Assessing the Resilience of Fintechs to Epidemic Crises from a Monetary Stability Perspective: Evidence from Africa

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Abstract

The paper aims to assess the resilience of fintechs to epidemic crises in Africa. This study is new in that it is one of the few to have examined the impact of fintechs on monetary stability in the African region, and it shows how digital tools have become crucial for regions to better manage their response to the crisis. To do so, we use the Ordinary Least Squares (OLS) technique to investigate the complexity of the relationship between Fintechs and monetary stability during the years 2011, 2014 and 2017. The study confirms that debit card use leads to an increase in inflation and participates in the decline of the interest rate. We also find that the use of the internet during transactions plays a stimulating role in lowering inflation, encouraging currency transactions and reinforcing the increase in interest rates. Finally, we conclude that the stability of money in bank accounts decreases the effect of inflationary pressures but favors exchange rates and interest rates together as a result of the increase in money. In terms

of practical implications, the paper suggests that economic managers should take some monetary policy measures in order to better control pandemics and reduce or mitigate risks in the region.

Keywords: Fintech, Resilience, Monetary variables.

Jel: 033, G18, G21.

1. Introduction

n recent years, digital technologies have disrupted many aspects of our daily lives. The use of digital technologies has never been more important than today, especially in times of a pandemic crisis. Herein, digitization is not only about infrastructure, but also about the use of digital technologies during crises (Brunnermeier, 2019), especially in a context of economic, political, and pandemic uncertainty (Rifkin, 2011; Loukil et al., 2019; Khan et al., 2020; Chen et al., 2020; Blakstad and Amars 2020; Ben Romdhane et al., 2020; Abdelkafi et al., 2020; Kammoun et al., 2020; Chen, 2020; Word Bank, 2020a, Sugandi et al., 2021; Ben Romdhane et al., 2021; Mefteh and Ben Romdhane, 2022; Ben Romdhane et al., 2022; Abdekafi et al., 2022). For the purpose at hand, pandemics have implications not only

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for the development and use of technology but also for the global economy.

From a technological standpoint, the pandemic crisis has accelerated the adoption of digital technologies immensely, and digital tools have become crucial for regions in order to better manage their response to the crisis. In a digital context, companies are increasingly looking into creative digital solutions to keep organizations operating remotely and serving their customers. As a matter of fact, the health crisis linked to the COVID-19 epidemic has brought a striking demonstration of the potential of digital technologies. In the same vein, the Information Technology Collaborative (NetHope) has provided a platform to address the ICT needs that arise in the wake of major disasters, including the Southeast Asian tsunami in 2004 and the famine in the Horn of Africa in 2011. In the Liberian context, ICT refers to the software and telecommunications infrastructure for epidemic control and management (UN, 2014). In 2014, the Ebola epidemic crisis in West Africa was the largest in history. In Nigeria, an emergency presidential decree allowed officials to access cell phone records and use law enforcement if necessary to track down those at risk. In Uganda, a mobile health platform, mTrac, was implemented as part of its response to the Ebola outbreak in 2012. This platform provides real-time alerts and surveillance and uses cell phones via SMS for communities and health workers. A pandemic was first reported in the Asian region in 2020, specifically, in the Chinese city of Wuhan in December 2019, which spread worldwide and was declared a global pandemic by the World Health Organization (WHO) on March 11, 2020. The coronavirus pandemic has had a huge impact on the financial and economic systems. Most importantly, telemedicine, telecommuting, and Assessing the Resilience of Fintechs to Epidemic Crises from a Monetary Stability Perspective: Evidence from Africa

online education are becoming essential to help society slow the spread of the coronavirus (Manokha, 2020; Devakumar et al., 2020). According to Sein (2020), this pandemic has generated a rapid demand for efforts to use innovative technologies to address the damage COVID-19 has done to our lives. The rapid transition to telehealth and online education in response to the coronavirus threat is a reminder that digital technology provides many benefits and can play a critical role in managing and reducing the risks caused by lockdown during the pandemic and even after the pandemic (Richter, 2020). In 2020, various technological innovations and applications have been developed to combat the coronavirus epidemic crisis. So far, this virus has severely damaged the poorest continents, such as Africa.

From an economic standpoint, digitization has revolutionized monetary and payment systems. In this economic context, Murphy et al. (2014) confirmed that significant progress has been made in developed economies, and more progress is needed in developing economies. In the last few years, most digitally active customers have made use of financial technology services to make payments and money (Wonglimpiyarat, 2017). transfer Since its introduction, financial technology, commonly called Fintech, has gained ground. Notwithstanding its significance, and due to the diversity of its business, there is not a single agreed definition of Fintech in the economic literature (Nicoletti, 2017). Nowadays, the Fintech sector has grown considerably and generated great effects on traditional financial institutions and modified the ways of providing financial services, which can pose significant challenges to monetary policy (Narayan et al., 2018). In addition to providing financial services capable of matching speed

and flexibility, Fintech initiatives are disrupting the financial services sector. All these factors have contributed to significant macroeconomic instability. Based on business models different from the traditional approach, the Fintech sector raises significant challenges for financial regulators, requiring changes in financial regulation and supervision systems (Chui, 2017). Several previous studies have analyzed the determinants of Fintech in the evolutionary framework of these firms and their segments (Ben Romdhane Loukil et al., 2021; Kammoun et al., 2020; Loukil et al., 2019) but empirical studies, in this area, have failed to explain the effect of digital money performance on monetary policy indicators. Therefore, understanding the consequences of epidemic crises and identifying appropriate governmental measures to implement is crucial during periods of crisis.

Within this framework. Fintech raises questions in developed important and especially in developing economies. Could the digitization of money lead to a gualitative change in economic activity? What is the nature of the relationship between Fintech macroeconomic aggregates? and Does Fintech resilience affect financial and monetary stability? This research paper attempts to answer the above questions by studying the implications of the use of Fintech in emerging countries from a monetary perspective during a pandemic crisis.

The paper aims to complement the existing literature by assessing the resilience of Fintech to epidemic crises and considering the macroeconomic implications of Fintech and the challenges that it poses to monetary policy. The main contribution of the empirical study is to investigate the complexity of the relationship between Fintechs and monetary variables in Africa during the period of

the health crisis. The paper attempts to complement the existing literature by exposing the effects of African digital resilience on the performance of monetary variables, namely the exchange rate, inflation, and interest rate, especially during periods of epidemic crises. The choice of the African region is justified by the fact that this region is evolving towards a knowledge-based economy where digitization is an important strategy to address the challenges of economic growth. Moreover, this region is known for its confrontation with several epidemic crises such as Ebola and, most recently, the Coronavirus.

While the implications for monetary policy are not always straightforward, the findings reveal that debit card use leads to higher inflation and that Fintech facilitates transactions and remittances worldwide with just a touch of smart use of new financial technologies. In fact, this concept aims to make financial services affordable for consumers. Therefore, a currency converter allows businesses to convert any currency the customer needs. Moreover, we argue that debit cards have a direct negative impact on interest rates and also have a positive indirect effect whenever there is an active use of these financial technologies. Most importantly, the use of the internet to buy and pay plays a stimulating role in lowering inflation, encouraging currency transactions, and enhancing interest rate increases. Finally, we show that the stability of money in bank accounts not only decreases the effect of inflationary pressures but also promotes exchange rates and interest rates together as a result of the increase in money.

The rest of this paper is organized as follows. The first part of section 2 provides an overview of the literature on the hypotheses related to the causal relationship between

macroeconomic aggregates and ICT during epidemic crises. Section 3 details the sample and research methodology. Section 4 presents the results and discussions. Section 5 synthesizes the key findings of the research, concludes, and highlights the main policy implications.

2. Theoretical Background

It is well known that information technology (IT) and information systems (IS) play an important role in risk management, responses to epidemic emergencies, and financial and economic crises (Angst and Agarwal, 2009; Ben-Assuli and Padman, 2020). Omoleke et al. (2016) found that the impact of the Ebola epidemic on African society is enormous. He noted that the isolation of suspects and treatment of cases is associated with the extraordinary use of resources. According to the UN (2015), airlines, tourism and financial institutions have reduced their operations, resulting in a considerable reduction in economic productivity. This, in turn, has caused the GDPs of countries in crisis to fall, reversing their economic growth in recent years. This economic contraction places fragile countries like Sierra Leone and Liberia, which are still struggling to emerge from the horrors and impacts of long years of interconnected wars and civil strife, in a precarious position. The study by Casey et al. (2014) presents evidence of a sharp decline in Liberia's economic activity nationwide during the Ebola epidemic for the business sectors most sensitive to economic fluctuations. They found that 20% of businesses closed during the outbreak with an average loss of 47% of their employees. This disruption is already having a palpable impact on the economies of affected countries.

Assessing the Resilience of Fintechs to Epidemic Crises from a Monetary Stability Perspective: Evidence from Africa

Recently, there has been a shortage of research contributions in the area of information systems (IS) to help combat the new COVID-19 pandemic. In this sense, Mingis (2020) has shown the efficiency of information systems to combat the spread of this virus. Gerfalk et al. (2020) also confirmed technology's stimulating role through remote working and virtual management. The Word Bank (2020b) noted that China's cash transactions experienced a significant decline due to the COVID-19 outbreak. Following the health interventions, WHO called for the use of contactless cards for payment transactions. as they are more secure than cash payments during this pandemic. As a result, this trend of contactless payment has become a trendy behavior in the world due to different calls to use electronic payments to fulfill the demands of financial transactions. Velychko (2020) showed that digital transactions present a key indicator to explain the fall of cash, in volume and value, based on consumers' usage behavior towards digital payments instead of traditional methods. He concluded that the growth of online shopping would be a key factor in driving consumers toward digital payments.

The issue of the effect of technology on the economic environment has received considerable attention in the existing literature (Bateman et al., 2019; D'agostinoa and Scarlatoa 2015; Kammoun et al., 2020; Ben Romdhane et al., (2021); Loukil et al. 2019), but the question of the relationship between Fintech and monetary policy indicators deserves further theoretical and empirical investigations. In this overview, we provide a brief summary of the background literature relevant to our study in order to distinguish the main monetary policy indicators that might be affected by Fintech adoption. In

the Asian context, according to Chansaenroj and Techakittiroj (2015), FinTech has a very significant effect on the country's inflation because it has a direct influence on consumer choice, especially in China and Malaysia. This would be due to the ease of online shopping transactions and checking account balances and money transfers (Wonglimpiyarat 2017; Taherdoost 2018; Tan et al., 2017; Kim et al. 2016). In the same context, Kammoun, Loukil, and Ben Romdhane (2020) confirmed that mobile money approximated by debit cards and digital payments has a positive effect on inflation, Similarly, Suri (2017) and Alvarez & Lippi (2017) confirmed that credit cards were a source of inflation despite their benefits to the economy. On the other hand, Narayan and Sahminan (2018) argue that digitization plays an important role in reducing inflation because it both reduces costs and improves the quality of financial services. In this sense, the IMF (2019) has noted that suspicions spread in the phase of a technological innovation revolution when the risks associated with money seem to be highest. These results are confirmed by studies by Ben Romdhane Loukil et al. (2021).

Other evaluated empirical studies suggest a significant relationship between Fintech and the exchange rate. Narayan et al. (2019) studied the impact of Fintech on the Indonesian exchange rate (rupee against the US dollar) and the inflation rate over the period 1998-2017. The empirical results suggest that FinTech is able to reduce inflation and lead to a real appreciation of the rupee against the US dollar, although its effect on the exchange rate is delayed. In this line of thinking, Sanchez-Miret (2018) noted that in order to tackle the banks' stranglehold on the very lucrative foreign exchange and international payments markets, fintech focuses first on user-friendliness. According to the author, Fintech's services represent an added value for the company, which does not want to change providers since the risk management of foreign exchange transactions is fully automated. More specifically, Fintechs rely on their ability to inject real-time into foreign exchange operations, but the main argument put forward by Fintechs is transparency.

Another set of studies focused on the difference between credit card rates and the interest rates applied to Lending Club consumer loans. Yuliya and Kolliner (2014) found that more creditworthy consumers benefit from preferential rates when using a P2P lender rather than a credit card. However, the data are not directly comparable at the loan level. These results are also confirmed by studies by Jagtiani and Lemieux (2018) and Buchak et al. (2017). To the best of our knowledge, the empirical literature on Fintech has neglected to assess the impact of Fintech on monetary variables. To this end, this paper focuses on the effect of Fintech on monetary variables and its resilience during periods of health crises in Africa.

3. Methodology

In this paper, we use the Findex global database as a representative of Fintech for African countries during the years 2011, 2014, and 2017. The choice of this period is justified by the appearance of an epidemic crisis, namely Ebola. Moreover, these countries present an unprecedented opportunity for the expansion of financial technologies. For Fintech variables, we use the bank account, the use of the Internet to pay or buy, and the debit card. The main purpose of this study is to investigate the impact of Fintech on macroeconomic variables such as the inflation rate, the exchange rate, and the interest rate (Broby 2017, Deloitte 2017;

Gomber et al., 2018; Nicoletti 2017; Pejkovska 2018; Alvarez and Lippi, 2017 and Suri, 2017). Table 1 shows the measures of the variables used in our study.

The study uses the ordinary least squares (OLS) technique to estimate the relationship between variables. The multiple regression models to estimate the main effects of Fintech have the following form:

$$\begin{split} Y_{i,t} = \beta_0 + \beta_1 B A_{\!i,t} + \beta_2 D C_{i,t} + \beta_3 I N T_{\!i,t} + \varepsilon \\ \text{Where;} \end{split}$$

Y: presents the endogenous variables namely the inflation rate, the exchange rate and the interest rate.

 β_0 : is the intercept or constant amount

 β_{i} are coefficients of the explanatory variables

 ε : stands for the error term

4. Empirical findings

4.1. Data and descriptive statistics

Descriptive statistics for all variables used in the empirical survey are presented in Table Assessing the Resilience of Fintechs to Epidemic Crises from a Monetary Stability Perspective: Evidence from Africa

2. These statistics show that all variables are normally distributed from their mean and average values to each other.

The table of descriptive statistics displays the average values for each variable. We note that on average 23% of Africans own debit cards, with a maximum of 45% in some African countries. These low average values explain the low development of digital transactions such as digital payments with an average of 8.54%. These results are confirmed by previous studies (Arner et al., 2016; Pousttchi and Dehnert, 2018; Philippon, 2018; Loukil et al., 2019, and Kammoun et al., 2020). This situation could influence the economic opportunities offered by Fintechs in Africa.

Table 3 shows the correlation between the independent variables. A high correlation is considered when the correlation coefficient exceeds 0.80, according to Kennedy (2003). Generally, the pairwise correlation coefficients are significantly low. A low correlation coefficient indicates the absence of multicollinearity problems in our analysis.

Variables	Indication	Measurement
Debit card	DC	The percentage of respondents who report having used a debit or credit card.
Bank account	BA	The percentage of respondents who report using a mobile phone or the internet to check their balance for a financial institution account in the past 12 months.
Internet Use to Pay or to buy	INT	The percentage of respondents who report having used a mobile phone to make a payment from an account, or who report having used the Internet to pay bills or buy something online, in the past 12 months.
Inflation	INF	Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Data are period averages.
Exchange rate	EXR	Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).
Interest rate	IR	Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. The terms and conditions attached to lending rates differ by country, however, limiting their comparability.

 Table 1. Definition and measurement of variables

Variable	Obs	Mean	Std. Dev.	Min	Мах
BA	45	0.2126	0.1725	0.02	0.85
INT	45	0.0854	0.0752	0	0.81
DC	45	0.2326	0.1625	0.03	0.45
INF	45	3.5012	11.3254	2.3599	86.4251
EXR	45	4.3625	16.55603	1.3809	13.8523
IR	45	1.2134	8.4203	1.5841	12.6254

 Table 2. Descriptive statistics

Table 3. Pairwise correlation matrix

	BA	DC	INT	INF	EXR	IR
BA	1.0000					
DC	0.4652	1.0000				
	0.0000					
INT	0.1257	0.214	1.0000			
	0.0432	0.1244				
INF	0.0145	0.0018	-0.1685	1.0000		
	0.8048	0.8715	0.1085			
EXR	-0.2314	-0.275*	0.0269	-0.1748	1.0000	
	0.1526	0.0010	0.5963	0.2048		
IR	0.3145	0.8201	0.7415	0.1362	-0.5632	1.0000
	0.0526	0.0000	0.0001	0.4125	0.0012	

Table 4 displays the outcomes of three models that examine the impact of Fintech proxies (*BA, INT, and DC*) on inflation (*INF*), interest rate (*IR*), and exchange rate (*EXR*).

The first model explains the effect of Fintech on inflation. Interestingly, we first find that the use of DC increases inflation. This result can be explained by the inflationary pressures that increased during the Ebola epidemic in the African context. In the same vein, FMI (2014a) confirmed that inflationary pressures during the epidemic crisis posed a competitiveness problem for firms and traders and decreased household purchasing power. According to the IMF (2014), the closure of borders has led to the damage of production

and the increase in the price of food goods in a situation of indebtedness. This result is consistent with other studies that focus on the Asian context, such as Chansaenroj and Techakittiroj (2015), who confirmed that Fintech has a very significant impact on inflation as it directly influences consumer choices in China and Malaysia. In addition, Alvarez and Lippi (2017) confirmed the positive impact of credit cards on inflation. Moreover, Geanakoplos (2010) and Alvarez and Lippi (2017) found that the widespread use of credit cards promotes transaction efficiency but leads to inflation in the absence of monetary intervention. They concluded that there is always more inflation and fewer

Assessing the Resilience of Fintechs to Epidemic Crises from a Monetary Stability Perspective: Evidence from Africa

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Table 4. OLS estimation results

Model 1

Coef.	Std. Err.	z	<i>P</i> > <i>z</i>	[95% Conf. Interval]	
-4.5263***	1.0892	-3.86	0.002	-17.03219	-4.4852
-12.8461***	6.1873	-4.23	0.004	-21.1298	-5.4325
5.85***	1.28597	2.48	0.005	5.9658	14.8523
4.73***	0.5231	7.52.	0.001	4.4632	9.1856
0.3258					
3.01 (0.0000)					
	Coef. -4.5263*** -12.8461*** 5.85*** 4.73*** 0.3258 3.01 (0.0000)	Coef. Std. Err. -4.5263*** 1.0892 -12.8461*** 6.1873 5.85*** 1.28597 4.73*** 0.5231 0.3258 3.01 (0.0000)	Coef. Std. Err. z -4.5263*** 1.0892 -3.86 -12.8461*** 6.1873 -4.23 5.85*** 1.28597 2.48 4.73*** 0.5231 7.52. 0.3258 3.01 (0.0000)	Coef. Std. Err. z P> z -4.5263*** 1.0892 -3.86 0.002 -12.8461*** 6.1873 -4.23 0.004 5.85*** 1.28597 2.48 0.005 4.73*** 0.5231 7.52. 0.001 0.3258 3.01 (0.0000)	Coef. Std. Err. z P> z [95% Conf. Interval] -4.5263*** 1.0892 -3.86 0.002 -17.03219 -12.8461*** 6.1873 -4.23 0.004 -21.1298 5.85*** 1.28597 2.48 0.005 5.9658 4.73*** 0.5231 7.52. 0.001 4.4632 0.3258

Model 2

IR	Coef.	Std. Err.	Z	<i>P</i> > <i>z</i>	[95% Conf. Interval]	
BA	9.93***	2.089205	-4.76	0.000	-14.03219	-5.8426
INT	61.20***	29.545323	2.85	0.014	-115.91795	-18.5009
DC	82.63***	17.8536	2.02	0.002	48.0485	190.5263
_cons	5.43***	0.45958	8.12	0.001	3.9526	12.6958
R-sq	0.3410					
Wald chi2 (P-value)	24.9 (0.0000)					

Model 3

EXR	Coef.	Std. Err.	z	P > z	[95% Conf. Interval]	
BA	-12.85***	2.0892	-4.76	0.000	-14.0321	-5.8426
INT	18.33***	9.545323	2.85	0.004	-45.9179	-8.5009
DC	-9.52***	0.98251	9.85	0.005	-15.6325	-7.5298
_cons	9.03 ***	0.9476	9.07	0.000	6.7374	10.452
R-sq	0.5023					
Wald chi2 (P-value)	6.82 (0.0000)					

Notes: * P<0.1, ** p < 0.05, *** p < 0.01

efficiency gains. In order to make the most of the economic opportunities offered by Fintech, policymakers should apply some changes to the financial regulatory system (Chui, 2017; Temelkov, 2018). Certainly, digital evolution changes the structure of global competitiveness and develops government and business policies and, consequently, human life (Rifkin, 2011). Then, we find interestingly that the use of (*INT*) decreases (*INF*). This finding is confirmed by the study of Alvarez and Lippi (2017), who asserted that if mobile money leads to economic efficiency through a reduction in transaction costs and a better allocation of resources and credit, it follows that overall economic activity will be supported. In fact, these findings just support previous academic results suggesting the importance of the

effectiveness of authorities and decisionmakers. We empirically demonstrate that the government's ability to formulate and implement sound policies and regulations significantly contributes to promoting development by reducing inflation. In the same vein, Narayan and Sahminan (2018) argued that Fintech is able to reduce inflation since these innovative solutions bring down costs and improve the quality of financial services. Ondabu et al. (2015) analyzed the relationship between effective inflation control and mobile money and found that mobile money service can be an inflation control tool that allows central banks to control inflation. The authors proposed some recommendations on mobile money transfer and effective inflation control, as well as the use of carefully crafted policies and procedures to maintain client satisfaction. For their part, Dumas et al. (2017) showed that online money transfers enabled the transfer of much-needed funds to households living in remote rural areas of Liberia and Sierra Leone during the 2014-2016 Ebola crisis. Along these lines, it could be said that digital transformation also exerts an impact on macroeconomic policy tools (FMI, 2014b). Indeed, some countries are conducting cash transfers using mobile money to provide immediate and muchneeded support to those affected by the pandemic. Although still in its infancy in public finance, the adoption of digital tools can even contribute to increased revenues, optimized spending, better budget management, and greater transparency (European Investment Bank, 2015). Even Mawejje (2017) argued that the use of mobile money does not lead to high inflationary risks. These results would encourage policymakers to continue to support and encourage the spread of mobile phones. In this sense, Mehrotra and Yetman (2014) showed the existence of a positive relationship between financial inclusion and the volatility of inflation. However, since the Fintech share in the economy and financial markets remains small, it is too early to draw a policy implication, especially in a fastgrowing market. Regulators and central banks must understand how disruptive innovation in Fintech affects the cost-benefit trade-offs of their micro-and macro-prudential regimes.

Finally, we find that opening bank accounts (BA) leads to lower inflation rates (**INF**). This result is consistent with the study by Walker (2016), who confirmed that financial innovations help to reduce the incomplete nature of markets and monetary authorities could usefully move from headline inflation to core inflation. This is why we are interested in knowing empirically the relation between the proxies of Fintechs and the interest rate in our second model, where we prove the positive relation between the **DC** and the interest rate (IR). This result demonstrates the benefits of Fintechs to creditors, particularly during times of health crises when consumers continue to request consumer credit to deal with Ebola and its severe consequences, namely job loss and poverty.

Regarding the relationship between (*INT*) and (*IR*), the empirical results are consistent with the studies of Jagtiani and Lemieux (2018), who find a high correlation with interest rate spreads, Lending Club rating grades, and loan performance. Also, Casey et al. (2014) explored the rates on small business loans using Lending Club consumer loan data. They compared the interest rates on Lending Club loans with interest rates on business loans reported by the National Federation of Independent Business borrowers paid a rate that was approximately twice as

high as small business loans obtained from traditional sources. Yuliya and Kolliner (2014) explain the difference in credit card rates by the fact that more creditworthy consumers receive preferred rates when using a P2P lender over a credit card. In contrast, in Germany, Calebe, Loriana, and Paolo (2016) use data from Auxmoney and interest rate data from the Deutsche Bundesbank and find that interest rates are comparable for loans made by P2P alternative lenders and those made by traditional banks. Finally, we confirm the positive effect of (**BA**) on (**IR**). This finding has been confirmed by the study by Buchak et al. (2017), who studied the rise of Fintech and non-Fintech activities and proved that Fintech customers are among the borrowers who value fast and convenient services and that Fintech lenders command an interest rate premium for their services. That being said, it's worth noting that when it comes to the interest rate, it all depends on the status of the borrower. If he wants to get a micro-credit for consumption only, he will be taxed at a higher interest rate than someone who wants to get a loan for investment.

In the third model, we find a negative relationship between the exchange rate (EXR) and (DC). This explains the shifting profit orientation of traditional bank customers towards more convenient services through the use of their cell phones. In this context, payments are made via the bank customer's mobile operator. This proves our result that shows the positive relationship between (**INT**) and the exchange rate. In Africa, mobile payment systems (M-payments) bring three players into opposition and competition, namely non-bank money transfer institutions (Western Union, MoneyGram), traditional banks and cell phone operators. Western Union and MoneyGram used to dominate Assessing the Resilience of Fintechs to Epidemic Crises from a Monetary Stability Perspective: Evidence from Africa

the money transfer market in Africa before the arrival of mobile money. MoneyGram, which operates in 52 African countries, had every interest in getting involved in the mobile payment market. This is how MoneyGram multiplies partnerships with mobile operators. As a result, in February 2014, Vodafone and MoneyGram created a money transfer system from over 200 countries to M-Pesa customers. But other players in the payments industry are also getting in on the act. In Nigeria, Mastercard has launched a "digital identity card" that allows its holders to receive electronic payments anywhere in the world. It is now considering launching e-wallets in Africa.

The rise of financial technology has made it easy to transact and send money globally with just a touch of the smart use of new financial technologies. In fact, Fintech aims at making financial services affordable for consumers. A currency converter allows companies to convert any currency into what the client needs. According to the World Bank, about \$450 billion is sent back to developing countries by immigrants working abroad every year. While the transfer fees range between 5-8 per cent of the total amount when we use a bank or a broker, costs are hidden within the exchange rate. So, consumers do not even realize they are paying fees. Recently, we have noticed that most people have shifted completely to using Fintech companies even though some people still depend on banks. Before, banks offered poor exchange rates, by buying a currency at a lower rate and selling it at a higher one. This explains the expensive transfer. On the other hand, Fintech companies operate through very scalable online platforms and apps. By connecting buyers and sellers of currencies without banks handling the transactions,

these Fintechs are carving out a nice niche for themselves. In this case, they do not need to be paid for expensive bank offices and consequently offer competitive exchange rates. Moreover, this emerging market offers potentially high returns for developers. Fintech software received important funds for its development. For example, Proxy Ventures has received around €20 million in funding, while rival TransferWise boasts \$58 million in Series C funding in 2015 alone¹. Narayan and Sahminan (2018) examined the macroeconomic implications of Fintech for Indonesian firms during 1998-2017. They find that Fintech allows the appreciation of national currency versus American dollar even if this impact is delayed. Our principal finding is that the benefits of Fintech such as their convenience, low fees, speed, and options offered, could be enhanced unless there is an active use of these new technologies through both types of transactions.

Based on the foregoing, the study proves that online financial services in Africa have been resilient to crises, especially health crises. This has been confirmed recently with the spread of Covid-19, which has changed the game for digital financial services. Indeed, low-income households and small businesses have benefited greatly from breakthroughs in mobile money, financial technology services, and online banking. Moreover, the health crisis has undoubtedly been a gas pedal for digital transformation in Africa. Today, more than ever, the African continent has an interest in accelerating the penetration of dematerialized financial transactions in order to limit the risks of transmission of the virus in the short and medium term but also to seize the opportunities related to digital finance in the long term.

Conclusion and practical implications

This paper attempts to examine the digital resilience of Africa during the epidemic crisis. To do so, the impact of the pandemic crisis on inflation and the exchange rate was investigated. The empirical analysis is based on the ordinary least squares method. Empirical results show a positive relationship between debit card use and inflation as Fintech aims to make financial services affordable for consumers. Additionally, we found a negative relationship between debit cards and the interest rate. Most importantly, the use of the Internet plays a stimulating role in reducing inflation, encouraging foreign currency transactions, and increasing interest rates. Finally, we confirm that the stability of money in bank accounts helps to reduce the effect of inflationary pressures but promotes exchange rates and interest rates as a result of the increase in money.

These findings allow us to conclude and set out some suggestions. In fact, if the pandemic crises have increased the use of fintech services, they have also caused difficulties for the growth of smaller players in the sector, highlighting inequalities and constraints in access to digital infrastructure such as low mobile phone and internet penetration, lack of identification coverage, and limited payment rails. Given these considerations, this study is a first contribution to giving policymakers and regulators a better understanding of fintech in Africa.

Governments are called upon to put in place certain measures to ensure optimal inclusion in the future. These measures could apply to both North Africa and Francophone

¹ https://igniteoutsourcing.com/fintech/p2p-currency-exchange-trends-software-development

Sub-Saharan Africa, given the similarities between the different countries in terms of electronic payments and telecommunications infrastructure development.

For example, it will be necessary to encourage the payment of salaries in electronic money or to "disincentivize" cash out. Other measures should aim to transform as much cash as possible into electronic money and limit the transformation of electronic money into cash. For their part, businesses are also required to encourage people to use electronic payment methods by offering promotions and reducing the commission margin for intermediaries.

Despite the contributions mentioned above, this study has some limitations and suggestions. The study's primary limitation is related to the availability of data. In fact, the period of our study is restricted to three years due to a lack of data on Fintech during the COVID-19 period. Therefore, expanding the data will be very important to obtain robust results. Another limitation is that this study does not consider the varying levels of institutional development across African countries. Indeed, there is a need to regulate fintech firms without hindering the evolution of the technology. African countries must develop their institutional regulatory framework before fintech contributes to risk in the financial system. This study suggests more institutional development in the field of Fintech in order to eliminate the prejudice that Fintechs pose a significant risk to financial institutions in African countries. These institutions should collaborate with Fintech companies in order to fully exploit their advantages.

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