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THE ECONOMIC IMPACT OF FINANCIAL TECHNOLOGIES AND INNOVATION

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ABSTRACT
Recently, financial technology and innovations have had a substantial domain in the financial sector of the Ghana. This thesis investigates the short-run and long-run impacts of financial technology and innovations on Ghana's economic growth via the auto-regressive distributed lag (ARDL) approach by using quarterly data for the period 2011 and 2020. The outcome of the ARDL bounds tests shows a long-run co-integration between financial innovation and economic growth in Ghana. According to empirical results, ATM and MM have a positive effect on economic growth in the long run. Lastly the study indicates that the banking sector and network providers should spread the digital infrastructures especially ATM and mobile money outlets even in the rural areas to boost financial technology and economic growth. Again, the Bank of Ghana should formulate policies to strengthen financial technology and innovation.

KEYWORDS: *Economic growth, financial technology, ARDL Financial innovation.*

CHAPTER I
INTRODUCTION

Fintech generally refers to the innovative ways that help financial institutions in all their transaction by enabling easier and more simple measures through which these institutions can take payments or savings, make loan facilities available, and the most common and current uses including online transactions, investments, and acquisition of all kinds of financial instruments (Higgins, 2018). For the last two decades, financial technology (fintech) and innovation has been a well-known subject in finance, economic development, international trade and in fact across the world. The interaction of traditional financial services with modern information technology which has led to fundamental changes in production has hence affected the delivery of financial services. Therefore, this study will help policymaker to understand the role of fintech and innovation with the emergence of new market players and tightening competitions since this rapid transformation in financial services has reached a level that will affect the lives of all individuals Paripunyapat and Kraiwanit (2018)

CHAPTER II
EVOLUTION OF FINANCIAL TECHNOLOGIES AND INNOVATION

Financial technology is greatly evolving and several definitions concerning its development exist according to various researchers. The central elements of this concept are agreed upon but its scope is not clearly defined, there is consensus that fintech relates to organizations that build financial systems and services primarily through the intensive use of information technology Azizah and Choirin (2018). In general, fintech can be traced back to 1866 where finance and technology combined to produce the first period of financial technology globally, with the first networking technology via the Trans-Atlantic transmission cable taking place on August 16, 1958. This period of fintech is termed as fintech 1.0. From 1866 to 1967, this development increasingly transformed with digital technology in the digital industry transaction like Fedwire in 1918, during the age of financial globalization, Diner's Club in 1950 and telex in telex in 1966 during the early post-war- period. Fintech 2.0 continued from 1967 until 2008 where the traditional financial services dominated the initiation period fintech 1.0 of financial technology. Innovations and technologies like ATM (Barclays), handled calculator (Texas Instrument) in 1967, BACS, CHIPS in 1968 and 1970, SWIFT in 1973, Bloomberg in 1981, Mobile phones in 1983, program trading in 1987, online banking (NBS.WF) between 1983 and 1985 where by 2001, 8 banks in the US had over one million online banking customers. The period of fintech 3.0 started from 2008. This period is the period where new startups together with established companies dominated the integration of businesses and consumers. This period enhanced the integration of startups and the already existing large companies such as the core or traditional banking vendors where innovations like Wealthfront was founded to provided automated investment services in 2008. The period saw the launch of Bitcoin to provide solutions to mobile payments in 2009, the start of reward-based crowdfunding platforms in 2009 and peer-to-peer money transfer services like Transferwise created in 2011. Currently, industry 4.0 is dominated by increased integration between virtual and physical industrial machines which give way to data gathering and analysis on a large scale not seen in the earlier periods Schlechtendahl et al. (2015). This current period of 4.0 has led to a reduction of operational cost, an increase in capital investments to startups and existing banks, industries, communities and individual innovators. Technology-wise, there is enormous smartphone penetration, extensive provision of Point of Sales (POS) and other systems that stores value accordingly.

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2.2. Types of Financial Technologies and Innovation

2.2.1. Blockchain Technology

Blockchain technology, also known as a distributed ledger technology is a virtual, digital, an unchangeable transaction ledger which replaces a central individual or authority just with algorithms. Blockchain has the potential to deliver new wave of innovation to the fintech ecosystem by providing a distributed system of exchange value which is "trustless". Even though blockchain technology has centred on the United States and Western European according the International Finance Corporation (IFC), globally, blockchain technology has impacted extensively in the reduction of transaction costs (IFC, World Bank, 2017

2.2.2. Cryptocurrency

Cryptocurrencies are the digital or virtual currencies developed on blockchain technology that serves to exchange goods and services through a platform of electronic transactions without the presence of an intermediary. As of the year 2020, over 2,000 cryptocurrencies were actively in existence and being traded on various blockchains according to the World Bank fintech database. Bitcoin was the first cryptocurrency and was founded in 2009, with the first truncation occurring in 2010. Presumably, Bitcoin acts as a moderate path or way of making direct deposits or transfers, while still encouraging the unbanked in any of the standard banking institutions to set up a global bank account that will be approved and open anywhere there is internet connectivity. Despite this, Bitcoin has weaknesses as it becomes a widely accepted means of exchange, transaction, like other types of commerce.

2.2.3. Crowdfunding

Crowdfunding is derived from the term crowd sourcing which describes the process of outsourcing responsivity or task to a large number of people who are often sometimes anonymous (an internet community) with the aim of drawing on their resources, expertise and knowledge. The case is crowdfunding has the basic aim to obtain money. Many individuals have described money differently but according to Lambert/Schwienbavher (2010), Crowdfunding involves an all open call importantly via the internet for the collection or gathering of funds which can either be in the form of donation thus without rewards or in exchange for some rewards as well as to support projects specific to an individual, company or a governments' project in every sector of the economy

2.2.4. Mobile Money Payment

With the current increase in cell phone usage and access to internet connections, direct payments can be made from a mobile money account itself. An important part of mobile money financing is making sure that mobile devices of all types can efficiently and easily navigate through various websites and mobile applications. Mobile money transactions are gradually replacing debit and credit cards.

2.4. The Impacts of Fintech on the Economy

2.4.1. Financial Institutions and Market

Customer Lock-In Effect: Fintech and innovation help reduce prices, through open networks where customers are connected to offer them the high value of experience which serves as an incentive for clients not to move to a different platform. Anna, (2017) asserts that there is a greater opportunity for customers to stay on one platform creating a customer lock-in effect. This help financial institution capitalizes positively to attract more consumers. With the greater number of clients, financial institutions and the financial market accumulate funds, distribute these efficiently to clients.

Quick and Cheap Financial Solutions: The World Economic Forum (WEF, 2015) report classifies the impact of fintech accordingly that, the financial market is expected to see changes in insurance, deposits, and lending, payments, retail, and SME capital raising, investment, and wealth management. De Reuver, Sørensen, and Basole, (2017) suggest that banks have been able to re-develop, re-train, recapture and implement effective solutions that were previously neglected. That is, banks with their huge investment in cutting edge technologies, the financial market provide B2B solutions, peer-to-peer (P2P) platforms for customers who are not able to attain loans and all forms of credit from the traditional financial institutions, mobile wallets, tools that help customers and banks to manage their finance, insurance (InsurTech), investment (Robo advisor).

Retail Payment Solutions: The advent of innovations and emerging non-bank companies have resulted in significant improvements in the world of alternative retail payment solutions. The increased use of smartphones globally and the internet were the major drivers of the spread of various web-based payments and online remittances. Kenya's M-Pesa mobile payment system, launched in 2007, is one of the most promising examples. M-Pesa is being used by 17.6 million people, or about 40% of the populace, and the service handled USD 31 billion in transactions in 2016, accounting for roughly half of Kenya's GDP (Safaricom 2016)..

2.4.2. Economic Growth

Intermediating funds from savers to borrowers Funding opportunities: Crowdfunding especially enables the quick collection of funds from individuals all over the world, including individuals never met. With crowdfunding platforms, several individuals and startups are assisted as funds are channelled from excess parties so that economic activity can run effectively and efficiently. Again, easy access to capital and other forms of funding is proven to increase the rate of turnovers, profitability, and employment which

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generally boost aggregate expenditure thereby increasing the levels of GDP (Yong& Choi, 2019). The impact of financial technology and innovation is far-reaching. Some countries in Australia have predicted a $1 billion boost by the end of 2021 with a compounded growth rate of about 76% due to the massive impact made by crowdfunding, blockchain technologies, and smart payment and credit options available to SME's (Xiang et al, 2019).

Increase in remittances: Reduction in transaction cost simply accelerates and simplifies remittances from foreign countries to home countries which benefit to home country. The inflow of remittance enhances economic growth as domestic spending increases leading to a higher spending power as well as the economy's tax receipts and the countries balance of payment Chikako et al, 2020). In 2019 Africa received about $50-75bn only in remittances which is seen as a key factor for sustainable economic growth. The Sub Saharan Africa now leads the worlds mobile money transactions and accounts for almost 10% of GDP and fintech is expected to contribute USD 150bn to Africa's GDP by 2022 and the current Covid-19 pandemic is expected to accelerate development in financial technology and innovation in the region (Asamoah et al, 2019).

Reducing Transaction Cost: The 2016 Moody report shows that through the financial systems fintech improves economic growth by reducing transaction costs. Reduced cost of the transaction by startups, companies, and all fintech stakeholders leads to higher returns where these companies employ reducing the higher levels of unemployment. According to the IMF report, Digital financing, thus financial technology and innovation is evolving from spending to lend and all G20 nations have sought to accelerate this very trend by adopting this objective and leverage fintech to boost access to finance for MSME's as well as for youth, women and vulnerable individuals (Kwablah&Aya, 2018)

2.4.3. Economic Development

Efficient Credit Allocation and Distribution by Financial Institution: Through fintech and innovation, financial data is collected and thus, provides the financial status of individuals, their creditworthiness, their general habits, spending preferences. The available data gathered through the use of AI leads to the development of the appropriate platform to assist individuals per their spending habits, and their general financial statements. Robotic decisions are accepted by both stakeholders because they are made without personal emotions or the courage of experts. The AI investment network combines quantitative business approaches with big data and cloud computing to provide personalized recommendations for the asset portfolio for different classes. In addition, personal consultant advice programs are also tailored to the specific needs of customers (Deloitte, 2016).

Improved Financial Inclusion: Mulligan (2015) asserts that fintech and innovation have partnered with SMEs and deposit money banks to aid financial inclusion which is a core driver of economic development as non-cardholders, non-bank account holders deploy new payment channels to make undertake their transactions. A clear instance can be given on M-Pesa which have successfully operated on a low technology not necessarily relying on advanced smartphones but Demirguc-Kunt et al. 2018 suggest that for financial inclusion to be completely fulfilled, underpinned electricity and mobile networks is key depending on the populace technological know-how and underpinned by the necessary infrastructure.

New domestic jobs (employment) Entrepreneurship Skill Development and extension of the pool of talent - Large fintech firms like PayPal contribute largely to the provision of employment. According to the PayPal (2020) Global Impact PayPal reports, it asserts that there are over 23,200 employees mostly with higher income. Also, in Indonesia fintech has employed 215,433 people into the workforce to increase labor income from salaries and wages amounting to Rp4.56 trillion (Adhinegara et al., 2018). Again, according to the UK FinTech State of the Nation (2019), the fintech sector employs about 75,000 workers across 1600 firms, and again over 10 billion EUR support indirect economic. With the innovativeness of the sector, talent is nurtured in these technological areas, especially in the field of finance and engineering providing an opportunity to grow the skill base in digital banking, cryptocurrency, smart contracts to sustain economic development.

Health: Digital payment and transaction most importantly health-wise prevented the spread of the virus in the Covid-19 pandemic era by encouraging virtual and remote transactions as a means of distributing funds, remittances to households and firms. In addition, substantial remittances from foreign countries cushions falling domestic incomes (Malmendier, 2009). Therefore, measures to educate, nudge and push consumers to embrace fintech and innovation are likely to accelerate economic development (Ratna Sahay et al, 2020).

2.4.4. International Trade and Finance

Reduction in The Volume of Documents: Fintech does help reduce both the volume of documents and thus the flow of documents in trade transactions are streamlined. Digitalized form of trade compared to the traditional form of trade is more transparent since all transactions are kept on a blockchain with a great sense of security due to the real-time visibility of transactions. The systematic and increased structural and documentary efficiencies are key for importers and exporters to efficiently carry out trade with reduced risks and issues of fraud as well double-spending issues with mostly a deterrent to trade but transpire positively on economic growth (Hilbert, 2016)

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Multi-Currency Trade: In history, the option of multi-currency trade was only available to large multinational companies which had an international network with extremely high charges but the current fintech innovation have developed platforms that support multi-currency which serve as a great option even for smaller companies. This same enhance trade and investment growth locally and internationally (Bhattacharya, 2021). Thus, the era where traders would have to open a foreign bank account is over which was both expensive and time-consuming. The trader can now move their money from one currency to another at a reasonable charge and less or no hassle compared to the old international banking regulations in the past (Jeremy, 2018).

Digitization of Trade: The modern blockchain platform offers the opportunity to increase the protection and transaction volume between sellers and buyers while reducing the associated banking costs. Several fintech companies have used these approaches and are committed to the long-term goal of building a global paperless business environment. For these returns to be available to global merchants, all actors in the supply chain must accept this acceptance at a time when they all support as a step towards this cashless future (Luc Soete, 1987). traditionally, export and import appear to be time-consuming and hectic due to the bottlenecks surrounding the long list of clearance and payments. It takes at least ten working days to complete a process in the traditional bank trade finance on the normal which can even surpass depending on the geographical and persisting economic situation in a particular country. On the contrary, the incorporation of fintech in international trade greatly reduces the time, reduce the cost incurred with drastically few steps involved (Kher & Xu, 2017)

CHAPTER III

THE IMPACT OF FINANCIAL TECHNOLOGIES AND INNOVATION ON ECONOMIC GROWTH: THE CASE OF GHANA

3.1. Literature Review

Financial technology (fintech) has been one of the most important discoveries in the financial industry over the years, and it has been developed at a quicker speed with its backbone being information technology and favorable regulations (Lee et al 2018). Even though fintech has been around for a while, Brandle and Hornuf (2017) believes that, existing financial institutions that have been around for a long time are slowly but increasingly embracing modern technical technologies. While a large portion of fintech is still autonomous and operates independently, several banks are heavily interested in fintech and have taken the opportunity to acquire fintech companies (Brandle et al 2017).

Table 1.

Empirical review showing the impact of fintech on economic growth

Title	Writer	Objective	Method	Outcome
Mobile financial services and financial inclusion: Is it a boon for savings mobilization , 2017	Shem Alfred Ouma, Teresa Maureen and Muareen Were	To find the impact of mobile money adoption on financial system	Ordinary Least square regression model	Positive effect on economic growth
Impact of digital finance on financial inclusion and growth 2018	Peterson K. Ozili	To examine the impacts of digital finance on growth	Ordinary Least square regression model	Positive impact on economic growth
Emerging financial technological innovation and economic growth in Nigeria, 2019	Okoye Victor, Nwisienyi, Kenechukwu J., Obi Onyeka A	To estimate the relationship between financial technology innovation and Nigerian economy	ARDL error correction methodology	Positive on economic growth
Financial innovation and economic growth: Evidence from Zimbabwe, 2016	Alex Bara, Calvin Mudzingiri	To establishes the causal relationship between financial innovation and economic growth in Zimbabwe	Autoregressive Distributed Lag (ARDL) and Granger causality test	Bi-directional causality also exists after conditionally netting-off financial development
Financial Sector Innovation and Economic Growth in the Context of Botswana(2013)	Hasan, Renzi and Schmiedel	To estimated the relationship between retail payment (technological innovation) and the real economy for 27 EU countries	GMM	The study concluded that there is a positive relationship economic growth and technological innovation.

3.2. Data and Variables

The purpose of this study is to examine how financial technology (Fintech) influences economic growth. In this study, quarterly time –series data from 2011 to 2020 for Ghana was used. The sources of data include the Ghana Statistical service and the Bank of

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Ghana database. An ARDL approach was used to estimate the result in chapter four. GDP is used as a dependent variable, thus economic growth (Beck & Levine, 2004; Beck, Levine, & Loayza, 2000; Ehigiamusoe & Lean, 2018) with a yearly data between 2011 and 2020. The independent variables for financial technology and innovation are E-zwich (biometric payment system), National switch (Gh-link) transaction, Mobile Money transaction, and Automated Teller Machine were used to direct the selection of these variables Okoye (2019), Motsatsi (2016), and Mwinzi (2013). This study will adopt the ARDL approach to estimate the long run and short run parameters of equation (1) and thus the model specification for this approach is as follow:

Y = MM, GHP, ATM (1)

Where Y is Economic Growth, MM, is Mobile Money, ATM is Automated Teller Machine and Point of Sale and GHP is Gh-link and E-Zwich. After transforming Eq. (1) into a linear form, it can be represented as follows:

$$lnY_t = \beta_1 lnMM_t + \beta_2 lnGHP_t + \beta_3 lnATM_t + \epsilon t \quad (2)$$

Where Y is Economic Growth, MM, is Mobile Money transaction, GHP represents total E-zwich and Gh-link transaction ATM for total ATM and POS transaction. The model above has got coefficients, β1 to β3 representing long-run elasticity, and ϵt is also termed as the error correction term. Nevertheless, Eq. (2) can only characterize the long-run effect on economic growth from an independent variable. A cointegration test is used to determine the model's long-run cointegration and short-run elasticities. Several cointegration experiments and methods have been used in recent decades, including Johansen and Juselius (1990), Johansen (1998, 1991, 1995), Engle and Granger (1987), and Johansen (1998, 1991, 1995), both of which are based on residuals and use maximum probability test approaches. Previous models have limitations in terms of the order in which variables were integrated. Pesaran and Shin (1998) proposed a new cointegration model with greater traceability and flexibility in the vector integration order I (0) and/or I (0). Pesaran et al. (2001) and Narayan (2001) expanded on this idea (2004). Furthermore, by a linear transformation, the error correction expression may be a derivative of ARDL. As a result, Eq. (2) can be rewritten in ARDL form as follows:

$$\Delta lnY_t = \alpha_0 + \sum_{i=1}^{n} \mu_1 \Delta lnY_{t-i} + \sum_{i=0}^{n} \mu_2 \Delta lnMM_{t-1} + \sum_{i=0}^{n} \mu_3 \Delta lnGHP_{t-1} + \sum_{i=0}^{n} \mu_4 \Delta lnATM_{t-1} + \gamma_0 lnY_{t-1}$$

3)

where Δ is the first difference sign, and the coefficients are represented from μ1 to Additionally, α0 stands for the constant term. The comparison between the essential value and the f-statistic is used to decide if the theory should be accepted or rejected. To make a definitive argument about cointegration, researchers used the essential value suggested by Narayan (2004), and Narayan and Narayan (2005). If the f-statistic is above the upper limit of the critical value, it indicates that the variables in question have a high prevalence of long-run relationships.

Finally, in the case of Eq. (3), the coefficients designated from μ1 to μ4 indicate short-run elasticities, and the coefficients of γ0 to γ4 indicate long-run elasticities in the model.

CHAPTER IV
RESULTS

4.1. Descriptive Statistics

Table 2.
Descriptive Statistics

	LNY	LNMM	LNGHP	LNATM
Mean	24.21743	10.91646	14.52183	9.789796
Median	24.20782	10.96702	14.60309	9.796704
Maximum	24.48790	12.05043	15.33266	10.53074
Minimum	23.81869	9.875993	13.52968	8.886962
Std. Dev.	0.170685	0.633530	0.589883	0.519861
Skewness	-0.490637	-0.035345	-0.217946	-0.155645
Kurtosis	2.784692	1.702818	1.566786	1.565086

Note: LNY=log(GDP) LNMM= log (Mobile money) LNGHP= log (Gh-link and E-zwich) LNATM= log (Automated Teller Machine and POS)

For the research period, the aggregate average mean of GDP was 24.21, for mobile money was 10.91, GHP was 14.52, and 9.78 for Automated Teller Machines. The least and highest values of all the variables are illustrated by the minimum and maximum values shown. The symmetrical normal distribution of the variables also shows that all the variables were negatively skewed. The probability value of Jarque-Bera established that all the variables are normally distributed. the lag selection criteria where the AIC was used at fixed lag of 5 for the model.

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Table 3.
VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	123.9580	NA	1.24e-08	-6.854742	-6.676988	-6.793382
1	261.7887	236.2812	1.18e-11	-13.81650	-12.92773*	-13.50969*
2	275.0755	19.74035	1.44e-11	-13.66146	-12.06167	-13.10921
3	287.1911	15.23103	1.99e-11	-13.43949	-11.12869	-12.64180
4	303.6536	16.93292	2.38e-11	-13.46592	-10.44410	-12.42279
5	342.2837	30.90406*	9.64e-12*	-14.75907*	-11.02623	-13.47050

4.2. Unit root tests

The prerequisites for the application of ARDL are that all regressors must either be I (0) or I (1). So, before the ARDL model estimation, ADF unit root test are applied to find out the existence of stationarity properties in the sequence. The appropriate lag is selected according to the AIC criterion. In all variables, the maximum lag is taken as 5.

Table 4.
Unit Root Tests

	Level			**First Difference**		
	Trend and constant	**Constant**	**None**	**Constant**	**None**	
lny	-2.80	0.29	1.79	-2.75*	-2.26**	I(1)
lnmm	-2.08	0.05	5.04	-5.85***	-1.11	I(1)
lnghp	-1.56	-109	4.60	-6.22***	-4.33***	I(1)
lnatm	-1.33	-0.95	5.68	-6.23***	-1.75*	I(1)

Note: *** significance at 1% level; ** significance at 5% level; * significance at 10% level.

4.3.1. ARDL Bounds test

The study uses the ARDL model cointegration approach by y Pasaran and Shin (1999), with was used to determine the long run relationship variables as shown in equation (2). ARDL method has widely been acceptable since it has numerous significant advantages like being applicable to all regardless of series I (0), I (1), or variables that are mutually cointegrated (Oskooee, & Oyolola, 2007). Secondly, the ARDL approach can obtain comprehensive group of lags. It is notably known for its common-to-particular technique. When economic growth (Y) is used as the dependent variable, the F-statistics F= 11.824, which is greater than the 1 percent threshold of importance value which exceeded the corresponding upper bound at the 1% significant level. F-statistics had no serial correlation at orders 1 and 5, respectively. '*', '**' and '***' denote significance at 0.01, 0.05 and 0.10 levels, respectively. We can see that the best model with no serial correlation problem is the one that uses 1 lag lengths for the ARDL equation.

Table 5.
Bounds Test Results

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	11.824	10%	2.37	3.2
		5%	2.79	3.67
		1%	3.65	4.66

Note: No serial correlation '*', '**' and '***' denote significance at 0.01, 0.05 and 0.10 levels, respectively

4.3.2. The Short-run and Long-run estimation

MM and ATM were all statistically significant at 10% significance level and GHP at a 5% level. Specifically, a 1% increase in Mobile money transaction and ATM together with PoS increases economic growth by 0.65% and 0.77% respectively. Contrarily, a 1% increase GHP, decrease economic growth by 1.16%. Therefore, we need Gh-mobile money and ATM for economic growth. For any policy design to enhance economic growth, the variables must be incorporated. Since quarterly data were used, the maximum number of lags in the ARDL was set equal to 5 which was decided on the basis of AIC criterion. '*', '**', and '***' denotes that the variable is of stationary form.

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Table 6.
Long Run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNMM	0.655872*	0.223844	2.930047	0.0126
LNGHP	-1.164969**	0.307579	-3.787546	0.0026
LNATM	0.770372*	0.298157	2.583781	0.0239
C	26.60554	1.170166	22.73654	0.0000

Note: *** significance at 1% level; ** significance at 5% level; * significance at 10% level.
This implies that MM, ATM, GHP were statistically significant in the long run where ATM and MM had a positive impact on economic growth, and GHP a negative effect. The error correction term -0.43 is statistically significant at the 1% level with a negative coefficient using the AIC criteria.

Table 7.
Estimated short run coefficient using the ARDL approach

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNY(-1))	-0.230216	0.112893	-2.039235	0.0641
D(LNY(-2))	-0.421398	0.094631	-4.453061	0.0008
D(LNY(-3))	-0.217266	0.083500	-2.602002	0.0231
D(LNY(-4))	-0.299400	0.085526	-3.500695	0.0044
D(LNMM)	0.059408	0.027511	2.159397	0.0518
D(LNMM(-1))	-0.171178	0.035023	-4.887577	0.0004
D(LNMM(-2))	-0.091229	0.044250	-2.061695	0.0616
D(LNMM(-3))	-0.130618	0.040234	-3.246459	0.0070
D(LNMM(-4))	-0.064663	0.041670	-1.551799	0.1467
D(LNGHP)	-0.057691	0.033052	-1.745475	0.1064
D(LNGHP(-1))	0.324979	0.042175	7.705527	0.0000
D(LNGHP(-2))	0.281588	0.040598	6.936058	0.0000
D(LNGHP(-3))	0.166264	0.041203	4.035249	0.0017
D(LNATM)	0.019608	0.048189	0.406909	0.6912
D(LNATM(-1))	-0.311219	0.060041	-5.183421	0.0002
D(LNATM(-2))	-0.322509	0.052637	-6.126976	0.0001
D(LNATM(-3))	-0.215345	0.063955	-3.367148	0.0056
D(LNATM(-4))	-0.250472	0.055015	-4.552803	0.0007
CointEq(-1)*	-0.430948	0.047862	-9.003917	0.0000

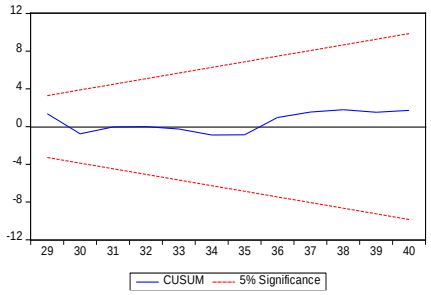
Note: ***, ** and * denote level of significance at 1%, 5% and 10% respectively.
ECT: Error Correction Model

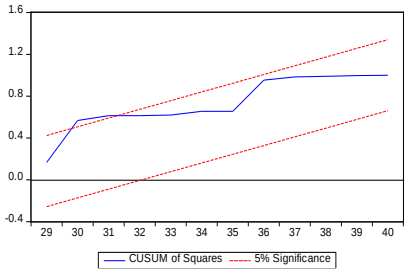
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Table 8.
Diagnostic Table

Diagnostic Test	P-value (P)	stats	Sig. (S)	Null Hypothesis (H0)	Decision Criteria	Result
LM Test	0.4457	1.080	0.05	No Serial Correlation	Reject H0 if P<S	No Serial Correlation
ARCH	0.8889	0.020	0.05	No Heteroscedasticity	Reject H0 if P<S	No Heteroscedasticity
J-B Normality Test	0.3112	2.33	0.05	Normally distributed	Reject H0 if P<S	Normally Distributed.
CUSUM						Model is Stable
CUSUMSQ						Model is Stable
RR	0.871648		0.05	Does not suffer from omitted variables		

From the Table 8, the diagnostic test results are presented. It shows clearly that the estimated ARDL model is free from the above mentioned econometrics problems since the probability values are greater than 0.05. Additionally, the result is also not spurious which is confirmed by the negative and statistically significant error correction term and the existence of long term cointegration. Thus, the cointegration equation does not exhibit serious deviation from the mode as mention by Pesaran (1974). The CUSUM and CUSUMSQ test also verified the model structure and F-statistics, demonstrating the model's precision and certainty in prediction. Finally, the modified R-squared revealed the model's potential to describe variance; the proposed model for Ghana could explain 87 percent of the variance.





CHAPTER V
CONCLUSION AND POLICY RECOMMENDATION

The bounds tests revealed long-run cointegration between financial technology and innovation and Ghana's economic growth. Beck et al. (2014), Mwinzi (2014), Qamruzzaman, and Jianguo (2014) all agree with the findings. In the case of MM and ATM, there was a positive effect on economic growth due to the low commission charge and less cost of transaction. Government workers and pensioners in the rural areas especially benefit extremely due to its reliability but dwellers have got low service paid jobs thus, low wages and salaries. Supermarkets, stores, and companies started accepting ATM cards for payment with less ease and high efficiency. International trade and intra-national trade were smoothly enhanced in the minimum amount of time. Ghana's economy has progressed financially over the last ten years as a result of the introduction of enhanced and advanced financial assets and services through financial innovation. Financial innovation, according to Merton (1992), is the catalyst that drives financial processes to improve the efficiency of real economies for a more bearable and prosperous future. Therefore, commission and high-interest rate charges should not be set by telecommunication firms to allow individuals to use mobile money accounts for education, transport, and even remittances which allows foreigners or nationals residing in foreign countries to send funds to the wards and relatives in Ghana.

Financial technology and innovation, according to Chou and Chin (2011), raises the amount of financial product variability while also promoting well-organized financial markets, resulting in financial development-led economic growth.

REFERENCES

1. *Abeliansky, Ana & Hilbert, Martin. (2016). Digital technology and international trade: Is it the quantity of subscriptions or the quality of data speed that matters? Telecommunications Policy. 41. 10.1016/j.telpol.2016.11.001.*
2. *Adhinegara et al. 2018 INDEF Monthly Policy Brief Fintech Lending Dalam Ekonomi Indonesia*
3. *Asamoah et al 2019 Examining The Effect of Mobile Money Transfer (MMT) Capabilities On Business Growth and Development Impact*

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 8 | August 2024 - Peer Reviewed Journal

4. *Azizah, U. S. & Choirin, M. (2018). Financial innovation on Zakat distribution and economic growth. International Conference of Zakat 2018 Proceedings,ISSN: 2655 – 6251, 31 – 42. Retrieved from https://www.iconzbaznas.com/submission/index.php/proceedings/article/download/115/62/*
5. *Bahmani-Oskooee M, & Oyola (2007) How sensitive are Britain's inpayments and outpayments to the value of the British pound. J Econ Stud 32:455–467.*
6. *Bara A, Mudxingiri C (2016) Financial innovation and economic growth: evidence from Zimbabwe. Invest Manage Finan Innov 13:65–75.*
7. *Barbara Brandle, Lars Hornuf (2017), Where Did Fintechs Come from, and Where Do They Go? The Transformation of the Financial Industry in Germany after Digitalization*
8. *Beck T, Levine R (2004) Stock markets, banks, and growth: panel evidence. J Bank Financ 28:423–442.*
9. *Mwinzi DM (2014) The Effect of Financial Innovation on Economic Growth in Kenya. (Master of Business Administration). Kenya: University of Nairobi (D61/ 60882/2013)*
10. *Beck T, Senbet L, Simbanegavi W (2014) Financial inclusion and innovation in Africa: an overview.*
11. *Beck T. (2010) Financial Development and Economic Growth: Stock Markets versus Banks? Africa's Financial Markets: A Real Development Tool. Tilburg University.*
12. *Beck, T., and R. Levine. 2004. Stock markets, banks and growth; Panel evidence. Journal of Banking and Finance 28 (3):423–42.*
13. *Beck, T., R. Levine, and N. Loayza. 2000. Finance and the sources of growth. Journal of Financial Economics 58 (1):261–300.*
14. *Ouma, S.A., Odongo, T.M. & Were, M., 2017, 'Mobile financial services and financial inclusion: Is it a boon for savings mobilization?', Review of Development Finance 7(1), 29–35. https://doi.org/10.1016/j.rdf.2017.01.001*
15. *Belleflamme, Paul & Lambert, Thomas & Schwienbacher, Armin. (2013). Individual Crowdfunding Practices. Venture Capital. 15. 10.2139/ssrn.2151179.*
16. *Brockner, J., Higgins, E. T. & Low, M. B. (2004). Regulatory focus theory and the entrepreneurial process. Journal of Business Venturing, 19(2), 203-220.*
17. *Chikako Et Al. 2020 Fintech in Europe: Promises and Threats*
18. *Chin, M.S. & Chou, Y.K. (2011). Financial Innovations and Endogenous Growth.*
19. ***De Reuver M, Sørensen C, Basole RC, 2017. The Digital Platform: A Research Agenda. Journal of Information Technology. 2018;33(2):124-135. doi:10.1057/s41265-016-0033-3***
20. *Demirgüç-Kunt, L Klapper, D Singer, S Ansar and J Hess, The Global Findex Database 2017 – measuring financial inclusion and the fintech revolution, World Bank Group, April 2018*
21. *Emmanuel Kwablah Apiors and Aya Suzuki 2018 Mobile Money, Individuals' Payments, Remittances, And Investments: Evidence from The Ashanti Region, Ghana*
22. *Himanshu Kher, Yang Xu 2017 Closing the trade finance gap citigroup inc.*
23. *In Lee (2018), Yong JaeShin Fintech: Ecosystem, business models, investment decisions, and challenges.*
24. *Jeremy Thomson-Cook 2018 Fintech facilitates seamless international payments https://www.tradeready.ca/2018/topics/international-trade-finance/fintech-facilitates-seamless-international-payments/*
25. *Johane Moilwa Motsatsi (2016) Financial Sector Innovation and Economic Growth in the Context of Botswana*
26. *Johane Moilwa Motsatsi, 2016. "Financial Sector Innovation and Economic Growth in the Context of Botswana," International Journal of Economics and Finance, Canadian Center of Science and Education, vol. 8(6), pages 291-291, June.*
27. *Johansen S (1991) Estimation and hypothesis testing of Cointegration vectors in Gaussian vector autoregressive models. Econometrica 59:1551–1580.*
28. *Johansen S (1995) Likelihood-based inference in Cointegrated vector autoregressive models. Oxford University Press, Oxford.*
29. *Johansen S (1998) Statistical analysis of co integration vectors. J Econ Dyn Control 10:231–254.*
30. *Johansen S, Juselius K (1990) Maximum likelihood estimation and inference on Cointegration – with applications to the demand for money. Oxf Bull Econ Stat 51:169–210.*
31. *Lambert, T. and Schwienbacher, A. (2010) An Empirical Analysis of Crowd-funding.*
32. *Luc Soete, 1987. The impact of technological innovation on international trade patterns: The evidence reconsidered, Research Policy*
33. *Omarini, Anna (2017): The Digital Transformation in Banking and The Role of FinTechs in the New Financial Intermediation Scenario. Published in: International Journal of Finance, Economics and Trade (IJFET) , Vol. 1, No. 1 (22 October 2017): pp. 1-6.*
34. *Megha Bhattacharya 2021 Currencycloud and CrescoFin to offer FX and multi-currency ewallet*
35. *Merton RC (1992) Financial innovation and economic performance. J Appl Corp Finance 4:12–24.*
36. *Mulligan, N. 2015. "5 African Crowdfunding Startups to Match." http://disrupt-africa.com/2015/11/5- african-crowdfunding-startups-to-watch/*
37. *Deloitte, 2016 Fintech Trends in 2016 An extract from Australian Mortgage Report 2016*
38. *Narayan et. al, 2019 A survey of Islamic banking and finance literature: Issues, challenges and future directions.*
39. *Narayan PK (2004) Reformulating critical values for the bounds F-statistics approach to Cointegration: an application to the tourism demand model for Fiji. Monash University, Australia, pp 1–40.*
40. *Narayan S, Narayan PK (2005) An empirical analysis of Fiji's import demand function. J Econ Stud 32:158–168.*
41. *Okoye Oko, Anambra State, Nwisienyi, Kenechukwu J. Oko, Anambra State, Nigeria Obi, Onyeka Emerging Financial Technological Innovation and Economic Growth in Nigeria, 2019.*
42. *Paripunyapat, D. & Kraiwanit, T. (2018). Financial technology acceptance in Bangkok metropolis and vicinity. Review of Integrative Business and Economics Research, 8(3), 54 – 60. Retrieved from http://buscompress.com/uploads/3/4/9/8/34980536/ riber_8-3_04_s16-031_54-60.pdf*

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 8 | August 2024 - Peer Reviewed Journal

43. *Pesaran HH, Shin Y (1974) Generalized impulse response analysis in linear multivariate models. Econ Lett 58:17–29.*
44. *Pesaran MH, Shin Y, Smith RJ (1999) Bounds testing approaches to the analysis of level relationships. J Appl Econ 16:289–326.*
45. *Peterson K. Ozili, Impact of digital finance on financial inclusion and stability, Borsa Istanbul Review, Volume 18, Issue 4, 2018*
46. *Qamruzzaman M, Jianguo W (2014) Financial innovation and economic growth in Bangladesh. Financ Innov 3:19.*
47. *Ratna Et Al 2020 The Promise of Fintech Financial Inclusion in The Post Covid-19 Era Monetary and Capital Markets Department Safaricom Limited Annual Report 2016*
48. *Xiang Deng, Zhi Huang and Xiang Cheng 2019 Fintech and Sustainable Development: Evidence from China Based On P2p Data*
49. *Yong Jae Shin and Yongrok Choi 2019 Feasibility of The Fintech Industry as an Innovation Platform for Sustainable Economic Growth in Korea*