

The Role of Fintech Payment Instruments in Improving Financial Inclusion

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Abstract: This study examines the role of Fintech payments instruments in evolving accounts ownership as- a master indicator of financial inclusion; to determine if their effectiveness differs according to the different income levels of countries. The sample of the study consists of a panel of twenty-two countries over the period 2010-2020. The database is gathered from the Global Findex; 2021 edition of World Bank. The account ownerships are regressed on Fintech instruments using (FMOLS) method. The results had shown a significant effect of digital remittances, debit and credit cards; and macroeconomic indicators on financial inclusion, in high and middle-income countries, indicating that Fintech payment instruments had been accelerated financial inclusion, but with different levels due to the variation in technological developments and low level of financial literacy. An insignificant effect of the S&P indicator across varying income countries had shown the need for more attention to Fintech and financial literacy to accelerate financial inclusion. In addition to that, countries should work to develop and strengthen of the communication and information infrastructure especially, in developing countries, in order to activate the role of financial technology.

Keywords: Fintech payment instruments, Financial literacy, Account ownership, Financial inclusion, Economic development.

1 Introduction

The improvement of world sustainable economic development is accomplished through progressing financial inclusion (FI) [1]. Financial technology (Fintech) is considered as a basic intermediary to improve FI by escalating access to efficient payment services to underserved individuals [2]. The contribution of Fintech payment instruments in financial sectors has been growing at a steady rate due to Fintech disruption since the global financial crisis (2008). This takes more attention to their contribution to financial inclusion, and their possibility of providing digital funds transfers through accounts as well as financial platforms, but the breaks are mixed with many barriers and challenges based on financial literacy levels [3].

The World Bank's financial inclusion support framework on financial inclusion empowers policymakers to robust digital inclusion for the underserved people. In addition to that a vast majority of governments and donors funding, such as UNICEF, USAID, and UN are providing and leveraging funds digitally to beneficiaries through Fintech instruments. Digital payments services achieve greater financial access and provide governments with more efficient and transparent ways of disbursing benefits like pensions and social welfare schemes.

This research examines the role of Fintech instruments on transaction account ownerships, as a master indicator of FI across different levels of income per capita countries, with more attention on how their role in improving FI might differ due to the variation in technological developments, and the range of reach to the unbanked individuals. In more specific terms, this study benchmarks FI variations, and how adults in different income level countries use digital financial services to manage their financial transactions through various digital payment methods to find out their role in enhancing FI. In addition to that, the study examined the financial illiteracy (the degree of secure use of financial instruments) as a barrier

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that might limit financial inclusion. It defines financial inclusion by estimating the percentage of accounts ownerships, within banks and non-bank financial institutions, either by traditional way or through mobiles applications, the Fintech instruments are digital remittances, credit and debit cards. S&P Global Market Intelligence [4] is also employed as a division of S&P global to estimate financial literacy that might deepen financial inclusion.

Since the 1990s, a Fintech disruption appeared, with the arrival of the Internet. The digital infrastructure has been widely spread Fintech services after the 2008 crisis, tolerating to be used directly with customers through smart phones. The new technologies like artificial intelligence and block chain have been improving financial inclusion by permitting undeserved individuals to access financial services by providing safe and quick payment methods like online application, wallets, and platforms [5]. Several empirical studies are conducted to analyze the role of Fintech payment instruments to achieve financial inclusion; through easy access to savings accounts by technologies, that increase productivity, income, and consumption [3]. Applying software and algorithm operations had improved financial inclusion by easy access to financial services, and satisfaction of economic units' financial needs [6]. With Fintech payments services like contactless debit cards by a retail bank, increase the access of poor digitally included individuals to this payment technology resulted in a significant increase in the use of debit cards for small value payments [7].

Digital financial services typically consist of three main components: a platform, retail agents, and the use of devices such as mobile apps by customers and agents to conduct transactions through the platform [8], [9]. In addition, Fintech should enhance social welfare [10], and improve businesses with formal bank accounts to complete multiple financial transactions. Nevertheless, the predictable benefits of Fintech are appreciated if the transaction cost of providing digital financial services is around zero [11].

Recent studies have discussed the benefits of Fintech payment instruments in improving FI through COVID-19 response payments [12]. A study by the World Bank found that digital payment systems were effective in delivering social benefits quickly and securely [13]. Within 25 days, around 2 million transaction accounts were opened digitally to allow workers to receive their payments [14].

Regulatory technology (Regtech) solutions like KYC and KYD and data privacy are considered an important matter to achieve FI via digital payments [15], [16], [17]. Furthermore, to state challenges, users need authorities to understand and test Fintech innovations in order to ensure that consumer protection and other legal and regulatory frameworks address potential risks [18],[19].

It is worth noted that individuals in emerging markets may not be active users of financial services due to a lack of trust and confidence in new technologies, this hindered the success of a digital financial inclusion program in emerging and developing countries.

Although digital payment finance and financial inclusion have brought many benefits, they have not reached significant portions of the population (Summit, 2013), indicating a gap in the availability, effectiveness, and adoption of these financial options.

Financial literacy (knowhow and which of financial tools to use) is considered as a central factor to accelerate digital inclusion [20], [21] suggested by survey only 18 percent of bank account holders, actively used it, because they do not trust the bank service, and expensive drawing fees. Individuals with strong financial skills will be more willing to have savings for the future. At the same time, financial illiteracy considers a significant barrier to both users and providers of financial services [22]. S&P Global FinLit Survey (2013) estimated the financial literacy across the world, it was estimated financial literacy with questionnaires evaluating elementary awareness of basic parts in financial decision-making process like knowledge of risk diversification. The survey found only 1:3 adults are financially literate across different income levels, with a high variation among countries; suggests that adults who have and use formal financial services, tend to have higher financial literacy regardless of their income level. Higher financial literacy may lead to wider financial inclusion, as using financial accounts and credit can also improve consumers' financial skills. On the other hand, most common barriers to using bank accounts were high costs, physical distance, and lack of proper documentation [23].

A stable macroeconomic environment is important for the healthy performance of the financial sector [24], [25]. The main macroeconomic indicators like GDP can have a significant impact on financial inclusion (FI). Previous studies have found that inflation can have a negative, nonlinear effect on finance, with an inflation threshold beyond which the relationship between finance and growth deteriorates rapidly like [12], [26], [27].

[28] investigated the effect of Fintech in FI by using Global Findex data, they find that Fintech had improved and accelerated FI, with no impact on gender gap.

There were previous studies that employed Findex data of the world bank, to analyze the levels of financial inclusion, effect of digital payments, and barriers of financial inclusion. Those studies include (Abu-AlSondos et al., 2022; Demirguc-Kunt ,2012; Qushtom et al., 2023; Klapper,2013; NCaamara, 2014; Demirguc et al., 2016; Marei et al., 2023;

MK Jukan · 2016 and Huong Nguyen,2021) [28], [29]. The implication from these studies is that poor, low-income and illiterate individuals benefit proportionately from financial inclusion. This study examines the role of Fintech payments products and services in improving financial inclusion. It is contributed to growing literature examining the role of Fintech payment instruments on the growth of transaction account ownerships as a master indicator of FI. Both concepts of financial inclusion and digital payments are relevant to this review.

To carry out the analysis, the annual Findex data is collected of 22 different income levels countries, during the period 2010-2020 to compare improvements across different income level countries due to differences in Fintech disruption and financial literacy.

The main assumptions in this study are that financial inclusion improvement might be based on Fintech payment instrument development and financial literacy, which are assumed to be differed across different income level countries. However, practically there are reliable differences across different income countries due to the effectiveness of the Fintech payment instruments in banks and non- banks financial institutions, translated into the main hypothesis in the study, as follows:

The dependent variable financial inclusion indicator (AC) transaction account ownership opened with a financial institution or with a mobile-money-service provider, as a percentage of population above 18 years considered as a major and the most relevant measure of financial inclusion to every country. The key financial inclusion indicator used in this study is the most relevant elements to every country that reflects the extension of financial services offered by bank and non-bank institutions, an account can be used to hold money, through deposit or receive payments by electronic cards and remittances. [30], [31], and several world bank group studies; are measured the degree of financial inclusion by maximizing usage and access to formal financial services. Our study is based on the findex data 2021 edition, it employed questionnaires the percentage of adult transaction account ownerships at financial institutions or with a mobile-money-service providers, at a country level. The main question is if the individuals were able to open an account at a bank or another type of formal financial institution, the uses of the accounts, the barriers, and if they could use it by themselves, without the help of another person, this led to the following hypotheses:

H₁: Based on Fintech developments; financial inclusion level varies across different income level countries.

Fintech services (such as digital remittances and crowdfunding) and products (such as prepaid, credit, and debit cards) have been improved access and delivery of money through digital channels. This study selected four Fintech indicators from the Findex 2021 data that affect financial inclusion as follows:

Table 1: Fintech payments explanatory variables

Payment instrument/notation	Measure	Similar studies
Credit cards (CC)	Total number of credit cards users per million	The impact of various digital payments Such as credit, debit, and prepaid cards Lippi and Secchi (2009); Amromin and Chakravorti (2009).
Debit cards & ATMs(ATM)	Automated teller machines (ATMs) (per 100,000 adults)	Bouhdaoui and Bounie (2012); Arango et al. (2015); Bagnall et al. (2016), (Alexander et.al (2017), Demirgüç-Kunt et al. (2018), Lyons, Kass-Hanna, and Greenlee 2020)
Digital remittances (REM)	Log of personal remittances received (in million US dollars)	The effect of remittances on financial development Barajas et al., 2018
S&P500 global market index (S&P)	S&P Equity Index (annual % change)	The S&P Global FinLit Survey (2019)

H₂: Digital remittances, credit cards, point of sales and ATM machines, have accelerated financial inclusion.

H₃: Financial literacy had an insignificant impact on financial inclusion; due to its low level around the world.

H₄: Low and middle-income countries are achieving financial inclusion less efficiently than high-income countries; due to less technological developments, and low level of financial illiteracy.

The study control variables of macroeconomic indicators are used to compare countries. GDP deflator is (nominal GDP/real GDP), and Inflation consumer price index because they are based on prices change of all goods and services and played an important role in economic development, such as a study by [30].

H₅: GDP growth improves financial inclusion by reducing inequality and poverty in any country

H₆: Financial inclusion response negatively to inflation, due to its negative effect on financial sector performance.

2 Methodologies

Current study used a quantitative approach to answer research questions and testing hypotheses. A secondary data was used and obtained from annual data which was collected from 22 different income levels countries. Data was collected during the period 2010-2020 to compare improvements across different income level countries due to differences in Fintech disruption. The database is collected from Global Findex; the 2021 edition –world bank; at which Financial Inclusion is estimated by the number of opened transaction accounts. The global data is arranged in the form of a panel and is analyzed using descriptive statistics, and fully modified least square models / E-views regression analysis. The Fintech digital payment services were chosen with respect to services recommended by international institutions, in a line with [28]. The dependent variable (AC) is the transaction account ownership opened with a financial institution or with a mobile-money-service provider, as a percentage of population above 18 years. The independent variables personal remittances received in current USD, Automated teller machines (ATMs) (per 100,000 adults), number of credit card holders, and S&P Global Equity Indices (annual % change) are proxies' digital payment. The study is also controlled for business cycles by including Inflation consumer prices and GDP deflator, as macroeconomic indicator usually develops in line with the business cycle.

Therefore, the regression models are estimated as follow:

$$AC_{i,t} = \beta_1 REM_{i,t} + \beta_2 ATM_{i,t} + \beta_3 CC_{i,t} + \beta_4 S\&P_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \epsilon_{i,t}$$

Where the *i* subscript refers to a country, and the *t* subscript to a sample year.

The multiple linear regression models were estimated by using E-views 10 software to the data on the impact of Fintech payments services in improving the financial inclusion.

The data then analyzed using fully modified least squares method analysis by random effects panel data analysis. The study is regressed the dependent variables on independent variable using the estimator Panel Fully Modified Ordinary Least Squares (FMOLS) after recommended cointegration test, to solve any data problem. The data obtained was analyzed by use of descriptive statistics and inferential Statistics (statistical analysis and panel multiple regression analysis). Descriptive statistics were used to summarize and profile the status of dependent and independent among 22 countries.

The descriptive statistics are provided data about average accounts across different income levels. Based on the reported tables 2 and 3, the average transaction accounts over the sample were equal to 63.85% about 3.73% higher than the median. There is a fair variation of AC across data, with the highest 90.8%; in contrast, the lowest were equal to 3.51%.

Table 2: Sample central tendency descriptive statistics.

Variable	observations	Mean%	Median%
AC	242	63.85	67.22
REM IN USD	242	7750	7720
CC	242	69.38087	42.45
ATM	242	50.50513	38.62
S&P	242	2.564	2.094
GDP	242	106.2	102.16
INF	242	4.34	3.39

Table 3: spread descriptive statistics.

Variable	Maximum %	Minimum %	SD	kurtosis	skewness
AC	90.800	3.510	28.839	-0.395	1.971
REM IN USD	59500.000	22.530	11600.000	2.516	6.442
CC	385.000	0.060	82.890	1.456	2.619
ATM	93.400	1.770	41.683	0.632	2.647
S&P	94.062	-58.346	22.431	0.468	4.374
GDP	235.886	1.001	34.889	-0.288	6.487
INF	21.350	-14.344	4.506	0.360	5.457

Outputs of tables 2 and 3 indicate that the mean value is a good estimator of variables in the analysis.

The analysis in table 3 indicates a significant variation in financial inclusion within countries due to differences in

technological development. In high-income countries, individuals in the highest 87% of income earners are more than twice as likely to have an account compared to those in the lowest 21%. Table 4 provides a summary of the extent of inclusion, which is measured by the percentage of account holders in the study sample.

Table 4: Average percentage account ownerships.

Income level	year	AC	Income level	AC	Income level	AC
High	2010	83.11	Middle	20.53	Low	27.89
High	2011	83.01	Middle	35.46	Low	28.24
High	2012	86.93	Middle	34.94	Low	34.79
High	2013	86.85	Middle	44.13	Low	36.52
High	2014	86.80	Middle	40.05	Low	39.99
High	2015	86.73	Middle	47.00	Low	46.45
High	2016	86.67	Middle	41.65	Low	50.68
High	2017	86.61	Middle	54.82	Low	56.86
High	2018	86.66	Middle	50.67	Low	52.16
High	2019	86.72	Middle	64.40	Low	60.33
High	2020	86.89	Middle	68.98	Low	63.45

For most governments, FI is considered as a key factor for economic development. To improve it; transaction accounts act as a medium that meet most of customer payment needs efficiently and safety (CPMI, 2016). Figure 1 appears average percentage users of transaction accounts of sample countries.

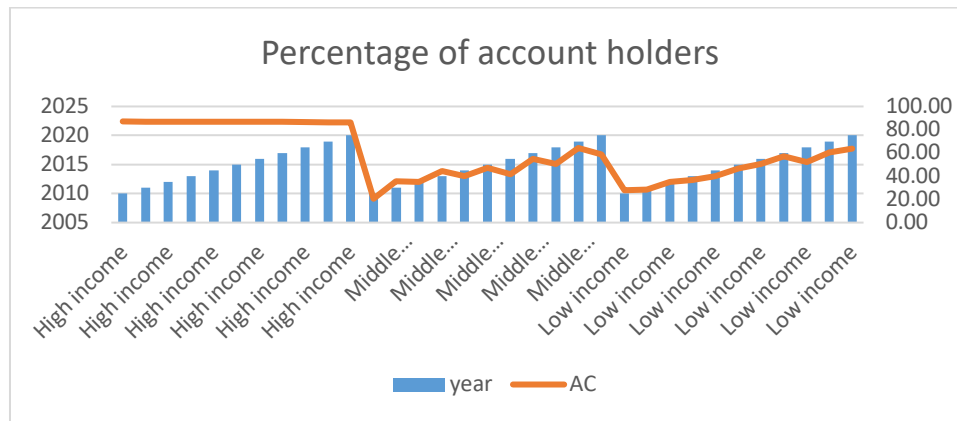


Fig. 1: Average transaction account holders.

According to the above figure there is a clear difference in the level of accounts holders between high, middle, and low-income countries. It also shows an increasing trend in low and middle income, with stable rate compared with high – income countries, especially in the years 2019 and 2020 due to the Corona pandemic, which pushed the vast majority of population to use Fintech applications and services, especially payment technologies. For a deeper analysis, figure (2) exhibits the average percentage of AC across sample countries in relation to average Fintech payment methods, GDP, and inflation. The countries vary in both the level of accounts and use of Fintech services according to income level; the high-income countries as higher users followed by middle, and low respectively.

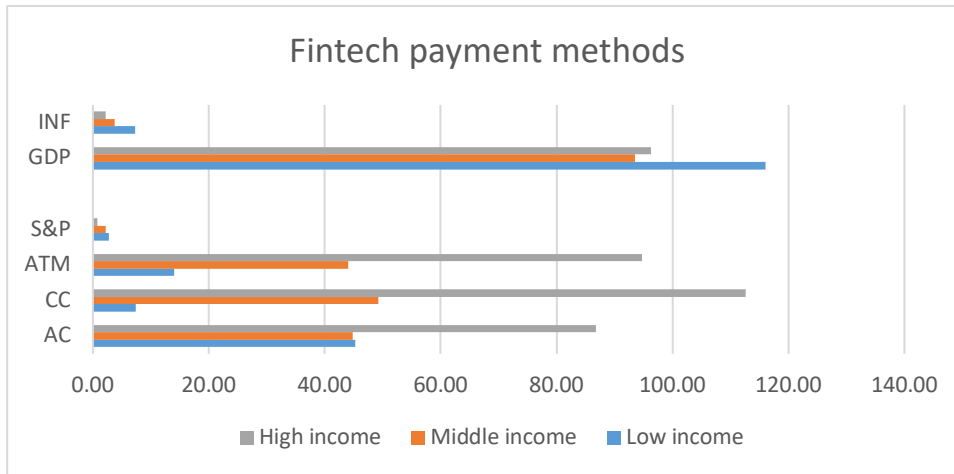


Fig. 2: the use of Fintech payment methods.

The adoption of card-based services like debit and credit cards led banks to deploy more point-of-sale (POS) terminals, replacing traditional "imprinters" that required cards to be swiped every time a cardholder made a payment. Figure 3 displays cards payment development trend for the period (2010-2020) across different income levels.

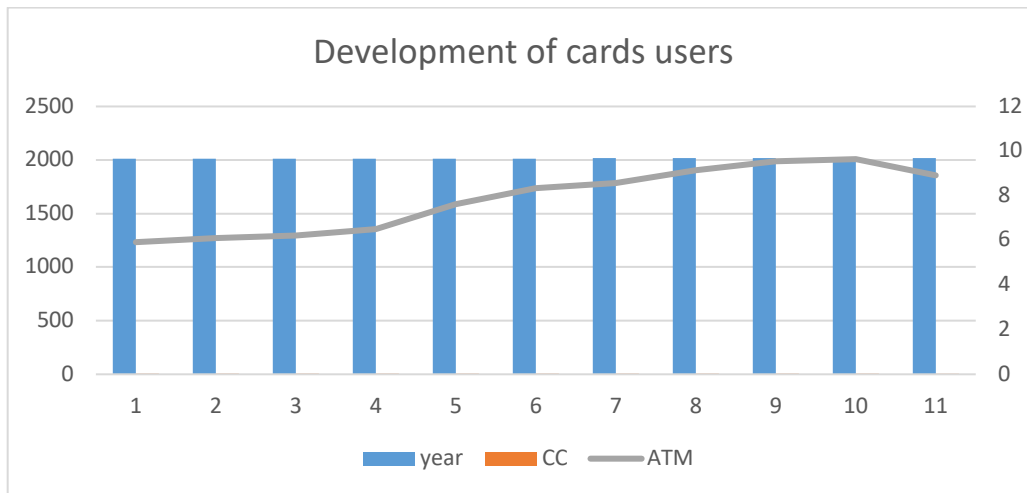


Fig. 3: development of debit cards users (2010-2020).

Fintech payments like digital remittances, point-of sale (POS) payments, ATMs, online banking application and mobile payment services, improve the lives of low-income individuals by allowing governments, companies, and international organizations to make and receive payments in a cheaper, safer, and more transparent way, helping to build more inclusive economies [32].

Table 5: average annual percentage of Fintech service users account transaction.

Income level	AC	CC	ATM	S&P
Low income	45.22	7.36	14.05	2.80
Middle income	44.78	49.1984	44.0875	2.254852
High income	86.75	82.611	94.73245	0.784156

Table (5) shows the average percentage transaction accounts users of Fintech payments. The number of transaction account holders increased as the number of Fintech payment subscribers increased in different income levels countries.

Figure 4 displays the developing trend of Fintech payments for the study sample 2010-2020.

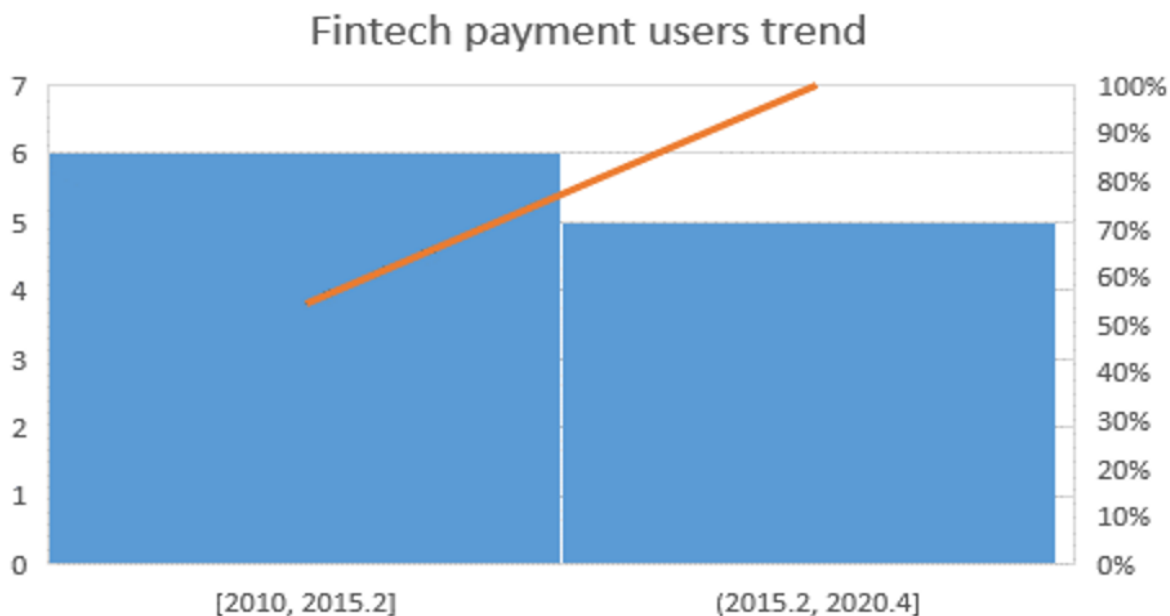


Fig. 4: Fintech payment users’ trend (2010-2020).

Recently, Internet or mobile banking significantly lags behind other modes of transaction all types of accounts, including bank and e-money accounts, are typically accessed and managed through ATMs and online or electronic platforms. Additionally, Robo-advisors are digital tools that offer automated investment strategies for clients. They are designed to improve the experience for individuals who have limited investment knowledge and smaller savings. Fintech instruments might improve the efficiency of transaction accounts and payments through increasing transparency, low transaction commission, and lower market entry barriers. At the same time, these benefits arise with many barriers and risks like cyber-attacks, data privacy, and market concentration.

3 Results

To carry out the role of Fintech payments services in improving the financial inclusion the regression analysis is employed. Cointegration Regressions are built by using fully modified OLS (FMOLS) into the model for this study to examine the role of Fintech services in enhancing financial inclusion, by using data of 22 world countries for the period 2010 to 2020. The analysis of the cointegration regression results was conducted using a significance level of 5%. The significance of the predictor variables in the model was determined by comparing their probability values to $\alpha = 0.05$. A predictor variable was considered significant if its probability value was less than α . The (FMOLS) regression results are provided in the following table.

Table 6: The regression results of sample countries.

Variable	Coefficient	SE	t-statistic	Prob.
REM	6.24	3.04	4.52	0.0011
ATM	1.91	.49	6.58	0.141
CC	2.93	.61	1.48	0.0002
S&P	.018	.067	0.24	0.8138
GDP	.103	.038	2.680	0.0079
INF	-1.6	.6	-3.934	0.0001
R ²	%60.01	Adjusted R ²	%58.99	

The Sample overall regression results of AC showed that REM, ATM, and GDP deflator are statistically significant with positive impact on FI. On the other hand, there is a negative significant relationship between AC with inflation. S&P and CC are statistically insignificant with positive relationship. To find out the effect of Fintech payment methods on FI, the regression is employed for each country’s income levels, as provided in table 7.

Table 7: The regression results of different countries’ income levels.

Low Income	Coefficient	SE	t-statistic	Prob
REM	11.64	7.58	1.536	0.129

ATM	0.57	0.639	0.898	0.372
CC	0.02	0.741	0.023	0.9820
S&P	0.004	0.069	0.057	0.9547
Middle Income				
REM	1.26	6.33	1.996	0.0451
ATM	1.83	0.43	4.276	0.0002
CC	0.81	0.223	3.626	0.0011
S&P	0.002	0.062	0.034	0.97
High Income				
REM	2.69	1.10	2.45	0.0160
ATM	0.25	0.04	6.22	0.006
CC	0.123	0.024	5.25	0.0002
S&P	0.006	0.076	0.089	0.93

The above results indicate that Fintech instruments had significant effect on middle and high-income countries, while insignificant affect in low-income countries. This might refer to the technological differences between developed and less developed countries. The major findings and previous studies' similarity are summarised in table 8. They are consistent with study proposed hypotheses, so we approved all hypotheses as follow:

Table 8: Major findings.

Study findings	Previous studies similarity
1. FI level vary across different income level countries, based on Fintech developments; with deeper effect in high income countries. 2. FI in low and middle-income countries had achieved less efficiently than high-income countries; due to less technological developments, and financial illiteracy.	Sarma and Pais, (2008), World bank (2012), Kendall, Mylenko and Ponce, 2010; and Andrianaivo and Kopdar, 2012), and Demirgüç-Kunt and Klapper (2012).
2. Digital remittances, credit cards, and ATM machines, had accelerated financial inclusion	Sarma and Pais, (2008), World bank (2012), Kendall, Mylenko and Ponce, 2010; and Andrianaivo and Kopdar, 2012), Demirgüç-Kunt and Klapper (2012).
3. Insignificant effect of S&P Global Market index on FI, reflect low level of financial literacy around the world.	Moore (2003), Agnew and Szykman(2005), and Mandell, (2004), and Lusardi and Mitchell (2014).
4. Financial inclusion response negatively to inflation, due to its negative effect on financial sector performance	Miguel et.al, (2018) Bose (2002), Huang et al. (2010), Santos (2014), Khan (2015).
5. GDP growth improve financial inclusion by reducing inequality and poverty in any country.	Kempson (2006), World Bank (2008), Sinclair et.al (2009), Andrianaivo and Kpodar (2011), and Ayyagari et al., (2013).

4 Discussions

The primary finding of this research is that FI level varies across different income level countries, based on Fintech developments; high-income countries had a wider number of transaction accounts ownership lead to a deeper financial inclusion; low and middle-income countries are achieving financial inclusion less efficiently than high-income countries; due to less technological developments, and higher level of financial illiteracy. In all countries, FI response negatively to inflation, due to its negative effect on financial sector performance, and GDP growth improves financial inclusion by reducing inequality and poverty in any country.

Other important findings show that Fintech payment instruments like digital remittances, credit cards, point of sales and ATM machines, have accelerated financial inclusion. S&P Global Market index as country financial literacy indicator; might lead to broader financial inclusion, this means Fintech payment services and products are secure and more control within legal authorities; manifested through flexibility, and ease of use of financial services through account specially Fintech payment services. To be more specific, the governments and other aid agencies were found transferring money within accounts is quicker, and more flexible. Fintech payment services by governments thus serve as a foundation for

Banks and formal telecommunication institutions are provided different DFS through financial wallets, and platforms. The Findex study found that around 75% of adults worldwide use at least one digital payment method, and half of all adults have an individual or joint account at a formal financial institution (World Bank, 2022). These accounts are used for a variety of purposes, such as receiving wages, government allowances, and foreign and local remittances. The study revealed disparities in the use of Fintech products and services across countries, with high-income countries having higher rates of usage compared to middle- and low-income countries, which confirms previous research findings [28], [33], [34].

While the percentage of high- level (developed) countries had been stable since 2010, the less developed countries had witnessed an increasing percentage, especially after the corona pandemic. Fintech makes the financial system more integrated; it also increased the demand for payment by making it easier, cheaper and safer for individuals to access money for activities such as receiving wages from employers and sending remittances to family members. Payment cards also make it easier to pay for goods and services. The regression results of this study indicate a positive significant impact of digital remittances, credit and debit cards on the amount of transaction ownership, which contributes to the global financial inclusion. The widespread availability of low-cost, functional mobile phones and affordable internet access is crucial for expanding digital finance. International organizations concur that a Real-Time Gross Settlement (RTGS) system is an efficient payment infrastructure that can reduce risks for interbank transactions by providing immediate and final clearance of time-sensitive payments on an ongoing basis. Remittance flows are currently used as basic of digital system infrastructure, it could be used to survive individuals out of poverty and provide additional revenue streams for the financial institutions. It is essential for governments and private sector actors to examine ways to expand the impact of financial inclusion through remittances by replicating successful strategies and policies, as depicted in Figure 5.

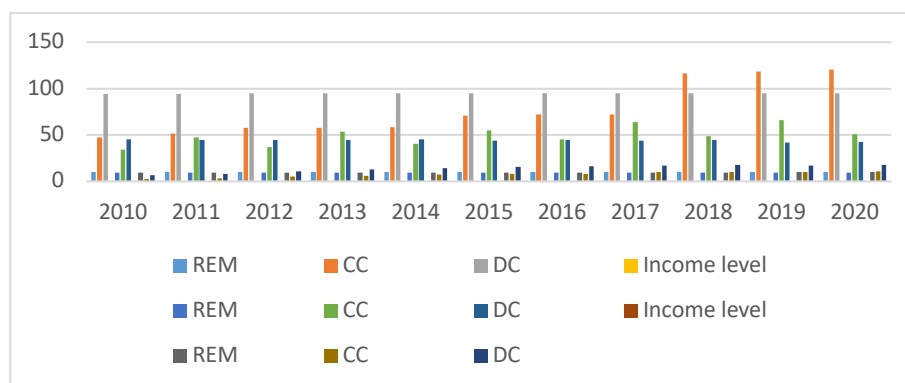


Fig. 5: Developments of Fintech services 2010-2020.

The above figure had shown that digital payments become more extensive and less expensive by providing a wide range of financial services that offer value across the financial and real sectors of the economy. Banks and non-bank financial institutions, commercial and industrial firms, and even individuals can benefit from RTGS services. The services provided by RTGS are key in determining the effectiveness and efficiency of a RTGS system in promoting financial inclusion and economic development, through the management of payment system risks for providers and users of RTGS services, and the ability of the central bank to maintain the stability of the financial system [20].

Financial illiteracy is considered the basic barrier that prevents the use of financial services in the world. FI can be achieved efficiently through knowing how to use digital payment services. Despite several benefits Fintech, their low use, and low acceptance, especially in developing economies, have led to less efficient FI. The use of Fintech services faced critical barriers and need foundations of the provision of it like public and private sector commitment; the legacy and Regtech framework. When digital financial services are implemented, the users should have appropriate skills to know how to use the new technologies securely [36]. Establishing a trust framework to protect rights and data privacy, might make underserved individuals feel more confident and more able to keep up with Fintech developments.

5 Conclusions

The Fintech payment products and services have been accelerated financial inclusion in recent years, through the disruption of how transaction accounts are used. This study examines the role of Fintech payment methods in improving financial inclusion across different income levels countries based on the growth rate of accounts ownership as a major indicator of financial inclusion. The study employed Global Findex data of high-, middle-, and low-income countries for the period (2010-2020). The descriptive analysis of the study has revealed that Fintech payments services are served as financial intermediary in improving financial inclusion of different income levels countries. The fully modified least

squares regression results of transaction account ownerships had shown that digital remittances, debit and credit cards, and GDP are statistically significant with positive coefficient signs in high- and medium-income level countries. On the other hand, S&P as a financial literacy indicator had an insignificant effect on FI, while negative relationships cleared by negative coefficient sign between AC with inflation.

The primary finding of this research is that FI level varies across different income level countries, based on Fintech developments, and wide the number of transaction accounts ownership led to a deeper FI; low and middle-income countries are achieving it less efficiently than high-income countries; due to less technological developments, and higher financial illiteracy. Another important finding shows that Fintech payment instruments like digital remittances, credit cards, point of sales and ATM machines, have accelerated FI. S&P Global Market index had shown insignificant effect and declares the need for more attention to improve financial literacy that might lead to broader FI.

6 Recommendations

The study recommended governments and social development agencies around the world to expand FI through enhancing both Fintech payments infrastructure, and population financial literacy, like providing cloud networks, e-payment platforms, Fintech regulations for many people who still haven't a transaction account.

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Conflicts of Interest Statement

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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