are represented by δ_i, π_i', ϖ_i', η_i, λ_i
and the white noise error denoted by ν. The presence of cointegration (i.e. long-run rela-
tionship) is established via the computed F-statistics and also the test of non-acceptance
of null hypotheses (no cointegration) against the alternative hypotheses (cointegration).
The following null hypothesis and alternative hypothesis are tested based on the above
equations:

$$H_0: \quad \vartheta' = 0, \quad \sigma' = 0, \quad \rho_1 = 0, \quad \rho_2 = 0, \quad \rho_3 = 0 \qquad \text{[i.e. no cointegration], and}$$

$$H_1: \quad \vartheta' \neq 0, \quad \sigma' \neq 0, \quad \rho_1 \neq 0, \quad \rho_2 \neq 0, \quad \rho_3 \neq 0 \qquad \text{[i.e. there is cointegration]}$$

The calculated F-test values are compared with the tabulated upper and lower bounds
presented in Narayan (2004). The decision is to reject the no cointegration hypothesis
with acceptance of cointegration, if calculated F-values exceed the tabular ones at the
upper bound. If they fall below the lower bound, then we accept the null hypothesis
of no cointegration. If they fall between the two critical bounds, the outcome becomes
inconclusive. Table 5 presents the findings of the ARDL bounds test to cointegration.

Table 5: Cointegration result from the ARDL bounds test framework

| | Critical bound F-statistic values | | | | |
| | 5% level | | 10% level | | Computed |
Specified model	**I(0)**	**I(1)**	**I(0)**	**I(1)**	**F-statistics**
$F_{\text{PCI}}(\text{PCI}|\text{BR, CAPY, FDIY})$	3.23	4.35	2.72	3.77	5.5911 ($k=3$)
$F_{\text{PCI}}(\text{PCI}|\text{TBRT, CAPY, FDIY})$	3.23	4.35	2.72	3.77	5.8543 ($k=3$)
$F_{\text{PCI}}(\text{PCI}|\text{BM, CAPY, FDIY})$	3.23	4.35	2.72	3.77	4.5854 ($k=3$)
$F_{\text{PCI}}(\text{PCI}|\text{BR, TBRT, BM, CAPY, FDIY})$	2.62	3.79	2.26	3.35	4.6007 ($k=5$)
$F_{\text{PCI}}(\text{PCI}|\text{MYC, CAPY, FDIY})$	3.23	4.35	2.72	3.77	4.5436 ($k=3$)
$F_{\text{PCI}}(\text{PCI}|\text{TSTY, CAPY, FDIY})$	3.23	4.35	2.72	3.77	4.5259 ($k=3$)
$F_{\text{PCI}}(\text{PCI}|\text{SMTR, CAPY, FDIY})$	3.23	4.35	2.72	3.77	4.7120 ($k=3$)
$F_{\text{PCI}}(\text{PCI}|\text{MCY, TSTY, SMTR, CAPY, FDIY})$	2.62	3.79	2.26	3.35	4.4829 ($k=3$)

Note: k represents the total number of explanatory variables.
Source: Authors' Compilation (2020).

In computing the F-statistical values, the study depends on the Akaike Info Criterion
to automatically select the order of the ARDL models. From Table 5, all the computed F-
statistics are higher than the tabulated statistics of the critical upper bounds by Narayan
(2004) at 5% critical levels. It means that we can reject the no-cointegration hypothesis.
The implication is that there exists sufficient proof for a steady and unique long-run
relationship among financial market development (i.e. money and capital markets) and
real income per capita.

4   Empirical Results and Discussion

The estimation outcomes of the long-run and short-run coefficients including the diagnostic and stability tests are presented in Tables 6 and 7 respectively. In Table 6, models I–III report the results of individual coefficients of the money market indicators with the control variables, whereas the joint relationship of the series is depicted in model IV. The results show that monetary policy rate measuring bank rate and total liquidity have adverse and insignificant effect on real per capita income when they are not augmented with other money market indicators. The results further show direct relationship when other money market indicators are considered. Similarly, the estimates are not statistically significant at 5%. Furthermore, the parameter of Treasury bills rate has a negative and significant value which indicates that a lower rate of the money market instrument has direct and statistically significant impact on income growth. This is in line with expectation of treasury bills rate. In magnitude, a 10% decrease in treasury bills rate leads to an improvement in real income per capita by 1.38% and 3.33% before and after augmented with other money market indicators respectively. However, the coefficient of capital investment does not follow the theoretical expectation. It may be due to out of date fixed assets and its diminishing return. Yet, the FDI parameters have the expected signs which are also statistically significant at 5% level. Therefore, their effect on output growth is significant as they indicate long-term capital inflow to Ghana. Table 6 shows that a 10% increase in FDI inflows into Ghana causes a 6.91% rise in real income per capital.

The individual and joint coefficients of capital market indicators on real income per capita are reported in Models V–VIII. The negative and insignificant coefficient of market capitalization signifies that its impact on economic growth seems negligible in the long-run. It is at variance with the findings of Shahbaz et al. (2008) which suggested direct and significant influence of market capitalization on output growth in Pakistan. The findings of the present study also indicate that the total amount of stock traded coefficient is statistically insignificant but it positively influences economic growth. This negates the findings of Aboudou (2009) for WAMU countries that found income growth being driven by total stocks traded volume. However, the coefficients of stock market turnover show both direct and (indirect) insignificant impact on overall income growth before and (after) augmenting with other capital market indicators respectively. The intuition suggests that capital market development does not significantly affect the Ghanaian economy. This is in tune with the result of Owusu and Odhiambo (2014b), which attributed the negative relationship to the illiquid nature of the capital market assets including the magnitude of financial instrument in the country. It also supports the results of Azarmi et al. (2005) that the stock market insignificantly influenced output growth in India between 1981 and 2001. It then contradicts the results of such scholars as Asante et al. (2011); Dziwornu and Awunyo-Vitor (2013); Churchill et al. (2013); Acquah-Sam and Salami (2014) among others.

Table 6: Long- and Short-run Estimates from ARDL bounds test

Independent	Dependent variable: Real Income Per Capita							
variables	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
Estimates of long-run parameters								
Intercept	14.594	13.283	−1.190	1.873	9.877	−2.292	14.40	6.413
	(9.778)	(8.015)	(3.827)	(1.777)	(8.854)	(3.154)	(14.79)	(10.40)
BR	−0.091			0.270				
	(0.075)			(0.188)				
TBRT		−0.138		−0.333				
		(0.061)**		(0.178)*				
BM			−0.020	0.092				
			(0.039)	(0.086)				
MCY					−0.100			−0.304
					(0.103)			(0.193)
TSTY						0.921		1.081
						(1.754)		(0.827)
SMTR							0.446	−0.294
							(0.416)	(0.323)
CAPY	−0.480	−0.339	0.131	−0.113	−0.364	0.130	−0.683	−0.231
	(0.369)	(0.291)	(0.130)	(0.337)	(0.370)	(0.143)	(0.724)	(0.496)
FDIY	0.511	0.372	0.470	0.691	0.647	0.487	0.597	0.606
	(0.234)**	(0.177)*	(0.128)***	(0.189)***	(0.227)**	(0.143)***	(0.272)**	(0.207)**
Estimates of short-run parameters								
ΔPCI_{-1}	0.173	0.102	0.371	−0.189	0.297	0.322		0.318
	(0.237)	(0.238)	(0.266)	−(0.333)	(0.230)	(0.260)		(0.260)
ΔBR_{-1}	−0.193			−0.372				
	(0.106)*			(0.150)**				
$\Delta TBRT_{-1}$		−0.005		0.165				
		(0.056)		(0.119)				
ΔBM_{-1}			−0.025	−0.006				
			(0.051)	(0.064)				
ΔMCY_{-1}					0.110			0.335
					(0.065)			(0.100)**
$\Delta TSTY_{-1}$						1.031		2.788
						(1.821)		(1.448)***
$\Delta SMTR_{-1}$							0.284	−0.218
							(0.195)	(0.235)
$\Delta CAPY_{-1}$	−0.069	0.234	0.164	0.261	0.351	0.145	0.189	0.267
	(0.164)**	(0.113)*	(0.176)	(0.144)	(0.127)**	(0.184)	(0.121)	(0.129)***
$\Delta FDIY_{-1}$	−1.035	−0.813	0.506	0.141	0.871	0.361	−0.792	−1.061
	(0.350)**	(0.302)**	(0.323)*	(0.042)**	(0.348)**	(0.383)	(0.322)**	(0.035)**
ECT(−1)	−0.527	−0.598	−0.654	0.119	−0.603	−0.112	−0.638	−0.541
	(0.237)**	(0.238)**	(0.382)**	(0.033)**	(0.23)**	(0.038)**	(0.272)**	(0.155)***

Note: *, ** & *** indicate significance at 10%, 5% & 1% levels respectively.
Source: Authors' Compilation (2020).

Regarding the short-run estimates, the dynamic estimate of monetary policy rate has a negative and significant value, implying that a low lending rate can improve the country's growth rate. This result is also in line with expectation. More so, the short-run estimate of total liquidity is negative and not statistically significant at 5%, whereas the coefficient of treasury bills rate has a positive, yet still insignificant value at the conventional level. On the other hand, the coefficients of the short-run market capitalization and total stock traded value are positive and significant at 5%. This means that they have an unconditional impact on real income per capita. It suggests that both capital market indices have the presumed direction in the short-run. In magnitude terms, a 1% increase in the short-run market capitalization and total stock traded value leads to a higher rate of income per capita growth by 0.34% and 2.79% respectively.

In Table 6, the parameter values of the error correction term (ECT) are negative and also statistically significant at the conventional level. Moreover, the ECT values range between 11.2%–65.4%. This result means that the convergence rate of long-run equilibrium of output growth in the current year is from roughly 11.2%–65.4% disequilibrium in preceding year's output shocks. Accordingly, it aligns with the earlier findings that a long-run relationship exists among money market, capital market development and overall output growth in Ghana.

Table 7: Stability and Diagnostic Tests of the Models

Test statistics	Dependent variable: Real per capita income							
	I	II	III	IV	V	VI	VII	VIII
Serial correlation	0.065	0.100	0.679	3.189	0.268	1.175	0.017	2.092
	(0.932)	(0.912)	(0.550)	(0.143)	(0.728)	(0.340)	(0.984)	(0.173)
Functional form	1.231	1.873	1.897	1.232	1.804	1.845	1.439	2.048
	(0.208)	(0.087)	(0.079)	(0.207)	(0.083)	(0.086)	(0.172)	(0.174)
Normality test	1.189	0.626	1.054	1.078	1.182	0.805	0.631	3.027
	(0.546)	(0.731)	(0.586)	(0.299)	(0.549)	(0.760)	(0.729)	(0.162)
Heteroskedasticity	1.079	1.373	1.087	2.028	1.378	1.177	1.724	1.088
	(0.297)	(0.289)	(0.294)	(0.175)	(0.276)	(0.258)	(0.180)	(0.296)
CUSUM	Stable	Stable	Stable	Stable	Stable	Stable	Stable	Stable
CUSUMQ	Stable	Stable	Stable	Stable	Stable	Stable	Stable	Stable

Note: The statistics in parenthesis are the p-values of the test results reported above them for the selected stability and diagnostic test approaches. Breusch-Godfrey LM method is employed for serial correlation; Ramsey RESET test is used for functionality form; Histogram for normality test; and Breusch-Pagan-Godfrey technique is employed for heteroskedasticity test.
Source: Authors' Compilation (2020).

The diagnostic and stability tests of the findings are reported in Table 7. The data in Table 7 show that the estimated models passed all the diagnostic test statistics. The outcomes indicate that the white noise errors are uncorrelated, distributed normally, and appear with the same variance. Also, the functional form test of the models indicates that they are well specified.

The stability test results of the models using both cumulative sum (CUSUM) and cumulative sum of square (CUSUMQ) are presented in Table 6. The CUSUM test is used to identify the changes in the regression parameters, whereas, the unexpected constant change in the regression coefficients is detected by the CUSUMQ. The outcomes of the CUSUM and CUSUMQ lie inside the critical bound at the conventional level. It implies that the coefficients are stable during the sample years for Ghana. Thus, at 5% significance level, there is no form of systematic change in the parameter estimates for the periods under study.

5   Conclusion

This study is a comparative analysis of the impact of both capital and money markets in the Ghanaian economy within the periods of 1991–2017. We use the dynamic ARDL bounds test approach in the study. Our cointegration result suggests there is a steady and unique long-run relationship among the money and capital markets and output growth in Ghana. For the money market indicators, the findings indicated that a lower monetary policy rate significantly enhanced short-run growth whereas a lesser treasury bills rate significantly drove the country's long-run economic growth. Capital market indicators total stock traded and market capitalisation enhanced short-run output growth positively and significantly. However, all the three indices of capital market did not significantly impact the country's long-run growth. The findings also implied that capital market, being a long-term equity and debt capital, had a short-run impact on the Ghanaian economy while money market, being a short-term debt instrument, enhanced growth both in the short- and in the long-run. The conclusion is that the money market had greater impact on growth in Ghana than the capital market. Thus, the important lesson relearned from this study is that the money market propels the Ghanaian economy better than the capital market. The study, therefore, recommends that appropriate monetary policies, which would sustain the Ghanaian money market, should be initiated and executed to boost output growth. Moreover, the prices of financial assets, that are traded in the stock market, must be well regulated to ensure that both the sellers and the buyers of such stocks are treated fairly. This will boost growth in both markets, enhance overall output growth in the country and lead to fairness in stock price. Finally, efficiency of information flow must be promoted in both markets to remove information asymmetry and aid the pre- and post- stock listings in the market. This will not only improve efficiency in the system but also encourage the entrance of more stakeholders into the market with a view to promoting the overall output growth.

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