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Electronic Money and Economic Growth in sub-Saharan Africa

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Abstract

This research analyzes the relationship between Electronic money and economic growth in sub-Saharan Africa. Using a panel of 21 countries from the CEMAC, WAEMU and EAC, we estimated a VAR model and according to the estimates, about 21.39% of the variation in economic growth can be explained by electronic money in the last period. Moreover, urbanization and gross fixed capital formation account for about 0.58 and 5.88%, respectively, of the variation in economic growth in the 10th period. Furthermore, ICTs captured by the internet network and the level of infrastructure are responsible for the variation in economic growth for about 3.02 and 10.71%, respectively. As expected, economic growth is itself responsible for the largest variation, i.e. 58.40%. However, thanks to the dynamic fixed effects regression model in the full panel, we found that this influence of m money is short-term and not long-term.

Keywords: Electronic money, Economic growth, Financial innovation, VAR.

1. INTRODUCTION

The year 2022 was marked by the slowdown of the global economic growth, going from 3.1% in 2010 to 5.7% in 2021 and to 2.9% in 2022 (World Bank, 2022). Among the plausible explanations, we can mention the subprime crisis of 2008, the resurgence of terrorism, the COVID crisis, the Russo-Ukrainian war, which disrupt the economic activity, exacerbate the uncertainty in terms of investment and trade, the slowdown of the catch-up effects of demand, and the gradual lifting of fiscal and monetary support measures (Boungou & Yatié, 2022).

Moreover, we can observe a disparity in the decline of the estimated growth in 2022. It is at 4.4% in East Asia and Pacific, at 2.9% in Europe and Central Asia, at 2.5% in Latin America and the Caribbean; 5.3% in Middle East and North Africa; 6.8% in South Asia and 4.5% in Southeast Asia, and a slowdown to about 3.7% in Sub-Saharan Africa (World Bank, 2022).

To meet the challenges associated with the slowdown of economic growth, the digital economy remains a necessity (Song et al., 2023). These challenges are reflected in the Sustainable Development Goals (SDGs), especially SDG 1 on eradicating poverty in all its forms everywhere. Indeed, the first sustainable development goal aims at ending poverty and fighting inequalities in all their forms and everywhere in the world. Specifically, it aims at fighting poverty, accessing basic services among others financial services, reducing the proportion of poor workers and the most vulnerable people, especially women and children. Access to financial services is a major issue for fighting poverty and promoting sustainable development. By offering all individuals and businesses financial services adapted to their needs, such as transactions, payments, savings, credit or insurance, financial inclusion is an essential factor for reducing poverty and shared prosperity.(Avom et al., 2023) (Ahmad et al., 2020) Indeed, it allows the most vulnerable people to manage risks, invest in their education or health, create or develop an economic activity, and overcome financial shocks.

Financial inclusion relies on the development of digital financial services, especially via mobile phones, which offer less expensive, faster and safer solutions than traditional financial services. It also involves an adapted regulation, which guarantees consumer protection and financial system stability. Sub-Saharan Africa is characterized by a very low financial inclusion rate compared to other regions of the world. According to the World Bank, it was 43% in 2017, compared to 69% on average worldwide. In 2021, it would have slightly increased to reach 45%. The main obstacles to banking are the high cost of financial services, the lack of infrastructure, the low trust in the banking system and the preference for cash transactions. Indeed, the lowest banking rate in 2021 is that of 8% in Burkina Faso and the highest that of Maghreb countries with banking rates of more than 60% (Gsma, 2021) In addition, the use of mobile phones in Sub-Saharan Africa has experienced

strong growth over the last years. According to World Bank data, the mobile phone penetration rate in the region increased from 44% in 2015 to 76% in 2021(Ouma et al., 2017). This figure reflects the development of telecommunication infrastructure, the accessibility of mobile services and the increasing demand of populations for connectivity and digital services. Mobile phone has become an essential tool for social, economic and financial inclusion of the inhabitants of sub-Saharan Africa. (Gsma, 2021)

The decade 2010-2020 was characterized by the development of electronic money. Initially conceived as a tool to facilitate money transfers between relatives, electronic money quickly evolved to integrate into many sectors of the economy. It offers a multitude of benefits to African populations, such as access to diversified, affordable and secure financial services such as money transfer, bill payment, savings, credit and insurance. By facilitating trade, supporting entrepreneurship, reducing poverty and promoting financial inclusion, electronic money also contributes to the economic and social development of the continent (Amal NAJAB & Kaltoum LAJFARI, 2022) According to a recent World Bank study, in sub-Saharan Africa, electronic money has experienced strong growth in recent years, notably due to the low penetration of formal banking services and the impact of the covid-19 pandemic on digital payments (World Bank, 2022) Indeed, according to GSMA data, electronic money in sub-Saharan Africa processed more than 701 billion $ of transactions in 2021, an increase of nearly 40% compared to 2020. The number of registered accounts reached 621 million, of which 184 million active over a period of 90 days. East Africa remains the most dynamic sub-region, with more than 65% of operations and 57% of amounts processed on the continent. On the other hand, Central Africa is less dynamic in terms of electronic money than West Africa; South Africa and East Africa. Indeed only 10% of the 621 million mobile banking accounts in Africa are located in Central Africa (Dontsi, 2023; Gsma, 2021)

Given the context of Africa, electronic money has developed more there. Indeed, by the end of 2020, electronic money exchanged in sub-Saharan Africa accounted for 64% of all electronic money value exchanged in the world reaching 490 Billion for the year. In 2021 electronic money in Africa had 173 services in operation, 621 Million registered accounts 184 Million active accounts, 36.7 billion transactions carried out and 701.4 Billion dollars transaction amount. (GSMA,2022). Electronic money is one of these recent innovations that offers financial transaction services via mobile phone such as payments and transfers, even savings (Mawejje & Lakuma, 2019). It is therefore defined as a monetary value stored on a medium, in electronic form, against delivery of funds of equal value, which can be used to make payments to persons other than the issuers without or with intervention of bank accounts (Dihia & Meriem, 2022).

Throughout economic history, financial innovation has often been at the basis of economic development in many forms. Thus, the development of payment mechanisms first appeared with the creation of barter, which gave rise to commodity money, then metallic money, which gave birth to paper money which today is gradually being replaced by electronic money (Wasingya ,2019). At each of these stages, these innovations have therefore had a profound impact (positive or negative) on our economies and societies. For example, the invention of money led to the development of cities and the division of labor in Mesopotamia in the 7th century BC. In China in the 13th century, the economy and financing of wars were facilitated by the invention of paper money or banknotes. The invention of banks enabled the development of the cities of Florence and Genoa in the 17th century. (Wasingya, 2019; Vallée, 2014). In 1970, financial liberalization played a decisive role in economic development. Some economies have seen a positive contribution of this financial innovation while for others it has resulted in failures. Since this period of liberalization, the financial sector has experienced several innovations: ATMs, automatic payment at points of sale, interest rate swaps, microcredit, developed by Mohammed Yunus, Nobel Peace Prize winner, which has enabled millions of people to borrow and develop an economic activity (Benoit, 2014). Crowdfunding: a type of financing made particular by the fact that it solicits, openly, a large number of investors. It can take the form of simple donation, counter-reward, equity investment in a company, known as crowdlenging appeared in 2008, it is experiencing growing success (Faten & Evelyne, 2018)

The crypto currency which appeared in 2008 following the financial crisis of 2008/2009, is a type of virtual currency decentralized from the classical financial system functioning and secured by a singularcryptographic process that involves the participation of a large network of computers (Shako ,2022). As far as electronic money is concerned, developing countries are not lagging behind in this field of financial innovation, a particularly documented analysis attests that Vietnam, India and Nigeria are among the most advanced countries in this field (Global Crypto Adoption Index, 2023). It should be noted that the development of electronic money in Africa is different from one country to another. Some African countries have already thought about creating a central bank electronic currency (the case of Nigeria and South Africa) while others have not even sufficiently developed credit cards and Electronic money let alone crypto currency which is almost non-existent in these countries (the case of Central African countries).

The observation is such that electronic money occupies an important place in financial exchanges in Africa, the penetration rate of mobile phone is much higher than the banking rate; electronic money could be an instrument to increase financial inclusion in Africa and thus boost economic growth.

Despite this important place occupied by electronic money, few scientific researches deal with the relationship between this financial innovation and economic growth in the African context. The few studies that have been done for some African countries such as Uganda, Kenya, CEMAC countries… Andrionaivo and Kpodar (2011) , Adam and Walker (2015), Nampewo and Opolot (2016) Lwanga and Adong (2016), Robert (2019) , Dontsi (2023); were more interested in the relationship between electronic money and financial inclusion on the one hand and on the other hand when the analysis was done on the relationship between electronic money and economic growth, electronic money was taken as a dichotomous variable . It is therefore interesting to analyze the relationship between electronic money and economic growth in Africa, given that the use of electronic money allows financial inclusion of populations previously excluded from the classical financial system. Given that there are more mobile phone users than there are bank account holders.

2. Methodological Approach

In this study, we adopted a quantitative approach and the hypothetico-deductive method. This method was chosen because it allows us to start from the theoretical hypotheses already formulated by various authors on the impact of financial innovations on economic growth. We then collect data and test the results obtained to refute or support these hypotheses. It is in this context that the quantitative approach was used. In addition, we used the econometric approach to estimate our panel VAR model. For this, we used the STATA computer tool.

3. Literature Review

Universal access to financial services remains an important challenge to accelerate inclusive economic growth (Avom et al., 2023) (AFI, 2017). Thus, financial inclusion proves to be very effective as a lever for sustainable development in developing countries in general and African countries in particular (Tchamyou , Erreygers, & Cassimon, 2019 ; Bhattachary , Inekwe , & Valenzuala, 2018 ; (Avom et al., 2023) The impact of financial innovations on economic growth is an issue that raises many debates in the academic and political world. Financial innovations refer to all the new products, services, markets or institutions that modify the functioning of the financial system. They can have positive or negative effects on economic growth, depending on the contexts and mechanisms involved. For example, financial innovations can foster optimal resource allocation, risk diversification, investment and innovation incentives, or transaction cost reduction. But they can also generate distortions, information asymmetries, speculative behaviors, liquidity or solvency crises, or social inequalities. Thus, the issue of the impact of financial innovations on economic growth requires a thorough and nuanced analysis, taking into account the specificities of each innovation and each economic situation.

According to the Keynesian approach, electronic money allows for an inclusive financial system. The more inclusive the financial system is, the more banks have more deposits and, consequently, more capacity to lend to the private sector. Also, it can also foster risk diversification and efficiency of financial markets. However, financial innovation is not without perverse effects. It can also generate macroeconomic imbalances, speculative bubbles, financial crises and social inequalities. It can also make public regulation of the economy more difficult, by creating shadow areas and actors out of control. Thus, financial innovation in Keynesian theory presents both opportunities and challenges for economic growth.(Amal & Kaltoum, 2022)

The theory of Milton Friedman, Nobel Prize in economics in 1976, is one of the main references for analyzing the effects of financial innovations on the economy. According to Friedman, money plays a crucial role in economic fluctuations and inflation. He defends the quantitative theory of money, according to which the variation of the money supply determines the price level in the long term. He also advocates the free fluctuation of exchange rates and a moderate and regular growth of the money supply to ensure economic stability. Financial innovations can have positive or negative consequences depending on whether they facilitate or disrupt the functioning of the quantitative theory of money. For example, financial innovations that allow a better allocation of resources, a reduction of transaction costs or a diversification of risks are beneficial for the economy. On the other hand, financial innovations that lead to financial instability, excessive speculation or a loss of control of the money supply are harmful for the economy.

The classical approach, which based economic growth on the factor of the quantity of capital, labor and innovation, leaves aside the financial system and its contribution to economic growth. Despite this reluctance,

several empirical studies have demonstrated the importance of the financial system in economic growth. By analyzing the classical theory, one can consider that financial innovations are a factor of economic progress, because they facilitate the financing of productive investments and stimulate capital accumulation. In addition, the classical school emphasizes the role of saving as a source of funds for economic development. One can therefore glimpse the indirect role that financial innovations play in economic growth.

The neoclassical approach, on the other hand, adopts a more analytical and formalized perspective by focusing on the general equilibrium conditions between the different markets, including that of capital. It studies the effects of financial innovations on the optimal allocation of resources and on social welfare. The neoclassical school underlines the role of the interest rate as the price of equilibrium between supply and demand for capital. The new classical economy follows in the footsteps of the neoclassical school but by reinforcing the assumptions of rationality and anticipation of agents. The new classical economy challenges the Keynesian models that assign an active role to the state in regulating economic activity. It asserts that financial innovations have no real effect on economic growth, because they are anticipated and integrated by agents in their decisions. The new classical economy argues that only monetary policy can have an impact on economic growth, provided that it is unpredictable and credible. For example, Lucas shows that financial innovations such as credit cards or electronic payments do not affect the level of real output, but only the level of nominal prices.

For nearly fifteen years, empirical studies have been interested in the benefits of new financial innovations. This interest stems from a better understanding of the role that these financial innovations play in raising the financial inclusion rate (Robert, 2019; Cocou and Alexandre 2020); improving well-being by reducing extreme poverty (Ahmad, Green, & Jiang, 2020) (Kim, 2022); economic growth (Ikouet, 2019; Mawejja and Lakuna, (2019); Chibba (2009); and the conduct of monetary policy (Mawejja and Lakuna, 2019; Ndirangu and Nyamongo, (2015)). All previous research carried out on several African countries evaluated electronic money in the form of a dichotomous variable but in this research we were able to quantify the electronic money data thanks to the data taken from the GSMA reports as well as the various reports of electronic money services within telecommunications companies. Thus we have built a database that allowed us to use estimate a panel VAR model.

4. Presentation of the results

4.1. Preliminary tests

Since the panel VAR methodology requires that the variables are stationary, we test the stationarity of our variables in this study. Indeed, according to Granger et al. (1974), using non-stationary series in an econometric model leads to a spurious regression. For this purpose, two tests are performed: the Fisher-type unit root test based on the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979) and the Phillips-Perron (PP) unit root test (Phillips and Perron, 1988). (Phillips and Perron, 1988), which has some advantages. First, the data are not missing variables. Secondly, as Choi (2001) points out, the Fisher-type test combines the probability values of the individual statistics and constitutes a more convincing test than the Im, Pesaran and Shin test. Similarly, the Augmented Dickey-Fuller test is a test that takes into account the presence of autocorrelation in the series studied. Testing the stationarity of the variables means studying their stochastic characteristics. If these characteristics (mathematical expectation and variance) are changed over time, the time series is considered non-stationary; in the case of a stochastic process invariant, the time series is then stationary. We test the null hypothesis that the variable has a unit root (i.e. the variable is not stationary) against the alternative hypothesis that the variable does not have a unit root (i.e. the variable is stationary). At a significance level set a priori at 5%, the null hypothesis is rejected if the probability of the test (the P value) is lower than this significance level.

The results obtained are confirmed in Table 1 below:

Table 1: Unit root test (stationarity)

Variables	DFA-Fisher	DFA-Fisher with trend	PP-Fisher	PP-Fisher with trend
Growth	92,0049(0,0000)	64,7776(0,0002)	92,0049(0,0000)	64,7776(0,0002)
Electronic money	107,5081(0,0000)	88,6861(0,0000)	7,3121(0,0000)	192,6220(0.0000)
Urbanization	13,5613(0,0000)	227,3263(0,0000)	13.5613(0,0000)	227,3263(0,0000)
GFCF	420,4705(0,0000)	359,6690(0,0000)	165,1151(0,0000)	343,6330(0,0000)

Internet	18,4722 (0,0000)	405,6697(0,0000)	15,8802(0,0000)	295,8677(0,0000)
Infrastructure	108,0032(0,0000)	75,7532(0,0011)	108,0032(0,0000)	75,7532(0,0011)

Source: Author based on data from the World Bank, GSMA and electronic money service reports Notes: DFA, PP and GFCF stand for Augmented Dickey Fuller test (ADF), Phillips Perron test (PP) and Gross Fixed Capital Formation (GFCF), respectively. The values in parentheses are the probabilities of the tests (P-value).

The first column shows the results of the Dickey-Fuller test without trend and the second column introduces the trend. The third and fourth columns show the results of the Phillips-Perron test which is more robust to serial correlation. From the results above all variables are stationary at 1% significance level. Thus these results imply that panel VAR can be estimated using these variables. • Choice of optimal lag. The quality of panel VAR model estimation depends on the choice of optimal lag. It is therefore important to clearly specify the order p of lags in the panel VAR specification. To this end Andrews and Lu (2001) propose consistent moment and model selection criteria for GMM based on Hansen's J statistic of over-identification restrictions. The criteria they propose are: AIC (Akaike 1969), BIC (Akaike 1977; Schwarz 1978), and HQIC (Hannan and Quinn 1979). The results are confined in Table 7 below. From the results below the optimal lag is: one (1), as it is the lag that minimizes the three criteria. The PVAR estimates are therefore performed with a lag of 1.

Table 2: Selection of optimal lag

Lag	CD	J	J P-value	MBIC	MAIC	MQIC
1	1	50.07537	0.2789994	-136.3657	-39.92463	-77.85537
2	1	30.06878	0.4105755	-90.08212	-27.93122	-52.37547
3	1	16.07219	0.2452538	-37.78857	-9.927814	-20.88558
4	1	3565.549	0	3548.976	3557.549	3554.177

Source: Author based on data from the World Bank GSMA and electronic money service reports

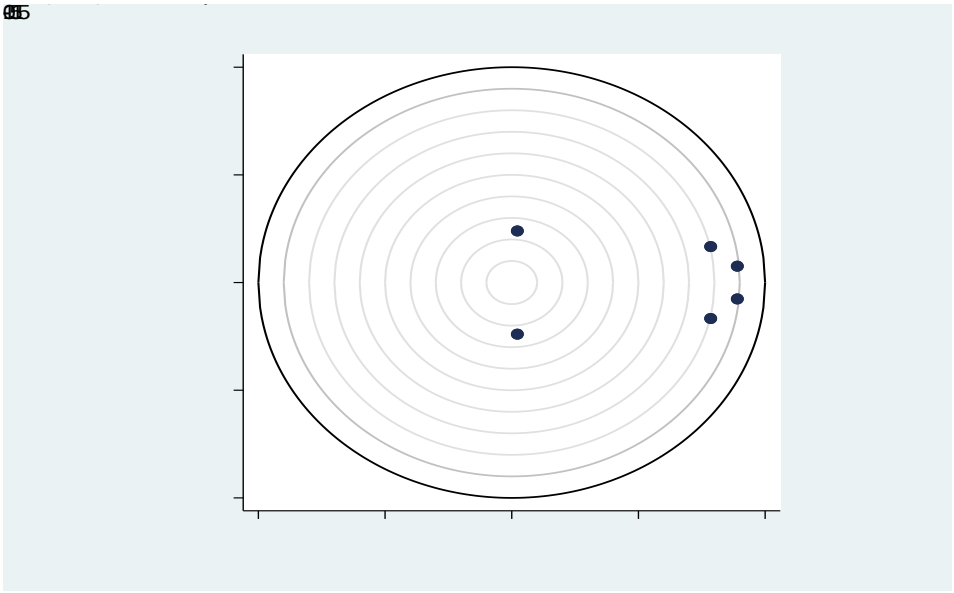
Notes: CD MBIC MAIC and MQIC are respectively global determination coefficient Bayesian information criterion Akaike information criterion and Hannan-Quinn information criterion.

Panel VAR Stability

Before proceeding to the variance decomposition of errors and impulse response functions, it is appropriate to examine the stability condition of the panel VAR. The stability condition implies that the panel VAR is invertible, and that its representation has the property of a vector moving average representation of infinite order (Abrigo and Love, 2016). The common way to decide whether the panel VAR is stable is to calculate the modulus of each eigenvalue of the estimated model. Lütkepohl (2005) shows that a panel VAR model is stable if each modulus of the companion matrices is strictly less than one.

In Figure 1, we plot the diagram of relative eigenvalues of the estimated panel VAR models with the complex components on the y-axis and the real component on the x-axis. Figure 2 shows that the model is stable because the roots of the companion matrix are all inside the unit circle. This result is confirmed in Table 8 since each modulus of the companion matrix is strictly less than one.

Figure 1. Stability of the PVAR model



Source: Author

Table 3: Stability of the PVAR model

Eigenvalues		
Real	Imaginary	Modulus
0.8903313	0.0759881	0.8935681
0.8903313	-0.0759881	0.8935681
0.7851001	-0.1670047	0.802666
0.7851001	0.1670047	0.802666
0.0221032	0.2396257	0.240643
0.0221032	-0.2396257	0.240643

Source: Author based on data from the World Bank, GSMA and electronic money service reports

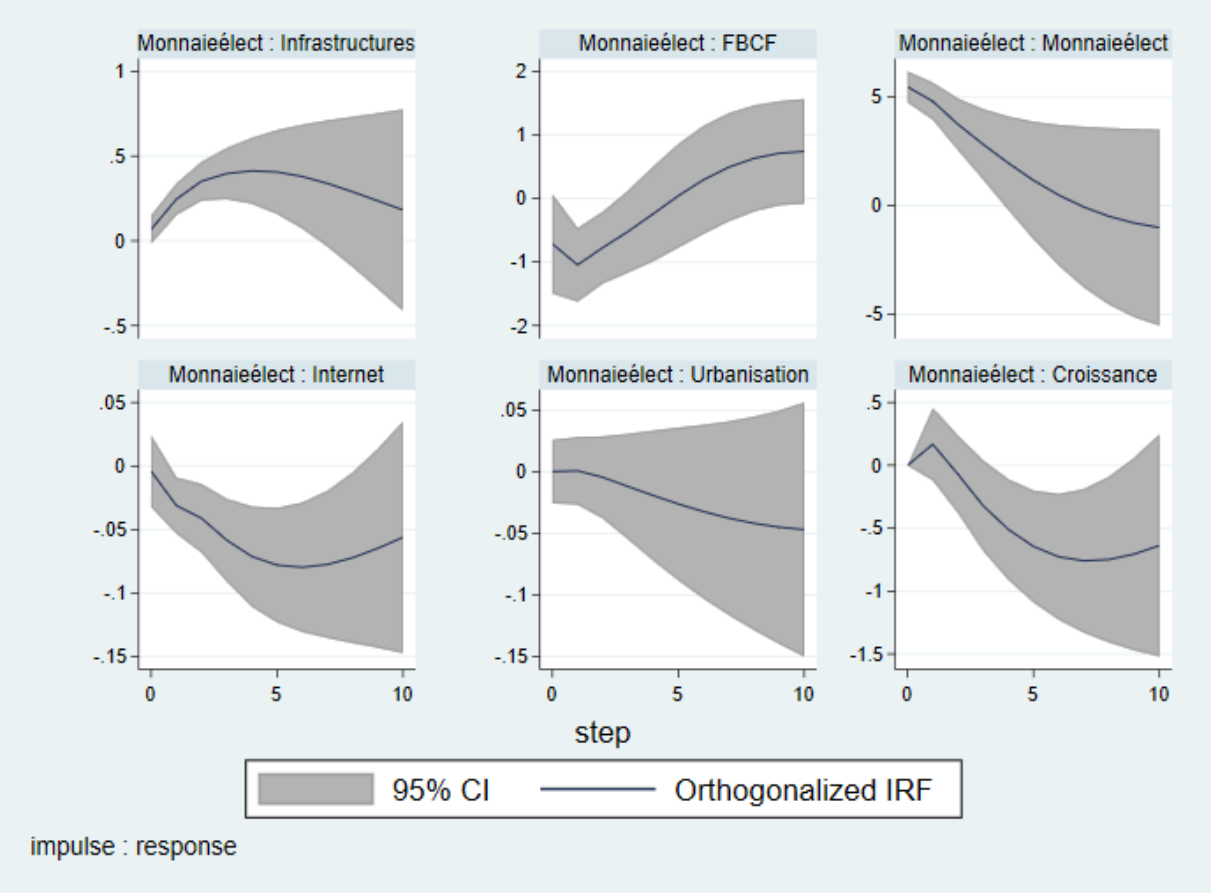
Table 4: Panel VAR estimation

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Growth	Electronic money	Urbanization	GFCF	Internet	Infrastructure
L. Growth	0.186***	-0.466***	-0.00799***	0.716***	0.0539***	-0.0616***
	(0.0557)	(0.129)	(0.00275)	(0.130)	(0.00799)	(0.0156)
L.Electronic money	0.0385**	0.918***	0.000102	-0.108***	-0.00275*	0.0332***
	(0.0189)	(0.0377)	(0.000987)	(0.0303)	(0.00150)	(0.00540)
L.Urbanization	0.449	1.234	0.965***	1.745**	0.194***	0.126

	(0.509)	(1.445)	(0.0302)	(0.875)	(0.0477)	(0.137)
L. GFCF	-0.0617*	0.233***	-0.00315**	0.714***	0.0136***	-0.0268***
	(0.0326)	(0.0341)	(0.00133)	(0.0633)	(0.00210)	(0.00541)
L.Internet	2.086	1.88***	-0.0144	-1.76***	-0.0191	-0.632*
	(1.849)	(3.797)	(0.0746)	(2.980)	(0.161)	(0.353)
L.Infrastructure	-1.169***	-0.0324	-0.0329	0.143	-0.0954**	0.631***
	(0.370)	(1.054)	(0.0217)	(0.784)	(0.0419)	(0.126)
Hansen's P-value	0.573	0.573	0.573	0.573	0.573	0.573
Observations	126	126	126	126	126	126

Source: Author based on data from the World Bank, GSMA and electronic money service reports Notes: Standard errors are in parentheses and *** p<001, ** p<005, * p<01 represent significance levels at thresholds of 1; 5 and 10% respectively.

Figure 2: Impulse response functions



Source: Author based on data from the World Bank, GSMA and electronic money service reports

Table 5: Variance decomposition Impulse variables Forecast horizon Growth Electronic money

	impulse variables					
Forecast horizon	Growth	Electronic money	Urbanization	GFCF	Internet	Infrastructure
Growth						
1	1	0	0	0	0	0
2	0.9239652	0.0045524	0.0002696	0.0014072	0.0271652	0.0426403
3	0.84636	0.004647	0.0011717	0.0249354	0.048485	0.074401
4	0.7861578	0.016361	0.0028665	0.0520845	0.0481222	0.094408
5	0.7381213	0.0416398	0.0046592	0.0655766	0.0432326	0.1067704
6	0.6985496	0.0764918	0.0059408	0.0671599	0.0388119	0.1130461
7	0.6646011	0.1155294	0.0064916	0.0630765	0.0355209	0.1147806
8	0.6345244	0.15365	0.0064278	0.0586738	0.0331791	0.1135449
9	0.6076657	0.1871284	0.0060848	0.0569921	0.031485	0.110644
10	0.5840082	0.2139493	0.0058806	0.0588888	0.0302059	0.1070672

Source: Author based on data from the World Bank, GSMA and electronic money service reports

The table 5 above presents the variance decomposition of the effect of electronic money on economic growth. According to the estimates, about 21,39% of the variation of economic growth can be explained by electronic money in the last period. Moreover, urbanization and gross fixed capital formation account for about 0,58 and 5,88%, respectively, of the variation of economic growth in the 10th period. Furthermore, ICTs captured by the internet network and the level of infrastructure are responsible for the variation of economic growth for about 3,02 and 10,71%, respectively. As expected, economic growth is itself responsible for the largest variation of 58,40%.

Table 6: Long-term relationship by dynamic fixed effects regression in the full panel

Dynamic Fixed Effects Regression: **Estimated Error Correction Form**
(Estimate results saved as **DFE**)

	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
ec						
Monnaieélect						
L1.	.0029769	.0152627	0.20	0.845	-.0269375	.0328913
Urbanisation						
L1.	-.4897652	.2170706	-2.26	0.024	-.9152158	-.0643147
FBCF						
L1.	-.1091318	.0360584	-3.03	0.002	-.1798049	-.0384586
Internet						
L1.	.1888726	.0764907	2.47	0.014	.0389535	.3387917
SR						
ec	-1.096324	.0851652	-12.87	0.000	-1.263245	-.9294036
Monnaieélect						
D1.	-.1363524	.0333113	-4.09	0.000	-.2016414	-.0710634
Urbanisation						
D1.	.7963983	1.132535	0.70	0.482	-1.423329	3.016125
FBCF						
D1.	-.0353145	.0548714	-0.64	0.520	-.1428603	.0722314
Internet						
D1.	.2255648	.1244144	1.81	0.070	-.018283	.4694126
_cons	23.67254	9.720847	2.44	0.015	4.62003	42.72505

Source: Author based on data from the World Bank, GSMA and electronic money service reports

Comment: According to the table above, in the long term, the coefficient of electronic money in the dynamic fixed effects regression model in the full panel is 0,0029769. This means that for each unit increase in electronic money, economic growth increases on average by 0,0029769 units, assuming that all other predictive variables remain constant. However, the z-value for this coefficient is 0,20 and the associated p-value is 0,845. These values suggest that this association is not statistically significant. In this case, it is possible that in the long term electronic money has no significant effect on the response variable in the model.

In the short term, the coefficient of electronic money in the dynamic fixed effects regression model in the full panel is -1,096324. This means that for each unit increase in electronic money, economic growth decreases on average by 1,096324 units, assuming that all other predictive variables remain constant. The z-value for this coefficient is -12,87 and the associated p-value is 0,000. These values suggest that this association is statistically significant. In general, a p-value lower than the significance threshold (often set at 0,05) indicates a statistically significant association between the predictive variable and the response variable. In this case, it seems that electronic money has a significant effect on economic growth in the short term.

5. DISCUSSION OF RESULTS

According to the estimates from the PVAR model on the whole sample (CEMAC, UEMOA , CAE), about 21,39% of the variation of economic growth can be explained by electronic money in the last period.

This result corroborates with the classical and Keynesian theory, electronic money is a factor of technical progress that leads to the optimal allocation of resources and the empirical works of Avom et al. 2023, Amad et al, 2020, Amal and Kaltoum, 2022 and Wenxiu (2019) Result 8. Long-term relationship by dynamic fixed effects regression in the complete panel In the long term, the coefficient of electronic money in the dynamic fixed effects regression model in the complete panel gives the z value for this coefficient is 0.20 and the p value associated is 0.845. These values suggest that this association is not statistically significant. On the other hand, in the short term the p value associated is 0.000 which suggests that this association is statistically significant.

The new classical economy is based on the assumptions of rationality and anticipation of agents. It challenges the Keynesian models and asserts that financial innovations have no real effect on economic growth, because they are anticipated and integrated by agents in their decisions.

6. Conclusion

The main objective of this work being to analyze the impact of electronic money on economic growth. Specifically: • -analyze the impact of electronic money on economic growth as well as gross fixed capital formation, urbanization level of countries; level of information and communication technologies (ICT) and level of physical infrastructure of countries. • Thanks to a quantitative approach and the hypothetical-deductive method and the econometric approach to estimate our VAR panel model. • The results are as follows: • Electronic money impacts economic growth in sub-Saharan African countries in the short term. • In conclusion, we can say that electronic money presents significant disparities between the three regional zones studied. The WAEMU and EAC are ahead of CEMAC, which still has to remove the barriers to its development. Electronic money is a potential lever for regional integration and strengthening trade between African countries.

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