

Financial Development and Economic Growth in the West African Monetary Zone Countries

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ABSTRACT

The study estimated a model of the relation between financial development and economic growth in the countries of the West African Monetary Zone (WAMZ). Three measures of financial development are used to construct a financial development index FINDEP by means of principal component analysis. The results suggest the existence of a unidirectional causality from financial development to economic growth. The study further examines the long-run relationship between RGDP and the composite index of financial sector development using the Johansen Fisher Panel Cointegration tests. The results suggest that the composite variable of financial development have significant long-run relationship with RGDP. The paper estimated and presented results for the pooled mean group (PMG), and mean group (MG) models for the regression, as well as the Hausman h-test results. The result indicates a statistically significant positive relationship between financial development and economic growth in the long run and a negative and insignificant relationship in the short run. The error correction model in the various analysis is negative, less than 1 and significant at the 5 percent level, signifying a long run relationship between the explanatory variables and the dependent variable. While our analysis shows impressive results suggesting that financial development significantly contributes to economic growth in the long run in the WAMZ, the study recommends greater link between savings and investment and more financial inclusion, as well as the need to have banking crisis resolution frameworks in Member States.

Key Words: *Financial Development, Economic Growth, WAMZ*

JEL Classification: C33, E44, F43, O16 and O47

1. INTRODUCTION

The interest in the relationship between financial development and economic growth is a long-standing one. Earliest studies that sought this relationship includes those of Schumpeter (1911), Robinson (1952), Patrick (1966), Goldsmith (1969), and McKinnon (1973). Divergence of views about the role of the financial sector in economic growth continue to rise despite various theories and empirical evidence that supports this relation. Since the advent of the “demand-following” and the “supply-leading” hypotheses, inferences based on empirical studies on the direction of causality between economic growth and financial development is yet to be resolved. Other strand of argument maintains that the relationship flows from economic growth to finance, in other words, growth drives financial development.

It is believed that developing countries have less developed financial systems with lower levels of banking and capital markets development. However, following the wave of liberalization that started in the mid-1980s, financial markets in developing countries have witnessed some level of efficiency. Nevertheless, studies on developing countries on the link between financial development and economic growth is inconclusive (Kar, Nazlioglu and Agir, 2011).

The depth and quality of the financial system has implication for the level of savings and investments, and ultimately economic growth. The financial system of the WAMZ has undergone extensive restructuring and market oriented innovations since the adoption of the liberalization policies of the mid-1980s. Prior to this period, the financial system of member countries were under severe government regulation as demonstrated by interest rates ceiling, selective credit rules, high reserve requirements, and restriction on entry into the banking industry. These controls stem from Member States pursuit of monetary and macroeconomic policies aimed at promoting price stability and stimulating employment and economic growth. Following government dominance in financial allocation decisions, the WAMZ financial system became relatively insignificant for effective mobilization and efficient allocation of financial resources.

The reform measures of the mid-1980s, aimed at improving the conduct of monetary policy and financial intermediation by broadening and deepening the financial system. Consequently, number of bank and non-bank financial institutions rose owing to growth and expansion incentives. Deregulation encouraged competition in the industry, forcing many banks to adopt various strategies and practices in order to survive. During the 1980s and 1990s therefore, inefficiency in banking operations, lax management and poor corporate governance structures in banks, and misallocation of resources as well as political interference resulted in bank distress in all the countries

of the Zone, which weakened the capacity of their financial systems in resource mobilization. Various crisis resolution mechanisms such as closure of distressed banks and placement of embargo on further licensing of banks were adopted in dealing with the banking crisis.

In light of the foregoing, Member States embarked on far reaching reforms to strengthen the banking systems in the Zone, starting with the introduction of new capital requirements for banks in order to enable them expand in size and scope, as well as upgrade their ICT infrastructure, particularly payments system infrastructure. The effect of the new capital requirements is the moderate increase in number of banks, number of branches and number of foreign banks operating in Member States of the Zone. For example, number of banks increased from 95 in 2010 to 110 in 2017, number of bank branches rose from 6470 to 7513, while number of foreign banks increased from 57 to 64, in the same period. On the supervisory side, the reforms also ensured that minimum international standards for financial regulation and supervision were met by adopting and implementing globally acceptable supervisory and regulatory standards, principles and recommendations.

Another important direction of change in the financial environment of some Member States of the WAMZ is the development of new products and services such as financial inclusion strategy and consumer protection services, which aims at providing formal banking opportunities for the benefit of the un-banked public. Other advancements include the establishment of credit reference bureaus; progress made in the automation of banking processes and payments system development, which has led to improvement in payments and settlements and reduction in cash transactions in the WAMZ countries.

Despite the plethora of reforms, the WAMZ financial system remain characterized by small financial sectors dominated by banks, low levels of access to formal financial services, limited development of securities markets and institutional investors, disjointed financial market regulation and supervision, and high cost of funds. As such, the level of access to formal financial services remains low across WAMZ countries. The banking sector of Member States are also characterized by sluggish growth in bank branches because of the structural bottlenecks such as poor information technology. These developments in effect cause one to wonder whether the financial sector of the WAMZ has the ability to drive the Zone's economy.

In lieu of this, many questions arise on the impact of financial sector development on economic growth in the WAMZ countries. Among them is: What effects does financial development in the WAMZ countries have on their real GDP growth? The absence of clarity on this issue constitutes a significant gap in knowledge.

An important requirement for countries considering entering an economic union is the transformation of their financial system alongside addressing other structural and institutional difficulties in their economies. This is an essential prerequisite for them, in order to exploit the benefits from financial integration.

Although, there has been several studies that examined the finance-growth relationship, there is however, no strong agreement on the influence of financial sector development on economic growth. A further study on these issues using WAMZ countries data would therefore, provide a clearer view that may help policy makers in the Zone in planning decisions for these countries in their journey towards economic integration.

Research that clarifies our understanding of the role of finance on economic growth in the sub-region will have policy implications and shape future policy-oriented study. Information about the impact of finance on economic growth will influence the priority that policy makers and advisors in these countries attach to reforming financial sector policies.

The broad objective of the study is to determine the connection between financial sector development and economic growth in the West African Monetary Zone countries. The specific objectives are: to access the impact of financial development, proxied by financial development index, on the growth of real GDP in the WAMZ; to examine the long run relationship between financial development index and economic growth in the WAMZ; and to determine the causal relationship between financial development index and economic growth in the WAMZ.

The analysis covers the six (6) countries of the WAMZ The Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone, from 1985 to 2017. This period covers an era of financial liberalization and development in these countries, as well as output expansion, money growth, and an increasing volume of investment. It also takes into consideration the period of enormous reforms in the Zone's financial landscape. The study relies mainly on secondary data and uses the panel dataset from the World Bank's World Development Indicators (WDI) 2015 database. The fact that Member countries of the Zone, with the exception of Nigeria and Ghana, have no functional equities market, the analysis is limited to banking sector development.

The rest of the paper is organized as follows: Section 2 presents an overview of the WAMZ financial sector, while Section 3 presents the theoretical and empirical literature. Section 4 outlines the research methodology, while Section 5 presents and analyses the results. Section 6 concludes the study.

2. OVERVIEW OF THE WAMZ FINANCIAL SYSTEM

The West African Monetary Zone comprises six (6) countries whose main objective is to attain economic and monetary union through macroeconomic harmonization, financial integration and intra-regional trade. The Zone comprises of small economies that account for less than one percent of the global economy. Member countries depend on primary commodity exports of varying endowments. This exposes the Zone to the vagaries of the international commodities market, with adverse implication for their growth and development, as well as impede their ability to meet the set primary and secondary convergence criteria for economic and monetary integration.

Nigeria being the largest economy in the WAMZ in terms of population and nominal GDP, accounts for about 77.4 percent of the population and 80.4 percent of GDP of the Zone in 2017. It is followed by Ghana with 11.7 percent and 10.7 percent of the Zone's population and GDP, respectively. The Gambia, which accounts for 0.9 and 0.2 percent of the Zone's share of population and GDP, respectively, is the smallest country in the sub-region.

In the same vein, Nigeria has the highest per capita income in the Zone (US\$2,450.0) in 2016, followed by Ghana (US\$1,390.0). Liberia has the lowest per capita income (US\$370.0) in the same period. In terms of population growth, the disparity in the rate of growth is minimal. Guinea has the fastest population growth of 2.62 per cent, followed by Liberia and Nigeria with 2.44 per cent apiece. The Gambia has the slowest population growth in the WAMZ with 2.11 percent. With a youth population of below 14 years of age that constitutes 40.5 per cent of the region's total population, the Zone can be said to have a growing young population. This signals the prospects of high labour force supply in the sub-region (Egbuna, ed. 2018).

The financial system in the WAMZ comprises of formal and informal financial sectors. The banking sector dominates the WAMZ's financial system, accounting for over 75.0 percent of total financial assets (Egbuna, *et al*, 2016). The banking sector encompasses central banks, deposit money banks, development finance institutions, microfinance banks, investment banks, merchant banks, non-interest banks, savings and rural and community banks, among others. Non-bank financial institutions (NBFIs) comprises of insurance companies, re-insurance companies, foreign exchange bureaus, pension funds, mortgage institutions, finance houses, investment funds, stock exchanges, and stockbroking firms, among others. While money market operations are fully developed in all Member States, stock and bond markets remain underdeveloped except for Nigeria and Ghana. Certain characteristics of the financial systems that are common to all the countries in the Zone include bank dominated financial systems, low levels of financial inclusion and services, inadequate

development of securities markets, fragmented financial market regulation and supervision, increase in cross-border banking and foreign ownership, and high cost of funds, among others.

Table 2.1: Composition and size of financial institutions in the WAMZ as at 31 December 2017

	The Gambia	Ghana	Guinea	Liberia	Nigeria	Sierra Leone
Central Bank	1	1	1	1	1	1
Securities and Exchange Commission (SEC)		1			1	
National Insurance Commission Deposit Insurance					1 1	
Deposit Money Banks	12	36	15	8	21	14
Merchant Banks					5	
Discount Houses				0	1	2
Micro Finance Banks		566	26	17	881	21
Non-Interest Banks					1	
Finance Companies	3	30		1	60	
Community Banks						17
Mortgage Institutions		1		0	35	
Development Finance Institutions				0	7	
Foreign Exchange Bureau (BDC)		431	42	173	4,061	62
Savings and Credit Unions/Post Office Bank (POB)	64	38		0		
Village Savings/Cooperative Associations	37					
SEC regulated Institutions		194				
Stock Exchange		40		0	1	1
Other Securities Exchanges					2	
Commodity Exchange				0	2	
Insurance Companies	11	53	12	19	56	15

Life Assurance Companies	1						
Re Insurance						2	
Takaful						2	
Brokers						454	
Loss Adjusters						30	
Financial Service Associations							52
Pension Funds (Government/Private)		66				0	27
Closed Pension Fund Administrators							7
Pension Fund Custodians							4
Asset Management Corporation							1

Source: WAMZ Member States Monetary Authorities

In recent years, the financial sector has witnessed expansion in the number and size of institutions (Table 2.2). With the exception of Nigeria and Ghana, most of the banks are foreign owned, representing cross-border subsidiaries of large financial groups.

Table 2.2: Generic features of the banking sector in the WAMZ

Country	Number of Banks								Number of Bank Branches								Number of Foreign Banks							
	2010	2011	2012	2013	2014	2015	2016	2017	2010	2011	2012	2013	2014	2015	2016	2017	2010	2011	2012	2013	2014	2015	2016	2017
The Gambia	13	13	13	12	12	12	12	12	71	74	76	80	80	75	85	85	12	12	12	11	9	8	8	8
Ghana	16	15	16	17	17	19	31	33	379	814	862	882	1,111	1,173	1,341	1,491	13	14	14	15	15	17	17	17
Guinea	11	12	14	15	15	15	16	75	76	96	109	136	155	162	170	11	12	14	15	15	15	15	16	
Liberia	8	9	9	9	9	9	9	66	78	79	82	85	87	70	88	7	8	8	8	8	8	8	8	
Nigeria	14	10	11	12	13	13	16	16	5,797	5,850	5,050	5,072	5,040	5,031	5,450	4	4	4	4	4	4	5	5	
Sierra Leone	13	13	13	13	13	13	14	81	83	87	95	97	103	104	108	10	10	10	10	10	10	10	10	
WAMZ Total	95	92	96	98	99	101	107	110	6,470	6,975	6,250	6,330	6,549	6,624	7,112	57	60	62	63	61	62	63	64	

Source: WAMZ Member States Monetary Authorities

Analysis of the capital adequacy of banks in the Zone, show a significant improvement in recent years, as countries in the sub-region continued to improve on banks minimum capital requirement, coupled with capital injection through equity, by some banks, in a bid to strengthen their capital bases, and take on additional opportunities and risks. As at December 2017, the average risk weighted capital adequacy ratio (CAR) of the banking industry remains significantly higher than the 10.0 percent minimum requirement in the Zone. Recent increases in capital

requirement in the sub-region has seen a significant increase in the capitalization of banks (Table 2.3). As at December 2017, Capital positions in the WAMZ countries were The Gambia (\$4.40 million), Ghana (\$78.6 million), Guinea (\$11.1 million), Liberia (\$10.0 million), Nigeria (\$81.6 million), and Sierra Leone (\$3.98 million).

Table 2.3: Banking capitalization indicators, December 2017

Country	Minimum Capital (\$ Million)	Average Capital (\$ Million)	Number of Banks with Capital Greater or Equal to Average	Total Assets (\$ Million)	Assets of the Largest 5 Banks as a Percentage of Total Assets
The Gambia	4.40	10.95	6.00	793.72	66.20
Ghana	78.60	31.09	12.00	21.20	36.47
Guinea	11.10	11.14	14.00	2182.02	69.28
Liberia	10.00	15.44	4.00	807.25	88.00
Nigeria	81.60	588.20	9.00	107.30	54.28
Sierra Leone	3.98	9.94	6.00	986.20	63.97

Source: WAMZ Member States Monetary Authorities

In a related development, all WAMZ countries recorded significant increases in bank assets during the period. Asset expansion was due to growth in deposits, increases in minimum capital requirement across the Zone, and a rise in the number of cross-border bank subsidiaries, particularly from Nigeria (Egbuna, *et al.*, 2016). An interesting revelation from Table 2.3 is the oligopolistic structure of the banking industry in Member States in light of the high level of assets of the largest five banks as a percentage of total assets. Assets of the largest five (5) banks as a percentage of GDP were The Gambia (66.2 percent), Ghana (36.5 percent), Guinea (69.3 percent), Liberia (88.0 percent), Nigeria (54.3 percent) and Sierra Leone (64.0 percent).

Depth and size of the WAMZ financial system

Indicators measuring the depth and size of the WAMZ financial system shows a mix performance between 2013 and 2017. The ratio of money supply (M2) to GDP, which measures the depth of the banking system, especially concerning the capacity of the banking system to support transactions in the economy, vary across the WAMZ. Sierra Leone had the highest increase in M2/GDP in the review period, with the ratio growing by 6.1 percentage points. While this may be inflationary, it also reveals the greater capacity of the banking system to support commercial activities in Sierra Leone. While the lowest growth was Liberia at minus 7.1 percentage points, Nigeria posted minus 0.3 percentage points. The Gambia recorded a 2.3 percentage points increase, while Ghana and Guinea experienced increases of 3.2 percentage points, apiece.

Credit to the Private Sector as a percentage of GDP (CPS/GDP), which measures the capacity of banks' financing of the economy, has remained marginal in the Zone over the five-year period. The rate of growth in CPS/GDP ranged between minus 6.9 percentage points recorded in The Gambia to 3.1 percentage points recorded in Liberia, indicating a moderate performance in banking sector financing of the economy in most countries of the region. Similarly, there are modest improvements in intermediation efficiency across the WAMZ, as shown by the decreasing trend in the ratio of Currency Outside Banks to Broad Money (COB/M2), particularly in Ghana, Guinea and Nigeria where increasing utilization of electronic banking especially mobile money technology has become widespread (Table 2.4).

Table 2.4 Selected Indicators of Financial Development in the WAMZ

	2013	2014	2015	2016	2017	2013 – 2017
Money Supply (M2)						<i>Growth Rate of M2/GDP</i>
Gambia	54.5	50.6	53.8	59.2	56.8	2.3
Ghana	29.3	33.1	34.4	34.5	32.5	3.2
Guinea	22.9	24.1	27	25.1	26.1	3.2
Liberia	37.3	34	35.7	31	30.2	-7.1
Nigeria	21.5	20.2	19.7	20.4	21.2	-0.3
Sierra Leone	17.5	20.4	24.2	26.4	23.6	6.1
Credit to Private Sector (CPS)						<i>Growth Rate of CPS/GDP</i>
Gambia	15.3	13	NA	NA	8.4	-6.9
Ghana	17.1	19.9	20.7	19.7	17.3	0.2
Guinea	6.8	9.2	11	9.6	9.1	2.3
Liberia	19.6	18.5	20.6	19.9	22.7	3.1
Nigeria	12.6	14.5	14.2	15.7	14.2	1.6
Sierra Leone	4.8	4.9	5.4	5.8	5.1	0.3
Currency Outside Banks (COB)						<i>Growth Rate of COB/GDP</i>
Gambia	17.2	18.1	20.3	20.2	20.2	3
Ghana	20.4	18.7	18.3	17.9	16.3	-4.1
Guinea	31	29.5	29.3	28.9	30	-1
Liberia	15.1	17.1	15.9	17.8	18.7	3.6
Nigeria	7.3	8.1	7.3	7.7	7.4	0.1
Sierra Leone	18.5	19.7	22.6	20.7	23.5	5

Source: WAMZ Member States Monetary Authorities

In terms of capital market development, debt markets in the Zone are not well developed compared to the money markets. Ghana and Nigeria have vibrant markets for the issuance of long-tenured instrument as well as active secondary markets for trading these instruments. The Gambia and Sierra Leone also issue government bonds but of shorter maturity. Corporate debt instruments are not very common in the WAMZ given the relative underdeveloped nature of debt markets. Three stock exchanges currently operate in the WAMZ, namely: Ghana Stock Exchange (GSE); Nigeria Stock Exchange (NSE); and Sierra Leone Stock Exchange (SLSE). However, the Ghanaian and Nigerian equities markets are the most vibrant. Equities market capitalization in Ghana was US\$13,320 million in 2017. This represents 28.18 percent of GDP. In Nigeria, equities market capitalization amounted to US\$44,430 million, accounting for 11.82 percent of GDP in 2017.

Other Developments in the WAMZ Banking System

WAMZ Member States have implemented reforms and measures to enhance compliance with international regulatory standards and strengthen financial regulation. The implementation of Risk-Based Supervision (RBS), Basel I and II and International Financial Reporting Standards (IFRS) have recorded significant progress. Ghana, Guinea, Liberia and Nigeria have continued to implement RBS methodology for bank surveillance. Other reforms in the banking sector include the automation of supervisory processes. Key milestones were recorded in the automation of the banking supervision processes such as the implementation of eFASS in Ghana and Nigeria and vRegCoSS in The Gambia, Liberia and Sierra Leone. Member States have also improved compliance in the implementation of the Anti-Money Laundering and Counter Financing of Terrorism in a bid to address the declining correspondent banking relationship (CBR) in the Zone.

Member States continued to enhance structures within their respective central banks for compiling and disseminating credit information. While, credit bureaus exist in Ghana and Nigeria; The Gambia, Guinea, Liberia and Sierra Leone continue to implement measures to upgrade their existing credit reference systems. The central banks of Liberia and Nigeria have taken measures to strengthen consumer protection regulation, which sets standards for transparency, disclosure, and redress for unsatisfied consumers of financial services. In terms of banking crisis resolution mechanisms, Member States have different resolution frameworks. Nigeria and Ghana are the only countries with deposit insurance schemes. Nigeria established the Nigeria Deposit Insurance Corporation (NDIC) in 1987, which compliments the central banks effort in crisis resolution. Ghana has set up its deposit insurance scheme, following the passage of the Ghana Deposit Protection Act 931 in 2016. To also support banking supervision and regulation, as well as banking crisis resolution, the Zone has adopted a Model Act for Banks and Financial Holding Companies.

In the area of payments system development, the WAMZ Payments System Development Project in The Gambia, Guinea, Liberia and Sierra Leone have been completed. This project sponsored by the African Development Bank (AfDB) aimed at building from the scratch payments system infrastructure in these countries, which hitherto lacked the facilities. The Bank of Ghana and Central Bank of Nigeria (CBN) have introduced reforms to further strengthen their payments systems. The Ghana Interbank Payments and Settlement System (GHIPSS) introduced a system of Instant-Pay, which guarantees instant value for cheques from banks other than the issuer. The BOG is working to achieve interoperability of all card-types in the country. The ecosystem for electronic money (e-money) was propelled by the introduction of new regulations allowing participants other than banks to operate e-money platforms. The Bank of Ghana (BOG), in collaboration with development partners, developed a National Payments System Strategy, and linked banks' automated teller machine (ATM) cards to the national switch (Gh-link).

In line with Nigeria's Payment System Vision 2020 (PSV2020), the key initiatives introduced by the CBN were the implementation of the Bank Verification Number Scheme (BVN), the deployment of Anti-Fraud Solution, the implementation of the global mobile payments monitoring and regulation system and the automation of the Nigeria Interbank Settlement System (NIBSS) (Egbuna, *et al.*, 2016). Next steps pursued by Member states in Zonal payments system development is the interlinkage of payment system platforms in order to make them interoperable to facilitate intra WAMZ trade and investment.

3. LITERATURE REVIEW

Theoretical Literature

Literature beginning with Schumpeter (1912) affirms that financial development and economic growth have close relationship. The assertion was endorsed by more recent studies by Levine (1997), Levine and Zervos (1996), which provided stronger and more robust proof that confirms financial development as a proper indicator of economic growth. The relevance of financial development in the economic growth process finds bearing in its role in savings mobilization and investment facilitation (Levine 2005; Hermes and Lensik 1996). The financial development-growth nexus is theoretically, supported by the neoclassical and endogenous growth theories.

Solow (1956) neoclassical growth model, which was motivated by the Harrod-Domar model of economic growth, emphasizes on capital accumulation in the growth process. The theory is stated in form of a long run growth model, with capital, labor and exogenous technological factor, expressed as a production function. The theory suggests that capital accumulation is consistent with the growth rate of the labor force. In addition, an endogenous technological innovation due to increase in resources to

research and development (R&D) could spur growth. Fundamentally, capital as well as knowledge from investment are believed to be major factors for long run growth.

Romer (1990) uses a one-sector neoclassical model with technological change, to demonstrate that growth is stimulated by the technological change which arises from foreign investment choices of profit seeking agents in the global market. Essentially, technological change has been established to be a proficient channel of financial development to economic growth, which provides incentives for sustained capital accumulation. Consequently, capital accumulation aided by technological change accelerates an increase in hourly output, which indirectly fast-tracks the country's rate of economic growth. As a center for financial activities, financial sector development is theoretically shown by the classical model of economic growth to have a positive contribution to economic growth.

The theory of endogenous growth however, avers that economic growth is linked to endogenous and not exogenous factors as suggested by the neo-classical growth theory. The theory of endogenous growth affirms that human capital development and modernization are major catalysts of economic growth. In addition, the spillovers from a knowledge-based economy is identified by the theory to be important for growth. It also underscores the role of policy measures, such as, supports for research and development or education, which increases innovation and consequently the growth rate.

Romer (1986), Lucas (1988), Rebelo (1991), and Ortigueira and Santos (1997) downplayed the role of innovation in technology in the growth process, by replacing it with sustained investment in human capital, which eventually helps in reducing the diminishing return to capital accretion.

Empirical Literature

Studies that employed cross country and panel regressions to analyse the finance-growth relation includes Omid and Zahra (2009) on the Middle East and North Africa (MENA) using generalized method of moments (GMM) and annual data from 1975 to 2004. Employing five measures of financial development, namely the ratio of broad money (M3) to GDP, credit to the private sector to GDP, credit by deposit money banks to the private sector to GDP, and the composite index of financial development, they found a strong two-way causality between financial development and economic growth. Hurlin and Venet (2008), uses a panel test of the Granger non-causality hypothesis on a selection of 63 industrial and developing countries over the period 1960 to 1995 and 1960 to 2000. Three financial development indicators namely: private credit by deposit money banks to GDP; liquid liabilities to GDP, and the credit by deposit money banks and other financial institutions to the private sector were

analysed. Their findings reveal a one-way link from economic growth to financial development.

Adopting a panel-data approach covering 23 upper- and 29 lower-middle income countries, covering the period 1980–2008, Samargandi, Fidrmuc and Ghosh (2015) examine the dynamic relationship between financial development and economic growth. The authors create a composite variable of financial development indicators, with economic growth measured by the real GDP growth rate, as the dependent variable. The explanatory variables include fixed capital formation, population growth rate (used as proxy for growth of the labour force), openness to trade, and government consumption expenditure as a percentage of GDP. Using pooled mean group estimator in a dynamic heterogeneous panel setting, they find that financial sector development does not have a positive linear long-run impact on economic growth. In the short-run, the relationship is insignificant. Applying non-linear relationship in the experiment, yielded an inverted U-shaped association in the long run, which suggest that there exists a threshold point after which financial development no longer contributes to economic growth in middle-income countries.

Nabila and Zakir (2014), employing panel data analysis, examine the routes through which economic growth is influenced by financial development, in 15 developing countries between 1978 and 2012. The study uses both financial development index constructed through principal component analysis (PCA) and indicators of financial development such as ratio of domestic credit provided by banking sector to GDP, ratio of broad money (M2) to GDP and ratio of domestic credit to private sector to GDP. The result shows a strong indication of long-run relationship between economic growth and financial sector development, a bi-directional relationship between financial development and foreign direct investment, and a relationship that flows from trade openness to financial development.

Cross-country studies focusing on Southern Africa include Allen and Ndikumana (1998), who investigated the role of financial intermediation in explaining the variation in economic growth for Member States of the Southern African Development Community (SADC). Measures of financial development employed were Liquid Liabilities (M3 as a percentage of GDP), Credit to the Private Sector as a ratio of GDP and an overall index of financial development. Other variables such as inflation, openness, debt service and government consumption were used to control for other factors affecting economic growth. The regression results reveal a significantly positive relationship between economic growth and financial sector depth as measured by liquid liabilities of financial institutions. While the overall index of financial development and credit to the private sector as a ratio of GDP are positively signed, they are however, not statistically significant. The authors concluded that financial development does have a positive effect on economic growth

in Member States of the sub-region, especially when measured by the size and depth of the financial system.

Acaravci, Ozturk and Acaravci (2009), examine the connection between economic growth and financial development in 24 sub-Saharan African countries from 1975 to 2005. Using panel co-integration and panel GMM estimation, the results reveal the absence of a relationship between financial development and economic growth in the long run. The paper's findings show a bi-directional relationship between real GDP growth per capita and the domestic credit provided by the banking sector. The authors concluded that African countries could quicken growth by developing their financial systems and vice versa.

Panel studies in Western Africa include Agbélénko and Kibet (2015), who empirically examine the connection between financial sector development and economic growth in the West African Economic and Monetary Union (WAEMU) for the period 1981-2010. Using the Generalized Method of Moments (GMM), their research found a positively and statistically significant bidirectional relationship between financial development and economic growth. In addition, control variables such as real exchange rate and foreign direct investment positively affect economic growth, while openness and inflation had no effect on economic growth in the region. The authors, however, noted that the argument that finance causes growth might not be entirely true as the 2008/2009 global financial crisis, which emanated from the advanced countries, with its contagious effect was inimical to economic growth during that period.

Esso (2009) uses data from 1960 to 2005 to ascertain the affiliation between financial sector development and economic growth in the Economic Community of West African States (ECOWAS). Adopting the Pesaran, Shin and Smith (2001) approach to cointegration and the test for non-causality proposed by Toda and Yamamoto (1995), the author found a positive long-run association between financial depth and economic growth in five (5) countries, viz. Cote d'Ivoire, Cape Verde, Guinea, Ghana and Liberia. In addition, the study reveals that financial development is a leading indicator for economic growth in Liberia, Ghana and Mali, while growth drives financial development in Cote d'Ivoire. In the case of Sierra Leone and Cape Verde, a bi-directional relationship was found.

Estrada, Park, and Ramayandi (2010), employing a cross-country panel data set covering 116 countries with diverse levels of development in the period 1987 to 2008, established the existence of a positive and significant effect of financial development on real per capita GDP growth. In all measures of financial depth employed in the study such as, liquid liabilities (M3/GDP), bank credit, or stock market capitalization, a consistently positive and significant influence on growth was established.

Additionally, the control variables have the expected signs, with many of them significant. They concluded that bank development, capital market development, and total liquid liabilities (M3/GDP) are all advantageous for growth. This suggests that rather than the structure of the financial system, what matters for growth is the overall level financial development.

Loayza and Ranciere (2006), estimates a panel error correction model, using pooled mean group estimator (PMG) on annual data of 75 countries over the period 1960-2000. In the long run, the authors find a positive and significant relationship between finance and growth, while the short run impact is significantly negative. They opined that the negative short run effect may be because of cross-country differences and volatility in the business cycle.

Literature on the WAMZ include Michael and Nkrumah (2013), who for Ghana, employed Cointegration, Fully-Modified Ordinary Least Squares (FMOLS), Error Correction and the Generalized Method of Moments (GMM) techniques using annual time series data from 1971 to 2010, to explore the relationship between economic growth and financial development. Employing three measures of financial development - broad money supply as a share of GDP, domestic credit to private sector as a share of GDP, domestic credit as a share of GDP, they find that financial development undermines economic growth in Ghana.

In terms of direction of causality, Ndako (2010) examines the direction of relationship between financial development and economic growth in Nigeria using three measures of financial development via principal component analysis, to create a financial development index. The results suggest the existence of unidirectional causality from economic growth to financial development using bank credit to private sector and a bi-directional causality from financial development to economic growth, when liquid liabilities is used.

Ogwumike and Salisu (2015), for Nigeria, uses the Bound Test approach to analyse the relationship between financial development and economic growth from 1975 to 2008. They find a positive relationship in the long run between growth and finance. Financial sector reforms, credit to the private sector and stock market indicator significantly and positively influence economic growth. In addition, the result of the VAR-Granger causality test lends support to the supply-leading hypothesis.

Kargbo and Adamu (2009), examine for Sierra Leone the relationship between financial development and economic growth during the period 1970-2008. Constructing a financial sector development index (FSDI) using principal component analysis on autoregressive distributed lag approach, the authors find a distinctive

cointegrating association between real GDP on the one hand and financial development, investment and real deposit rate on the other. The results suggest that financial development exercises a statistically significant and positive impact on real GDP growth, with investment as a key conduit through which financial sector development feeds into real GDP growth. Similarly, Tarawally, Sun, Kargbo and Kargbo (2015), examine the link between financial sector development and economic growth in Sierra Leone from 1985-2010. Using granger causality test the study shows that the overall financial depth and credit to the private sector have positive impact on growth, while inflation and interest rate spread negatively impact growth.

For The Gambia, Sillah (2005) attempts to relate the impact of banking activities to the real sector of The Gambian economy. Estimating the hypothetical relationships between the banking sector and real economic activities using Johansen Vector Error Correction Methods on data spanning 1964 – 2002, the study finds a positive long-run relationship between real GDP growth and credit to the private sector. Similarly, Kambo (2010) examines the effects of financial sector development on economic growth in Liberia using time series data from 1960-2008 and the Johansen cointegration and error correction modeling (ECM) techniques. The Johansen cointegration technique confirmed the existence of a long-run relationship between economic growth and financial development. The results reveal a positive association between financial sector improvement and economic growth. A unidirectional relationship from economic growth to financial sector development is also established. Credit to the Private Sector (CPS) was found to be statistically significant. Gross Fixed Capital Formation (GFCF) was found to be correctly signed but not statistically significant. Current Labor force and Exports were positively signed and statistically significant in explaining economic growth.

On the long-standing debate about the relative importance of bank-based or market-based financial system on growth, Nyasha and Odhiambo (2016), examine the dynamic impact of both bank-based and market based financial development on economic growth in the United Kingdom (UK) in the period 1980–2012. Using the autoregressive distributed lag bounds testing approach, the empirical results show that while market-based financial development has a positive impact on economic growth in the UK, bank-based financial development has a negative impact, regardless of whether the regression analysis is conducted in the short run or long run.

Samargandi, Fidrmuc and Ghosh (2014), in the context of a resource rich country, investigates the effect of financial development on economic growth. Their approach allows the effect of financial development to be different for the oil and non-oil sectors. Using the Autoregressive Distributed Lag (ARDL) bounds test technique to cointegration and time series data from 1968 to 2010, they find that the growth of the

non-oil sector in Saudi Arabia has a positive impact from financial development. Conversely, its influence on growth is insignificant and negative.

From the empirical literature discussed, there seems to be no consensus and hence one can conclude with caution that finance is significant in explaining economic growth. Second, it is evident that the effect of finance on growth largely depends on the type of proxy used for financial development. The inconclusive nature of the foregoing empirical studies provides the basis for a further empirical investigation on the role of financial development on economic growth in the six (6) countries of the WAMZ. The study covers the gap in the literature for the WAMZ by adopting a panel data technique in the analysis of finance and growth relationship, as well as using a principal component analysis to combine three measures of financial sector development to create a single index of financial development used in the analysis for the WAMZ.

4. RESEARCH METHODOLOGY

In analyzing the link between financial development and economic growth in the WAMZ, the paper draws largely from the methodology of Loayza and Ranciere (2006), and Samargandi, Fidrmuc and Ghosh (2015).

Sources of Data

The source of data on financial development indicators is the 2016 version of the World Bank Financial Structure Dataset. E-views and Stata-13.1 econometric softwares are used for the data estimation and analysis.

Model Specification

To analyse the relationship between financial development and growth the study estimates an augmented Barro growth regression including financial development variables, which takes the following form:

$$Growth_{i,t} = \alpha_i + \beta_i(Finance)_{i,t} + \gamma_i(Conditioningset)_{i,t} + \varepsilon_{i,t} \quad (1)$$

This is rewritten as:

$$g_{i,t} = y_{i,t} - y_{i,t-1} = \alpha_i + \beta_i f_{i,t} + \gamma_i C_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

Where y is real GDP per capita, $g_{i,t}$ its growth rate, $f_{i,t}$ is financial development, $C_{i,t}$ is conditioning variables, μ_i and $\varepsilon_{i,t}$ are error terms, i (where $i = 1,2,3,\dots,N$) is observational unit (country), and t (where $t=1,2,3,\dots,T$) is the time period, while $\varepsilon_{i,t}$ is a white noise error with zero mean, and μ_i is a country-specific element of the error term which does not necessarily have a zero mean. The parameter α_i is the country-specific intercept, which may vary across countries.

The estimated model, which includes the proxy for financial development, is the following:

$$\begin{aligned}
 &RGDP_{i,t} \\
 &= \beta_1 FINDEP_{i,t} + \beta_2 FIXED_CAPITAL_{i,t} + \beta_3 LABOUR_FORCE_{i,t} + DUMMY + \mu_t \\
 &+ \epsilon_{i,t} \qquad \qquad \qquad (3)
 \end{aligned}$$

where:

- *RGDP* is Real per Capita GDP growth;
- *FINDEP* is Principal Component Index of Financial Development Indicators (banking sector indicators);
- *FIXED_CAPITAL* is Gross Fixed Capital Formation as a ratio of GDP;
- *LABOUR_FORCE* is Labour Force Participation Rate; and
- *DUMMY* is Dummy for Banking Crisis Episodes (indicates years of crisis)

Financial Development Indicators used for the computation of the composite indices of financial development – *FINDEP*, include:

- *LL* is Liquid Liabilities of the banking system as a ratio of GDP (M3 as a ratio of GDP);
- *CPS* is Credit to the Private Sector as a ratio of GDP;
- *DMBA* is Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets as a ratio of GDP;

Justification of Variables

• Financial Development Variables:

The prime objective is to investigate the long-run relationship between finance and growth in all the countries of the WAMZ by using bank-based financial proxy. Common indicators of financial development usually employed in the finance growth study include: Liquid liabilities of commercial banks to nominal GDP (*LL*), measured as M3/GDP. Liquid liabilities is the sum of demand deposit, savings and time deposits. This indicator is used as proxy for broad money ratio especially when developing countries are concerned (Demetriades and Hussein, 1996; and Luintel and Khan, 1999). The idea is that a large component of the broad money stock in developing countries is held outside the banking system. Consequently, an increasing ratio of broad money to income may actually be because of the extensive use of currency and not necessarily due to a rise in the volume of deposits. As such, bank deposit liabilities, which exclude currency in circulation from the broad money stock, are better measures of financial depth and hence of the overall size of financial intermediation. Therefore, several papers including Beck, Levine and World Bank(2000) suggest

employing $M3/GDP$, which is a less liquid monetary aggregate, as a measure for financial development. However, Ang and McKibbin (2007), indicate that monetary aggregates are not perfect substitutes for financial development since they merely reflect the financial sector's role in servicing transactions, rather than measuring their ability to channel funds from depositors to investors.

The second indicator is Credit to the Private Sector as a ratio of GDP (*CPS*). Credit to the private sector is the financial resources given to the private sector by commercial banks in form of loans with interest charged. This measure does not include credit to government (Levine, Loayza, and Beck, 2000). This ratio emphasizes the importance of the financial sector, particularly the commercial banks in private sector financing. It also does not include credits issued by the central banks (Levine, Loayza, and Beck, 2000). The idea is that credit to the private sector rather than credit to the government sector generates a much larger multiplier effect in the economy. It is further argued that credit to the private sector are extended under rigorous conditions and that financial intermediaries very demanding appraisal of project viability enhances the quality of investment that emanates from private sector credit (Levine and Zervos, 1998, Levine 1998). Thus, *CPS* is a more precise measure of the resources that financial intermediaries channel to the private sector.

The third indicator which is deposit money bank assets to deposit money bank assets and central bank assets as a ratio of GDP (*DMBA*) shows the significant influence of the deposit money banks in the economy. It also brings out the insignificant role of central banks in the face of increasing deposit money banks assets (Valickova, Havranek and Horvath 2013). The measure becomes a good proxy of the financial system development, as these banks are more likely to perform the financial intermediation functions.

Based on the foregoing review, an index of financial development (*FINDEP*) that represents the overall banking sector development in the WAMZ countries is constructed. Consequently, following the works of Ang and McKibbin (2007); Gries, Kraft and Meierrieks (2009); Samargandi, Fidrmuc and Ghosh (2015); and Allen and Ndikumana (1998) among others, the study combines the ratio of liquid liabilities (*LL* or $M3/GDP$) to nominal GDP, the ratio of commercial bank assets to the sum of commercial bank assets and central bank assets (*DMBA*), and the ratio of bank credit to the private sector to GDP (*CPS*), into a single indicator (*FINDEP*) by using principal components analysis (PCA).

The justifications for the need to construct these indices out of the aforementioned financial development indicators are as follows: First, previous studies (Samargandi, Fidrmuc and Ghosh 2015) establish that when all the financial development indicator

variables are included in each regression, inconsistent results are obtained, which could be due to the established correlation between financial development variables. Therefore, the index is used to avoid the problems of multi-collinearity. Secondly, the absence of a consensus as to which proxies are most appropriate for capturing the linkage between financial development and growth makes the use of a composite index of financial development indicators a better indicator than the individual variables. This is more so, as the index of financial development captures most of the information from the original data set (King and Levine, 1993; Khan and Senhadji, 2003; Chuah and Thai, 2004),

Using the formula similar to the procedure developed by Dermirguc-Kunt and Levine (1996), and adopted by Ndako (2010), the composite index of financial development (*FINDEP*), for the model, is calculated as follows:

For a country *i* in year *t*,

$$FINDEP_{it} = \frac{1}{m} \sum_{j=1}^m \left(100 * \left(\frac{F_{j,it}}{\bar{F}_j} \right) \right) \quad (4)$$

Where *F* is an indicator of financial development, \bar{F}_j is the sample mean of the indicator, and *m* is the number of indicators included in the computation of the index (*m* = 3 in this case).

Table 4.1 shows the outcomes of the principal component analysis. The financial development index is constructed from the following financial indicators: liquid liabilities (LL), deposit money bank assets (DMBA), and credit to the private sector (CPS). The first eigenvalue shows that 73.6 percent of the variation is captured by the first principal component, while 18.2 percent of the total variation is explained by the second principal component. The third principal component accounts for just 8.2 percent of the total variation. Based on the foregoing analysis, the first principal component appears to be the adequate measure of the index as it accounts for about 73.6 percent of the information from the three financial development indicators used. As such, we use the first principal component, PC1, to pool the rest into one principal component.

Table 4.1 Result of the Principal Component Analysis for FINDEP

Principal Component Analysis						
Eigenvalues: (Sum = 3, Average = 1)						
Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion	
1	2.2079	1.6611	0.7360	2.2079	0.7360	
2	0.5468	0.3015	0.1823	2.7547	0.9182	
3	0.2453	---	0.0818	3.0000	1.0000	
Eigenvectors (loadings):						
Variable:	PC 1	PC 2	PC 3			
DMBA	0.5323	0.8116	0.2409			
LL	0.5804	-0.5570	0.5940			
CPS	0.6162	-0.1764	-0.7675			
Ordinary correlations						
	DMBA	LL	CPS			
DMBA	1.0000					
LL	0.4701	1.0000				
CPS	0.6007	0.7316	1.0000			

(Authors computation using eviews on tables of results)

• **Dependent and Control Variables:**

The dependent variable, which measures economic performance, shall be the natural log of real GDP (*RGDP*). In order to control for the other possible determinants of economic growth not captured by the financial development variables, indicators that capture the impact of macroeconomic factors on growth are included in the analysis.

According to Akimov, Wijeweera and Dollery (2009), from the endogenous growth theory, the well-known fundamental variables affecting economic growth are physical capital, and labour or human capital. Therefore, the most popularly used measure of physical capital is the ratio of gross fixed capital formation to GDP, which is included in the model. The study follows the paper by these authors by including labour force participation rate to represent labour.

In the light of the foregoing, the control variables include gross fixed capital formation as a percentage of GDP, denoted by *Fixed_Capital*, to capture the investment in physical capital; and labour force participation rate, denoted by *Labour_Force*. Furthermore, a dummy variable denoted as *Crisis_Dummy* to capture the impact of banking crisis on financial development and growth as earlier suggested by Valickova, Havranek and Horvath (2013) appeared as an exogenous variable.

Estimation Technique

In estimating the relationship between finance and growth in the WAMZ, first, the study adopts the dynamic panel heterogeneity analysis based on the technique presented by Pesaran and Shin (1999). Specifically, it uses the autoregressive

distributed lag (ARDL) model to carry out estimations using the following estimators: the pooled mean group (PMG), mean group (MG), and the dynamic fixed effect (DFE) estimators in order to study the long run and short run effects of financial development on economic growth. By using these techniques, the study is able to recognize country-specific heterogeneity. Based on Pesaran and Shin (1999), the dynamic heterogeneous panel regression is integrated into the error correction model using the autoregressive distributed lag ARDL (p,q) technique (Loayza and Ranciere, 2006). This is stated as:

$$\Delta(y_i)_t = \sum_{j=1}^{p-1} \gamma_j^i \Delta(y_i)_{t-j} + \sum_{j=0}^{q-1} \delta_j^i \Delta(X_i)_{t-j} + \varphi^i [(y_i)_{t-j} - \{\beta_0^i + \beta_1^i (X_i)_{t-1}\}] \epsilon_{it} \quad (5)$$

Where y is the GDP growth rate, X is a set of independent variables including the financial development indicator, and represent the short-run coefficients of lagged dependent and independent variables, respectively, $\beta_0^i + \beta_1^i$ are the long run coefficients, and φ^i is the coefficient of the speed of adjustment to the long run equilibrium. The subscripts i and t represent country and time, respectively.

Three different estimators can estimate equation (5): the pooled mean group (PMG) estimator developed by Pesaran, Shin, and Smith (1999), the mean group (MG) model of Pesaran and Smith (1995), and the dynamic fixed effects estimator (DFE). The long-run equilibrium and the heterogeneity of the dynamic adjustment process are accounted for by these estimators and are calculated by maximum likelihood (Demetriades and Law, 2006). The need to have consistent and efficient estimates of the parameters in a long run relationship is emphasised. While Johansen (1995); Philips and Hansen (1990), stress that the long run relationships exist only in the context of cointegration among variables with the same order of integration, Pesaran and Shin (1999) opine that panel ARDL can be relevant among variables with different order of integration. Lastly, the ARDL model, particularly the PMG, MG and DFE, offers reliable coefficients, in spite of the likelihood of endogeneity since it includes the lags of dependent and independent variables (Pesaran and Shin (1999)).

To choose among the PMG, MG and DFE methods, the Hausman test examines whether there is a significant difference between the three estimators. The null of this test is that the difference between PMG and MG or PMG and DFE is not significant. If the null is not rejected, the PMG estimator is recommended since it is efficient. Based on the Schwartz Bayesian criterion, the study imposes the following ARDL lag structure (1, 1, 1, 1) for the GDP growth rate, Financial Development Index, Fixed Capital Formation, and Labour Force indicators, respectively.

The estimation procedure for our model, which measures the impact of the banking sector on economic growth in the WAMZ, is in five (5) main steps. First, a Panel Unit

Root test to determine the order of integration of variables; following Im, Pesaran and Shin (2003); Levin, Lin and Chu (2002), and Breitung (2000), is conducted. Second, the study adopts the methodology proposed by Fisher (1932), known as the Johansen Fisher panel cointegration test (Maddala and Wu 1999) to determine whether a cointegrating relationship exists. Third, the pooled mean group (PMG), mean group (MG) and dynamic fixed effect (DFE) estimators to identify the long-run and short-run determinants of economic growth among the explanatory variables, are estimated. Fourth, the Hausman test to distinguish between the pooled mean group (PMG) and mean group (MG), and the (PMG) and dynamic fixed effect (DFE) estimators in order to select the appropriate model, is carried-out. Finally, the study estimates panel diagnostic tests to check the robustness of the results. These include: the Variance Inflation Factor (VIF) which estimates how much the variance of the regressions coefficients are inflated due to multi-collinearity in the models. In general, a VIF above 10 indicates high correlations and is a cause for concern. The Panel VAR-Granger causality Wald tests and Pairwise Granger causality tests are carried out to ascertain the direction of causality between financial sector development and economic growth.

5. PRESENTATION OF RESULTS AND ANALYSIS

Stationarity Tests for the Variables

The study employed the Levin-Lin-Chu, Im-Pesaran-Shin and Breitung panel unit root tests and the results are presented in Tables 5.1.

Table 5.1: Unit Root Test results (*lrgdp, findep, lfixed_capital, llabour_force*)

Unit Root Tests							
Variable	Variable (Levels)			Variable (1st Differences)			Order of Integration
	LLC	IPS	Breitung	LLC	IPS	Breitung	
<i>lrgdp</i>	-1.1661	4.5261	7.0509	-3.4104	-5.5406	-4.1924	1(1)
	0.1218	1.0000	1.0000	0.0003	0.0000	0.0000	
<i>findep</i>	1.5576	3.3102	1.4233	-6.3319	-6.9136	-7.2827	1(1)
	0.9403	0.9995	0.9227	0.0000	0.0000	0.0000	
<i>lfixed_capital</i>	-2.7687	-2.5353	-2.0614	-10.4739	-8.0616	-7.8722	1(0)
	0.0028	0.0056	0.0196	0.0000	0.0000	0.0000	
<i>llabour_force</i>	0.5990	3.1432	9.8407	-2.0388	-3.8102	-2.6379	1(1)
	0.7254	0.9992	1.0000	0.0207	0.0001	0.0042	

**p*-value is below the adjusted *t*-statistic

The unit root test for our model as shown in Table 5.1, indicates mixed results, that is, the variables are either of order zero or order one and none is stationary at order two.

Interestingly, the three different panel unit root tests give very similar results. In view of these different orders of integration, panel ARDL instead of the customary panel cointegration test is used in the study.

Estimation and Data Analysis

The result of the unit root test as captured in Table 5.1 suggests that the variables are of order one and order zero, i.e., $I(1)$ and $I(0)$. Following this result, the study conducts the Johansen Fisher Panel Cointegration tests as stated in the previous chapter. The result of the Johansen Fisher Panel Cointegration test with intercept and no trend indicates at most one cointegrating equation as the trace and max-Eigen value tests are significant at the 1 percent level. This suggests the existence of a long run relationship between the dependent and independent variables. Nonetheless, based on the unit root tests the study conducts a Panel Augmented Distributed Lag (ARDL) model.

Table 5.2 Johansen Fisher Panel Cointegration Test

Johansen Fisher Panel Cointegration Test				
Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)				
LRGDP, FINDEP, LFIXED_CAPITAL, LLABOUR_FORCE				
Hypothesized # of CE(s)	Fisher Stat * (from trace test)	Prob	Fisher Stat * (from max-eigen test)	Prob
None	75.61	0.0000	53.06	0.0000
At most 1	34.56	0.0006	19.25	0.0826
At most 2	26.12	0.0103	20.64	0.0559
At most 3	24.08	0.0198	24.08	0.0198

*Probabilities are computed using asymptotic Chi-square distribution
 (Authors computation using eviews on tables of results)

To ascertain the impact of the variables of interest, error correction based on ARDL (p,q) model is employed, with attention on the pooled mean group (PMG) model. Table 5.3, reports the results of the PMG model. The lag structure is ARDL (1, 1, 1, 1) and the order of variables is: log RGDP, log FINDEP, log Fixed Capital Formation and log Labour Force Participation Rate.

Table 5.3: Pooled Mean Group Regression (PMG) Results

Pooled Mean Group Regression (PMG)							
D.lrgdp	Coef	Std Error	z	P > z	(95% Conf Interval)		
ECT							
findep	0.3358253	0.1383371	2.43	0.015	0.0646895	0.60696	
lfixed_capital	-0.2779274	0.1442114	-1.93	0.054	-0.560577	0.00472	
llabour_force	1.355109	0.3002773	4.51	0.00000000	0.766576	1.94364	
SR							
ECT	-0.0739	0.0352	-2.1	0.036	-0.1428	-0.0049	
findep D1.	-0.0845	0.0473	-1.79	0.074	-0.1773	0.0083	
lfixed_capital D1.	0.1380	0.1241	1.11	0.266	-0.1052	0.3812	
llabour_force D1.	-0.6876	1.4987	-0.46	0.646	-3.6250	2.2498	
dummy	-0.0640	0.0614	-1.04	0.297	-0.1843	0.0563	
_cons	0.2798	0.1136	2.46	0.014	0.0571	0.5025	

(Authors computation using Stata 13.1 on tables of results)

While the first panel in Table 5.3, shows the long-run (LR) effects, the second panel reports the short-run (SR) effects and the speed of adjustment or error correction (ECT). The vector has been normalized such that the coefficient on the first term in the cointegrating vector is 1 (Hoechle, 2007)). Accordingly, the normalized term is omitted from the estimation output. Often only the long-run parameters are of interest. The lag structure is ARDL (1, 1, 1, 1) and the order of variables is: log RGDP, log FINDEP, log Fixed Capital Formation and log Labour Force Participation Rate.

The result of the PMG model shows that in the long run, the financial development composite index (FINDEP) as expected is positive and significant at 5 percent significant level. The fact that this relationship is positive suggests that there is a positive and direct relationship between financial development and economic growth in the WAMZ. In fact, a unit increase in the financial development indicator will lead to a 0.34 increase in RGDP in the region. This relationship is expected apriori given that the literature upholds a positive effect of financial development on economic growth and the accelerated rate of development that has taken place in the WAMZ's financial sector since the mid-1980s, following the liberalization policies of that era.

The error correction model was both negative, less than 1 and statistically significant. The result also reveal that a departure from equilibrium in the past period is reduced in the current period. Specifically, about 7.0 percent reduction is indicated by the model.

The study also estimated the mean group (MG), along with the Hausman h-test to measure the comparative efficiency and consistency among them. While the PMG results indicate that financial development has a positive strongly significant impact in the long run and a negative insignificant impact in the short run on economic growth, results of the MG estimator in Table 5.4 suggests a positive and insignificant coefficient in the long run but negative and significant coefficient in the short run.

Table 5.4: Mean Group Regression (MG) Results

Mean Group Regression (MG): Error Correction Form							
D.lrgdp		Coef	Std Error	z	P > z	(95% Conf Interval)	
ECT							
	findep	0.1109	0.1003	1.11	0.269	-0.0857	0.3074
	lfixed_capital	-0.3590	0.3348	-1.07	0.284	-1.0152	0.2972
	llabour_force	1.1407	0.2867	3.98	0.0000	0.5787	1.7027
SR							
	ECT	-0.2990	0.0904	-3.31	0.001	-0.4761	-0.1219
	findep D1.	-0.0612	0.0245	-2.49	0.013	-0.1093	-0.0131
	lfixed_capital D1.	0.2072	0.2133	0.97	0.331	-0.2108	0.6253
	llabour_force D1.	-0.1774	1.1609	-0.15	0.879	-2.4527	2.0979
	dummy	-0.1196	0.1175	-1.02	0.309	-0.3498	0.1106
	_cons	2.3854	1.3979	1.71	0.088	-0.3545	5.1252

(Authors computation using Stata 13.1 on tables of results)

In comparing the PMG and MG estimators, we note that the estimated long-run financial development elasticity is significant and properly signed in the PMG model than the MG model. Also, the PMG estimate of the financial development index elasticity is larger in magnitude than the estimate from the MG model (0.33 and 0.11), respectively. The speed of adjustment imply significantly different short run dynamics ($\varphi = -0.7$ in PMG and $\varphi = -0.3$ in MG), as shown in Tables 5.3 and 5.4, respectively.

Table 5.5: Hausman h-test Results

Hausman h-test	
Test: Ho: Difference in coefficients not systematic	
chi2(3):	(b-B)'[(V_b-V_B)^(-1)](b-B)
	1.11
Prob>chi2:	0.774

(Authors computation using Stata 13.1 on tables of results)

The acceptability of the long run homogeneity restriction across countries, and therefore the effectiveness of the PMG estimator over the other estimators, is verified by the Hausman test. As expected, the null hypothesis of the homogeneity restriction on the regressors in the long run, is accepted by the Hausman test, which indicates that PMG is more efficient estimator than MG.

In all, the Hausman test indicates that PMG is consistent and efficient estimation than MG estimation, as the probability chi-square of 0.77 is greater than the 0.05 decision rule (Table 5.5). Moreover, since the time span for this study is 31- years for each country in the panel, and the MG estimator may lack enough degrees of freedom, it is, expected therefore, that the PMG estimation is more appropriate for this analysis.

Based on the PMG estimator, therefore, there is confirmation that financial development has a linear, positive and significant effect on economic growth in the WAMZ countries in the long run. However, financial development has a negative and insignificant impact in the short run. Furthermore, financial development does not contribute to economic growth in the short run, with the two estimators, PMG and MG, yielding similar results.

Multi-collinearity was also tested and the results opine that the variance inflation factor (VIF) for all the variables as well as the mean VIF was less than 10, implying that the variables are free of any multi-collinearity among them (Table 5.6).

Table 5.6: Variance Inflation Factor (VIF): Test for Multicollinearity

Variance Inflation Factor (VIF)		
Variable	VIF	1/VIF
lfixed_capital	1.28	0.7792
llabour_force	1.28	0.7815
findep	1.14	0.8794
Mean VIF	1.23	

(Authors computation using Stata 13.1 on tables of results)

The Mean VIF is below the threshold of 10, indicating the absence of Multicollinearity.

Discussion of Results of Control Variables

From the estimated model, the control variables yield mixed results. Gross fixed capital formation has the wrong negative sign but is statistically insignificant at the 5 per cent level in both the long and short runs. While the result is inconsistent with theory which supports a positive and significant relationship between gross fixed capital formation and economic growth, it is worthy of mention that some of the WAMZ countries (Liberia and Sierra Leone) witnessed many years of civil wars which led to the massive destruction of infrastructure. Also, the civil strife in most of the countries has led to enormous investment in defense which on its own is unproductive. The lack of accretion to infrastructure and the rapid decay and depreciation of existing infrastructure in the WAMZ countries could partly explain the disappointing result between investment and growth. Despite our results, which suggest a positive and significant relationship between financial development and economic growth in the long run, the financial sector of the WAMZ may not have played significant role in infrastructural financing, in view of the long gestation of infrastructural projects and the risk of maturity mismatches. The result however is similar to the findings of Mbulawa (2015) where gross fixed capital formation was found to have had an unfavorable effect on growth in Southern African Development Community.

Labour force participation rate which captures the effect of labour supply on growth appeared with the expected positive sign and is statistically significant at the 5 percent

level in the long run and confirms the endogenous growth model. The result is similar to that obtained in the study by the South African Reserve Bank (2014).

The financial crisis dummy came out with the expected negative sign, although statistically insignificant at the 5 percent level (Table 5.3). The fact that the relationship is negative suggests that the financial crisis that affected the countries of the Zone particularly in the 1990s and the late 2000s (the global financial crisis), adversely affected financial development and consequently growth in the region.

Long-run relationship between Financial Development Indicators and Economic Growth in the WAMZ

The study employed the Johansen Fisher Panel Cointegration tests in testing for long run relationship between RGDP and the composite financial development indicators. The results suggest that *FINDEP* have significant long run relationship with RGDP as shown in Table 5.7. As such, we reject our null hypothesis that there is no long run relationship between economic growth in the WAMZ and financial development index.

Table 5.7: Johansen Fisher Panel Cointegration tests

(Long run Relationship between LRGDP and FINDEP)

Johansen Fisher Panel Cointegration Test				
Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)				
LRGDP, FINDEP				
Hypothesized # of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	25.80	0.0115	25.99	0.0108
At most 1	12.68	0.3929	12.68	0.3929

*Probabilities are computed using asymptotic Chi-square distribution.

(Authors computation using eviews on tables of results)

Causality Analysis between Financial Development Indicators and Economic Growth in the WAMZ

The paper equally employed a panel granger causality analysis to estimate the direction of causality between RGDP and financial development. Leamer (1985) interprets granger-causality to mean a situation when a phenomenon precedes another. Given the null hypothesis that Excluded variable does not granger-cause

Equation variable, the study with a *p-value* of 0.02 posits that financial development index (*FINDEP*) significantly granger causes RGDP, but the reverse is not true (Table 5.8). Following from the granger causality tests, we reject our null hypothesis that there is no causal relationship between financial development index and GDP growth in the WAMZ.

The strong effects of financial development on growth may therefore be seen as supporting the ‘supply leading’ hypothesis propounded by Patrick (1966). This is indeed a major contribution of this study to the literature.

Table 5.8: Panel VAR-Granger causality Wald test (*FINDEP* and *RGDP*)

Panel VAR Granger causality Wald Tests			
Ho: Excluded variable does not Granger- cause Equation variable			
Ha: Excluded variable Granger- causes Equation variable			
Equation \ Excluded	chi2	df	Prob > chi2
lrgdp			
findep	5.457	1	0.019
ALL	5.457	1	0.019
findep			
lrgdp	0.437	1	0.508
ALL	0.437	1	0.508

Authors computation using Stata 13.1 on tables of results)

Pairwise Granger Causality Tests

<u>FINDEP vs. LRGDP</u>			
# of Lags	From FINDEP to LRGDP	From LRGDP to FINDEP	Test Result
1	0.0077	0.5723	FINDEP Granger- causes LRGDP

Null Hypothesis :

FINDEP does not Granger-cause LRGDP

LRGDP does not Granger-cause FINDEP

(Authors computation using eviews on tables of results)

6. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This paper investigates the impact of financial development on economic growth in the countries of the West African Monetary Zone (WAMZ). The study also examines the direction of causality and long run relation between financial development and economic growth. It employs three measures of financial development, which include liquid liabilities (*LL*) of the financial system (*M3/GDP*), credit to the private sector as a ratio of GDP (*CPS*), and deposit money bank assets to deposit money bank assets and central bank assets (*DMBA*) to ascertain the relation between finance and growth in the WAMZ.

Panel data estimation technique was used in estimating the model. The model of study investigates the impact of banking sector indicators on growth by combining liquid liabilities (*M3/GDP*), credit to the private sector as a ratio of GDP (*CPS*), deposit money bank assets to deposit money bank assets and central bank assets (*DMBA*), for the WAMZ countries, in a principal component analysis, with *FINDEP* as the resultant variable.

The results of our model estimated with the pooled mean group (PMG) estimator shows that the financial development index (*FINDEP*) in the long run is positive and significant at 5 per cent significant level. This suggests a positive and direct relationship between financial development and economic growth in the WAMZ in the long run. The result indicates that a unit increase in the financial development indicator will lead to a 0.34 increase in RGDP in the region. This relationship meets *a priori* expectations in that the literature supports a positive effect of financial development on economic growth. The accelerated rate of development that has taken place in the WAMZ's financial sector in the last three decades lends credence to this result. The error correction term is negative, less than 1 and statistically significant at the 5.0 per cent level. The result also reveals that a departure from equilibrium in the past period is reduced in the current period. Specifically, about 7.0 percent reduction is indicated by the model. The result shows that in the short run financial development is negatively and insignificantly related to growth. This could be attributed to individual country differences.

The variance inflation factor at 1.23 was below the threshold of 10, indicating that the model does not suffer from multicollinearity. The granger-causality test results for this model suggest the existence of a uni-directional causality from financial development to economic growth. Results of the Johansen Fisher Panel cointegration tests suggests the existence of a long run relationship between the financial development variable (*FINDEP*) and economic growth (RGDP).

Among the control variables the level of investment in the WAMZ economy proxied by gross fixed capital formation was negative and insignificant. This underscores the level of infrastructure deficit in the WAMZ. On the other hand, labour force proxied by labour force participation rate was significant at the 1 percent level. The dummy variable included in the model to capture periods of banking crisis appeared with the right negative sign but is statistically insignificant at the 5 percent level.

A likely inference from these results is that the combined variables of financial development adequately capture the positive effects financial development could have on the allocation of resources into productive uses. Also, these results may be the outcome of the efficiency of the financial systems resulting from the financial liberalization policies of the mid-1980s as well as the WAMZ economic and financial integration programme that started in the year 2000. Another possible explanation is that the intra-regional cooperation in place could also have accounted for the positive externalities from the more relatively developed financial sectors in the Zone such as Ghana and Nigeria to the other members of the WAMZ.

While our analysis shows impressive results suggesting that financial development significantly contributes to economic growth in the long run in the WAMZ, the study recommends as follows:

The need for the mobilization of savings and allocation of funds to productive investment projects. As such market frictions and impediments in the form of high transaction costs and improper allocation of resources should be removed. There should be strong interaction between savings and investment and link with economic growth. Also, credit expansion should be done along with adequate regulatory control and monitoring from the bankers. Banks should invent better methods for screening entrepreneurs. As such, there is need for a collateral registry to capture the identities of borrowers in order to avert adverse selection and moral hazards.

Policy direction should also aim at introducing enabling environment to broaden financial inclusion, which should also include measures that aim at reducing intermediation costs. As continuous progress in financial inclusion is dependent on financial literacy, policies could emphasize on encouraging the financial literacy of middle to low income users of financial services. This will require well-designed and implemented financial literacy programs and awareness campaigns. In this perspective, the authorities should also create consumer protections in the access to and use of financial services.

Finally, safety, stability and soundness of the financial sector is key to the health of the financial system. We observe in this study that financial crisis captured by a dummy

variable is negatively related to growth. As such, Member States should develop national and regional frameworks for crisis avoidance and resolution. These should include stress testing and early warning mechanisms.

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