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COMPARING DIGITAL FINANCE IN THE UK, US, INDIA AND NIGERIA

Peterson K. Ozili[1]

Abstract

This paper examines digital finance usage in the UK, US, India and Nigeria. Using data from the global financial development indicators, the findings reveal that the UK and US have higher digital finance usage than India and Nigeria. The US has higher credit card usage compared to the UK while the UK has higher debit card usage compared to the US. Also, Nigeria has higher debit card usage than India. The findings also show that higher debit card usage is correlated with higher domestic credit to the private sector in the US and Nigeria. Higher credit card usage is correlated with lower domestic credit to the private sector, lower private credit by deposit money banks, and fewer remittances to the UK. The implication of the findings is that policy makers in developing countries should develop the digital finance and payment systems in their countries to close up the wide gap in digital finance adoption between developing and developed countries.

[1] Central Bank of Nigeria, Abuja, Nigeria, e-mail: petersonkitakogelu@yahoo.com, ORCID: 0000-0001-6292-1161.

INTRODUCTION

This paper examines digital finance usage in the UK, US, India and Nigeria. Digital finance is defined as financial services delivered through mobile phones, personal computers, the internet or cards linked to a reliable digital payment system (Ozili, 2018). Digital finance can improve access to financial services and instruments when digital finance products and services are easy to use and are offered at a low cost. Innovative digital finance can eliminate or reduce the existing barriers to traditional finance particularly when financial services are delivered through mobile devices and the internet.

Several studies show that Fintech is the product of digital finance innovation (see Philippon, 2016; Nicoletti et. al., 2017; Ozili, 2018; Goldstein et. al., 2019). In recent years, many digital finance applications have emerged. Examples include: Personal Capital, Lending Club, Kabbage, Wealthfront, Varo, Chime and Neo Bank. These applications are used to enhance activities in the stock market, services sector and the banking sector in different countries.

Despite the recent growth in digital finance around the world, the use of digital finance in developing countries is still very low compared to developed countries. One reason for this is the low investment in technological development, illiteracy, lack of government's support for technological advancement, and a general apathy towards technology by individuals with religious and traditional beliefs. Another reason is that developed countries enjoy first-mover advantage in digital finance development, and for this reason, it may take a long time for developing countries to catch-up with developed countries. Another possible reason for the low rate of digital finance adoption in developing countries compared to developed countries is the relatively low level of mobile (smart) phone ownership in developing countries, which makes it difficult for individuals and households in developing countries to engage in banking activities remotely without visiting a physical bank branch.

Making comparison between the UK, US, India and Nigeria is important because these countries represent countries that have substantial differences in technological innovation, economic system and infrastructural development. In the study, the US and UK represent major developed countries, India represents a major emerging country and Nigeria represents a major developing country. The findings show that the UK and US have higher digital finance usage than India and Nigeria. Also, Nigeria has higher debit card usage than India while India has higher credit card usage than Nigeria.

This paper contributes to the digital finance literature

(see, Ozili, 2018, Hasan et. al., 2020; Ketterer, 2017; Ligon et. al., 2019; Rana et. al., 2019). It builds on the work of several authors that investigate the proliferation of digital financial services in the financial sector (Karlan et. al., 2016; Bachas et. al., 2018; Staschen et al, 2018). On the empirical side, this paper uses graphical analyses to analyze the trend in digital finance indicators.

The rest of the study is structured as follows. Section 2 presents the literature review. Section 3 presents the data and methodology section. Section 4 discuss the results. Section 5 concludes.

LITERATURE REVIEW

Prior studies investigate the growth of digital finance in several countries. Zhu et. al. (2016) show that many non-financial companies have rapidly made their way into the financial sector with internet technology.

Kusimba (2018) examines the role of gender in the use of digital finance in Kenya. They show that Kenyan women and men use digital finance to present themselves as connected and trustworthy members of financial groups and collectivities. Babcock (2015) show that digital finance can transform agriculture in developing countries such as Ghana. Buckley and Malady (2015) explore the changing role of digital financial services for financial regulators, and recommend that regulators should focus on building consumer demand through promoting partnership in digital financial services as a means of promoting financial inclusion. They highlight that partnership introduce collaboration risks and heighten consumer risks, and require regulators to adjust their regulatory frameworks to ensure such risks are identified and mitigated.

Ephraim et. al. (2016) show that poor people in Tanzania use emerging mobile payment solutions to send money home, facilitate informal business transactions, pay for bills, or buy pre-paid electricity. They show that most digital accounts are empty and serve mainly as a pass through for such payments.

Weihuan et. al. (2015) argue that there is a need to regulate the development of digital financial services and Fintech, and at the same time, balancing growth and innovation with financial stability. Hasan et. al. (2020) show that mobile payment systems are among the best tools for the development of inclusive finance in China. They suggest that financial sector authorities should give increasing priority to promote innovation and the use of technology to improve inclusive finance and consumer protection.

Ozili (2018) show that digital finance and financial inclusion has several benefits to financial services users, digital finance providers, governments and the economy.

Ozili (2020) also examines the turn from 'microfinance for the poor' to 'digital finance for the poor', and contests the argument that digital finance is pro-poor. He argues that the claim that digital finance can improve development outcomes is based on weak economic logic, and that digital finance is good business only with government support. Ozili (2020) further argue that digital finance will expose the poorest to multiple risks in the financial sector. Ligon et. al. (2019) examine the reasons for the low rates of adoption of digital finance among merchants in Jaipur India with small fixed-location store enterprises. Using survey data for 1,003 merchants, they find that the low rate of adoption of digital payment systems do not appear to be the result of supply-side barriers, but are caused by demand-side factors or taxes. Rana et. al. (2019) show that the main challenges to digital financial services in India are the high cost and low return problem, the risk of using digital services, and lack of trust.

DATA AND METHODOLOGY

DATA

Data for digital finance and financial development were collected from the global financial development indicators of the World Bank. Data was collected for four countries, namely: US, UK, India and Nigeria. The sample period covers the year 2011, 2014 and 2017. Table 1 shows the basis for country selection.

Table 1: Country selection: context and basis

Context	Country	Basis for country selection
Major advanced economy	US, UK	The UK and US are highly developed nations that exert considerable international economic, political, scientific and cultural influence in the World.
Major emerging economy	India	India is the sixth largest and the fastest growing emerging economy in the world, contributing almost 3.2% to world GDP. India has low level of technological development
Major developing economy	Nigeria	Nigeria is the 30th largest economy by GDP volume, and is highly dependent on revenue from crude oil export. Nigeria has low level of technological development

Source: Own work

METHODOLOGY

The method of analysis used in this study is graphical analysis, covariance analysis and correlation analysis. One advantage of graphical analysis is that it shows the individual data points rather than merely summaries. Another advantage of graphical analysis is that information can be compared and it helps for quick understanding. Pearson correlation and covariance analyses were also used in the study to measure the linear association and co-movement among the indicators and across the four countries. Pearson correlation statistic measures the statistical linear association and strength of the association between two variables (Gujarati, 2009). The covariance statistic measures the directional co-movement among two variables, that is, how two pairs of variables move together (Gujarati, 2009). The variables analyzed in the study is shown in table 2.

Table 2: Variable description and data source

Variable	Description	Source of Data
EPP	Electronic payments used to make payments (% age 15+)	Global Financial Development Indicators
PCD	Private credit by deposit money banks to GDP (%)	Global Financial Development Indicators
RGDP	Remittance inflows to GDP (%)	Global Financial Development Indicators
DCP	Domestic credit to private sector (% of GDP)	Global Financial Development Indicators

DC	Debit card (% age 15+). Used for digital payments	Global Financial Development Indicators
CC	Credit card (% age 15+). Used for digital payments	Global Financial Development Indicators

Source: Own work

DISCUSSION OF RESULTS

GRAPHICAL / TREND ANALYSIS

ELECTRONIC PAYMENT USED TO MAKE PAYMENTS

Figure 1 reports the percentage of people that use electronic payment to make payments. As can be observed, the UK and US have a high number of people using electronic payment to make payments. Nigeria has a moderately low number of people using electronic payment to make payments while India has the lowest number of people using electronic payment to make payments. This suggest that developed countries, such as the UK and US, have superior payment systems which facilitate greater digital finance usage through electronic payments compared to developing countries. Also, Nigeria appears to have better payment systems than India.

**Figure 1 : Electronic payments used to make payments (% age 15+)**
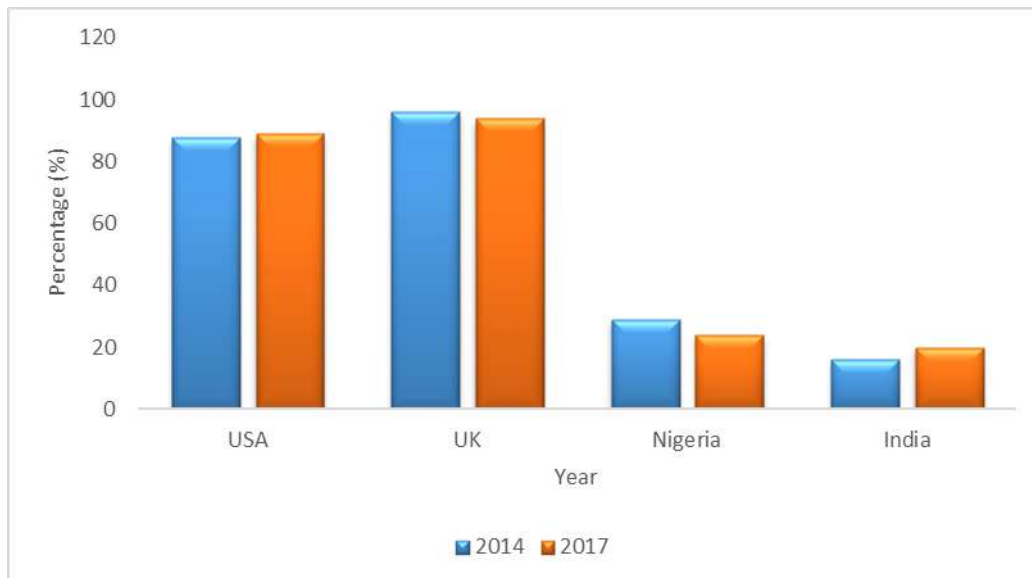
Source: Own work

DEBIT CARD USAGE

Figure 2 reports the percentage of people that use debit card to make cash withdrawals. As can be observed, the UK and US have a high rate of debit card usage compared to Nigeria and India. The UK outperforms the US in debit card usage while Nigeria outperforms India in debit cards usage. This suggest that developed countries such as the UK and US have greater debit card usage which promotes greater access to finance for individuals and households while developing countries have lower debit card usage. One explanation for this result is that developed countries have a first-mover advantage over developing countries in the use of debit card. Debit card were used early in developed countries such as the UK and US while developing countries adopted debit card almost a decade later. Comparing India with Nigeria, figure 2 shows that Nigeria has high debit card usage than India. This might be due to population differences or due to differences in technology diffusion in Nigeria and India.

Figure 2: Debit card usage (% age 15+)
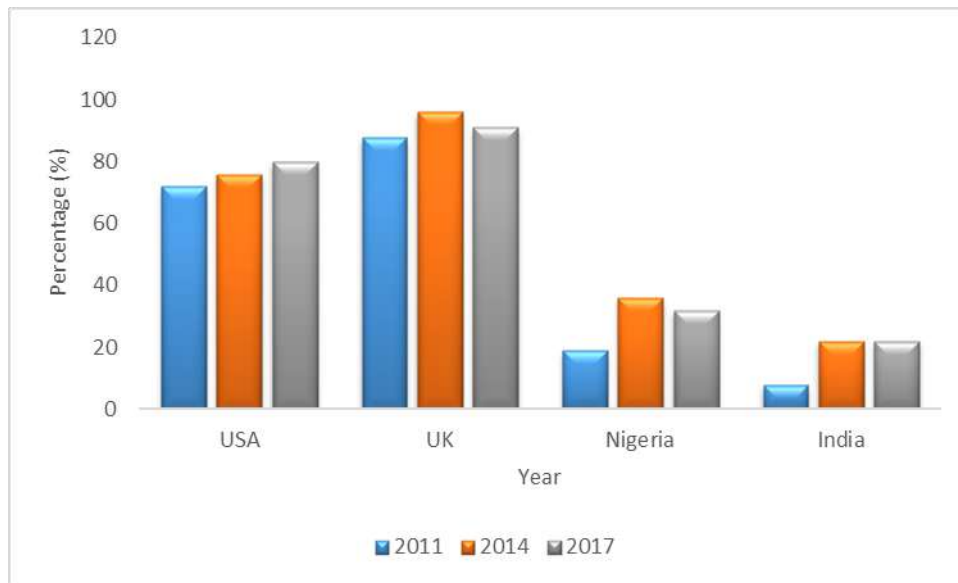
Source: Own work

Figure 3: Credit card usage (% age 15+)
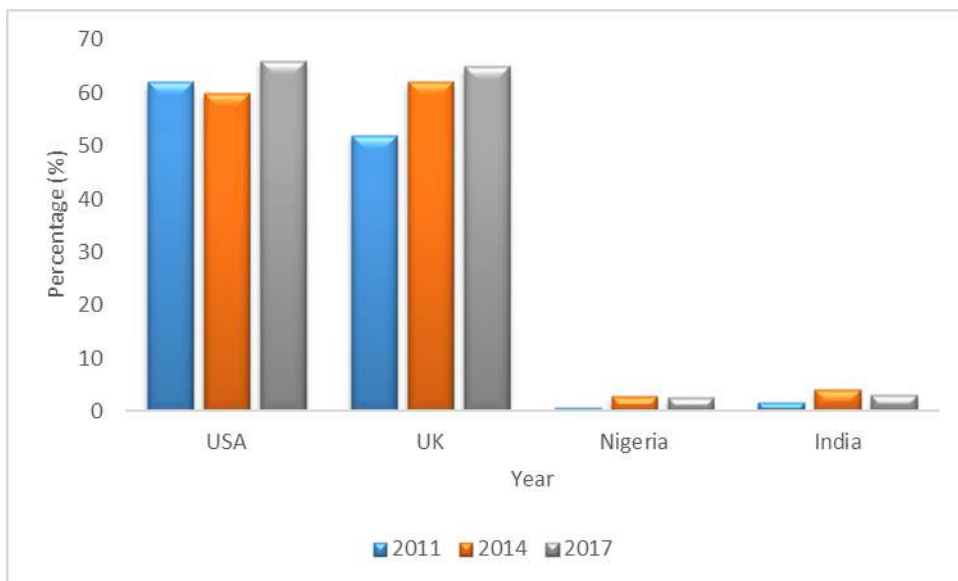
Source: Own work

CREDIT CARD USAGE

Figure 3 reports the percentage of people that use credit card to make payments. As can be observed, the UK and US have a high rate of credit card usage compared to Nigeria and India. The result suggests that developed countries such as the UK and US have greater credit card usage compared to developing countries such as India and Nigeria. This suggest that individuals and households in developed countries have greater access to credit through credit card compared to households in developing countries. One explanation for this result is that developed countries have a first-mover advantage over developing

early in developed countries such as the UK and US while developing countries do not use credit card extensively. In fact, credit cards in developing countries are mostly available to privileged citizens and high-end individuals especially in India and Nigeria. Comparing India with Nigeria, figure 3 shows that India has higher credit card usage compared to Nigeria. The low usage of credit card in Nigeria is mostly due to individuals and households becoming increasingly apathetic towards debt. Individuals and households in Nigeria do not want to borrow money from banks.

TEST OF ASSOCIATION

USE OF ELECTRONIC PAYMENT TO MAKE PAYMENTS (EPP)

The covariance analysis in Table 3 shows that the time-varying EPP has a positive covariance for USA and India, and for Nigeria and UK. This suggest that there is a posi-

tive linear co-movement in electronic payment development between the US and India, and between Nigeria and the UK. On the other hand, the time-varying EPP has a negative covariance for USA and UK, and for Nigeria and India. This suggest that there is a negative linear co-movement in electronic payment development between the US and UK, and between Nigeria and India.

DEBIT CARD USAGE (DC)

The covariance analysis in Table 4 shows that the time-varying DC has a positive covariance for all the four countries. This suggest that there is a positive linear co-movement in debit card usage in the four countries. Also, in the correlation analysis in Table 5, the time-varying DC has a positive correlation for the four countries. The country correlation is statistically significant, indicating that there is a strong positive correlation in debit card usage between UK and Nigeria, and between US and India.

Table 3: EPP covariance analysis: use of electronic payment to make payments

	USA	UK	Nigeria	India
USA	0.25	-0.5	-1.25	1
UK	-0.5	1	2.5	-2
Nigeria	-1.25	2.5	6.25	-5
India	1	-2	-5	4

Source: Own work

Table 4: Covariance analysis: debit card usage

	USA	UK	Nigeria	India
USA	10.7	4	17.3	18.7
UK	4	10.9	21.7	17.1
Nigeria	17.3	21.7	52.7	46.7
India	18.7	17.1	46.7	43.6

Source: Own work

Table 5: Correlation analysis: debit card usage

Country	USA	UK	Nigeria	India
USA	1.000			

UK	0.371	1.000		
	(0.39)	-----		
Nigeria	0.731	0.904**	1.000	
	(1.07)	(2.12)	-----	
India	0.866*	0.785	0.974***	1.000
	(1.73)	(1.27)	(4.33)	-----

T-statistics are reported in parenthesis. ***, **, * represent statistical significance at the 1%, 5% and 10% level
Source: Own work

Table 6: Covariance analysis: credit card usage

	USA	UK	Nigeria	India
USA	6.22	5.56	0.25	-0.77
UK	5.56	30.89	4.73	4
Nigeria	0.25	4.73	0.79	0.79
India	-0.77	4.05	0.79	0.96

Source: Own work

CREDIT CARD USAGE (CC)

The covariance analysis in Table 6 shows that the time-varying CC has a positive covariance for all countries, except for India and the US. This suggest that there is a negative linear co-movement in credit card usage between India and US. Also, in the correlation analysis in Table 7, the time-varying CC has a positive correlation for most countries, except the correlation between India and US which is negative. The positive correlation between UK and Nigeria as well as for Nigeria and India, is statistically significant, indicating that there is a strong positive correlation in credit card usage between UK and Nigeria, and for India and Nigeria.

Table 7: Correlation analysis: credit card usage

Country	USA	UK	Nigeria	India
USA	1.000			

UK	0.401	1.000		
	(0.44)	-----		
Nigeria	0.112	0.955***	1.000	
	(0.11)	(3.23)	-----	
India	-0.314	0.744	0.908**	1.000
	(-0.33)	(1.11)	(2.17)	-----

T-statistics are reported in parenthesis. ***, **, * represent statistical significance at the 1%, 5% and 10% level
Source: Own work

COUNTRY CORRELATION

US CORRELATION

The correlation analysis in Table 8 shows that the correlation between DC and DCP is positive and signify-.

cant. This indicates that higher use of debit cards is correlated with higher domestic credit to the private sector in the US. Also, the correlation between DC and RGDP is negative and significant. This indicates that higher use of debit cards is correlated with lower remittances to the US.

Table 8: US: correlation analysis

Indicators	CC	DC	DCP	PCD	RGDP
CC	1.000 -----				
DC	0.633 (0.81)	1.000 -----			
DCP	0.429 (0.47)	0.971*** (4.06)	1.000 -----		
PCD	0.83 (1.50)	0.097 (0.09)	-0.143 (-0.14)	1.000 -----	
RGDP	-0.802 (-1.34)	-0.969*** (-3.96)	-0.883* (-1.88)	-0.337 (-0.35)	1.000 -----

T-statistics are reported in parenthesis. ***, **, * represent statistical significance at the 1%, 5% and 10% level
Source: Own work

INDIA CORRELATION

The correlation analysis in Table 9 shows that the correlation of DC and CC with the financial sector varia-

bles (DCP, PCD, RGDP) are not significant. Therefore, no meaningful conclusion can be drawn.

Table 9: India: correlation analysis

Indicators	CC	DC	DCP	PCD	RGDP
CC	1.000 -----				
DC	0.573 (0.69)	1.000 -----			
DCP	0.164 (0.16)	-0.713 (-1.02)	1.000 -----		
PCD	0.785 (1.27)	-0.057 (-0.06)	0.740 (1.10)	1.000 -----	
RGDP	0.009 (0.01)	-0.814 (-1.40)	0.987*** (6.33)	0.626 (0.80)	1.000 -----

T-statistics are reported in parenthesis. ***, **, * represent statistical significance at the 1%, 5% and 10% level
Source: Own work

NIGERIA CORRELATION

The correlation analysis in Table 10 shows that the correlation between DC and DCP is positive and significant. This indicates that higher use of debit cards is correlated with higher domestic credit to the private sector in Nigeria. Also, the correlation between CC and DCP is positive and significant. This indicates that higher use of credit cards is correlated with higher domestic credit to the private sector in Nigeria.

Table 10: Nigeria: correlation analysis

Indicators	CC	DC	DCP	PCD	RGDP
CC	1.000 -----				
DC	0.988*** (6.55)	1.000 -----			
DCP	0.994*** (9.56)	0.998*** (21.12)	1.000 -----		
PCD	0.337 (0.36)	0.192 (0.19)	0.238 (0.24)	1.000 -----	
RGDP	-0.216 (-0.22)	-0.360 (-0.38)	-0.316 (-0.33)	0.846 (1.58)	1.000 -----

T-statistics are reported in parenthesis. ***, **, * represent statistical significance at the 1%, 5% and 10% level

Source: Own work

UK CORRELATION

The correlation analysis in Table 11 shows that CC is significant and negatively correlated with DCP, PCD and RGDP. This indicates that higher use of credit card is correlated with lower domestic credit to the private sector, lower private credit by deposit money banks, and fewer remittances to the UK

Table 11: UK: correlation analysis

Indicators	CC	DC	DCP	PCD	RGDP
CC	1.000 -----				
DC	0.658 (0.87)	1.000 -----			
DCP	-0.975*** (-4.35)	-0.809 (-1.38)	1.000 -----		
PCD	-0.997*** (-14.41)	-0.708 (-1.00)	0.987*** (6.34)	1.000 -----	
RGDP	-0.960*** (-3.42)	-0.843 (-1.56)	0.998*** (17.15)	0.977*** (4.59)	1.000 -----

T-statistics are reported in parenthesis. ***, **, * represent statistical significance at the 1%, 5% and 10% level

Source: Own work

Conclusion

This study examined digital finance usage in four distinct countries – the US, UK Nigeria and India. The findings reveal that the UK and US have higher digital finance usage than India and Nigeria. The US has higher credit card usage compared to the UK while the UK has higher debit card usage compared to the US. The correlation analysis show that higher debit card usage is correlated with higher domestic credit to the private sector in the US and Nigeria while higher credit card usage is correlated with lower domestic credit to the private sector, lower private credit by deposit money banks, and fewer remittances to the UK.

The findings have two implications. One, the results suggest that digital finance developments in developing countries are still low. Policy makers in developing countries should develop the digital payment systems in their countries. Secondly, the findings bring clarity to the debate on the benefits of digital finance for developing countries. Policy makers in developing countries should pay attention to how digital finance can improve financial development outcomes in order to harness the benefits of digital finance while being mindful of the potential risks to the financial system. Thirdly, the findings can motivate policy makers to gain more insight on the issues related to the rapid expansion of digital financial services

as well as the strategies for its effective delivery and the risks involved in digital financial inclusion.

Regarding the usefulness of the findings, the findings are useful to policymakers and economists in their assessment of the developments in digital finance across countries. Such assessment becomes easier when comparison is made between developed countries, emerging countries and developing countries. Such assessment can also help policymakers and economists understand why some countries have low level of digital finance usage compared to other countries.

The study has some limitations. One limitation of the study is that graphical, correlation and covariance analyses do not show a causal relationship across countries and among the digital finance indicators. Therefore, the findings should be interpreted with caution. The findings do not imply causality. Another limitation of the study is that graphical analysis does not factor-in all the factors that influence the digital finance indicators used in the study. Another limitation of the study is the small sample size.

Future research should explore the correlation of digital finance and financial inclusion for the four countries. Future research can extend the analysis in this study to more countries. Future research can also investigate the causal relationship and bi-directional correlation among the digital finance indicators.

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