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Analysis of the relationship between financial development and economic growth in Mauritania

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Abstract: This article examines the causal link between financial development and economic growth in Mauritania during the period 1992-2019 using Johansen's approach based on the ordinary least squares (OLS) method. The empirical results of this study show that in the short-run only the variables credit to the private sector and mobilization of savings are significant with negative effects. However, in the long-run, it is only the variables: public expenditure, trade openness and credit to the private sector, that are significant. The impact of the first variable was positive while those of the last were negative.

Keywords: Financial development; Economic growth ; Cointegration ; Estimation ; Model.

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1. INTRODUCTION

The link between financial development and economic growth has long been established. Numerous theoretical and empirical studies have affirmed the positive impact of this sector on economic growth. Schumpeter (1912)[1] supports the idea that the financial system plays an important role in the growth of the real economy. At the beginning of the 70s, McKinnon (1973)[2] and Shaw (1973)[3] also conclude that the financial sector accelerates economic growth and improves economic performance by facilitating the orientation of capital towards the most productive sectors, hence the development of this sector promotes economic development. Thereby, Greenwood et Jovanovic (1990)[4], Pagano (1993)[5] and King et Levine (1993)[6] have all shown in their studies that the financial system has a positive impact on economic growth, thanks to its essential role in the mobilization of savings, the allocation of resources and the effective management of risk.

It is in this perspective that this study aims to analyze econometrically the level of development of the Mauritanian financial sector and its role in promoting economic growth after the application of financial reforms.

To do this, our study is organized as follows: Section I will be devoted to the presentation of the literature review on the link between financial development and economic growth.

In the second section, we will focus on the analysis of the results of the econometric estimation inspired by the work of King et Levine (1993 a, b, c) et Andersen (2003)[7]. First, we will start, by checking some important assumptions like stationarity and cointegration of the series, before tackling the estimation of the specified model using the ordinary least squares (OLS) method via Eviews. Secondly, we will move on to the econometric interpretation of the results obtained by estimating the model, while using the appropriate econometric tests.

The third section will be dedicated to the economic interpretation of the estimated coefficients. Finally, in the last section, we will try to draw the main conclusions.

2. LITERATURE REVIEW

Empirically, several studies have been conducted to examine the relationship between financial development and economic growth. For instance, King and Levine (1993)[8], through a sample of 77 countries during the period 1960-1989, show the existence of a positive correlation between each variable of financial development and the three growth indicators, in a confidence interval of 99%. In another empirical study on the effect of the functioning of stock markets and banks on long-term economic growth, Levine et Zervos (1998)[9] find that this effect is positive and robust. But, they could not claim that the integration of international financial markets positively affects long-term growth.

In addition, another study carried out on 40 countries are well developed countries and others in the process of development for the period 1976-1998, Beck et Levine (2004)[10] show that the development of stock markets and banks has a positive influence on economic growth. Caporale et al. (2003)[11] found a strong correlation between stock market development and economic growth in four developing countries: Chile, Korea, Malaysia and the Philippines.

otherwise, Demetriades & Hussein (1996)[12] studied the relationship between financial development and economic growth for 16 countries during the period 1960-1990. The two authors have shown that this relationship is bidirectional and that it varies between countries, which means that financial development does not contribute to the promotion of economic growth. Thereby, De Gregorio et Guidotti (1995)[13] examined the empirical link between economic growth and financial development for a sample of 95 countries over the period 1960-1985. Their study reveals that this relationship is significantly negative in 12 Latin American countries. Harris (1997)[14] also concludes that there is a weak relationship between financial market development and economic growth for a sample of 49

developed and developing countries between 1980 and 1991. Based on panel data for 15 countries in sub-Saharan Africa during the period 1976-2005, Ahmed (2010)[15] found that there is a positive relationship between financial development and economic growth in seven out of 15 countries.
Generally, many empirical studies show a positive relationship between financial development and economic growth, but there are also others that prove the opposite.

2.1. Empirical analysis

Our study is based on the analysis of annual time series over the period from 1992 to 2019. The sources of our data are: World Development Indicators from the World Bank, the National Statistics Office in Mauritania, and the Annual Reports of the Central Bank of Mauritania.

2.2. Model specification

To analyze the level of financial development in Mauritania and its role in promoting economic growth after the application of financial liberalization, we will focus on the specification of an econometric model inspired by the work of King and Levine (1993 a, b, c) and Anderson (2003).

The variable to be explained in our econometric model is the annual growth rate of per capita GDP, TXPIB. The explanatory variables are seven, including three financial indicators expressing and measuring the development of the financial sector (credit to the private sector, deposits in the banking sector and money supply M2), and four control variables comprising the other factors likely to affect the economic growth (government expenditure, inflation rate, trade openness rate and school enrollment rate).

We use a standard equation suggested by the authors mentioned above:[7]

$$TXPIB_t = \beta_0 + \beta_1 LCREDPRIV_t + \beta_2 LMOBEP_t + \beta_3 LM2_t + \beta_4 LDEPUB_t + \beta_5 INF_t + \beta_6 LOUVCOM_t \ \beta_7 LTXSCOL_t + \varepsilon_t$$

Where:

$TXPIB_t$: is the annual growth rate of per capita GDP.
$LCREDPRIV_t$: Credit granted to the private sector.
$LMOBEP_t$: Savings mobilization.
$LM2_t$: Money supply relative to GDP (M2).
$LDEPUB_t$: Public expenditures.
INF_t : Inflation.
$LOUVCOM_t$: Trade openness.
$LTXSCOL_t$: The schooling rate.
ε_t represents measurement errors and excluded variables.
We use logarithmic data to derive elasticities.

2.3. Estimation results

As part of the estimation of the model, we use the method of Ordinary Least Squares (OLS). But before this estimate, a verification of certain hypotheses will be necessary.

2.3.1. Stationarity Analysis

For stationarity analysis, Augmented Dickey Fuller (ADF) tests are used. As indicated in the **Table 1** summarizing the ADF tests, only the variables TXPIB, INF and LCREDPRIV are stationary in level,

while the other variables are integrated of order one, because they have become stationary after having been differentiated only once.

Table 1: Unit Root Tests

Variables	*ADF statistic (Level)*	*ADF statistic (1st differnece)*	*MacKinnon 1%*	*MacKinnon 5%*	*MacKinnon 10%*	*Order of integration*
TXPIB	***-4.762651 (0.0007)***	*-*	***-3.752946***	***-2.998064***	***-2.638752***	***I(0)***
ltxdepub	***-2.258877 (0.1919)***	***-4.122571 (0.0038)***				***I(1)***
lmobepa	***0.094263 (0.9593)***	***-4.471366 (0.0016)***				***I(1)***
lcredpriv	***-4.035744 (0.0047)***	*-*				***I(0)***
lm2	***-1.381130 (0.5764)***	***-5.564570 (0.0001)***				***I(1)***
inf	***-3.671167 (0.0107)***	*-*				***I(0)***
louvcom	***-1.125905 (0.6904)***	***-4.148816 (0.0036)***				***I(1)***
ltxscol	***-0.437455 (0.8867)***	***-4.336263 (0.0027)***				***I(1)***

2.3.2. Cointegration test

To determine the number of cointegration relationships, the Johansen test is used, which detects cointegration relationships if they exist. Analysis **Table 2** shows that at a threshold of 5%, there are four out of eight cointegrating relationships, that's to say four relationships are non-cointegrated. This means that the specification of an error correction model is more adequate, and it will also highlight the short and long-run behaviors.

Table 2: Cointegration test of Johansen

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	*Eigenvalue*	*Trace Statistic*	*0.05 Critical Value*	*Prob.***
None *	*0.957649*	*258.3680*	*159.5297*	*0.0000*
At most 1 *	*0.924467*	*176.1620*	*125.6154*	*0.0000*
At most 2 *	*0.759950*	*108.9990*	*95.75366*	*0.0045*
At most 3 *	*0.658564*	*71.89948*	*69.81889*	*0.0338*
At most 4	*0.546818*	*43.95998*	*47.85613*	*0.1108*
At most 5	*0.490630*	*23.38200*	*29.79707*	*0.2278*
At most 6	*0.184935*	*5.842929*	*15.49471*	*0.7140*
At most 7	*0.020038*	*0.526269*	*3.841466*	*0.4682*
**** denotes rejection of the hypothesis at the 0.05 level***				

2.3.3. Model estimation

Referring to **Table 4** which summarizes all the estimated coefficients, the error correction model that we have specified is correct. Indeed, the error correction coefficient (return force at equilibrium) which is equal to -0.99 is negative and significantly different from 0. For our model, the coefficient of determination R^2 = 0.96 means that the explanatory variables explain 96.78% of the fluctuations in the GDP growth rate. Thereby, the F^* calculated ($F^* = 22.10$) is greater than the theoretical F (F= 0.000005), the hypothesis H0 of nullity of all the coefficients is then rejected and consequently the model is globally significant.

Le **Table 3** summarizes the robustness tests ensuring the validity of the model. With this in mind, for ***the Serial Correlation LM*** test, the probability obtained is greater than the critical value of 5%. We therefore accept the null hypothesis of the absence of autocorrelation of errors. We also note that the probability obtained by the Ramsey test (RESET) is greater than 5%, that is to say that we accept the null hypothesis, the model is indeed linear and there is no problem of specification. Moreover, the Jarque-Bera normality test and the heteroscedasticity test (ARCH) confirmed that the residuals are normally homoscedastic.

Table 3: Robustness tests

Statistical tests	***Test stat probability***	***Acceptance Rule: H0***	***Hypothesis : H0***
Ramsey RESET	*(0.66)*	*Prob > 0,05*	***The model is well specified***
Serial correlation LM	*(0.10)*	*Prob > 0,05*	***Uncorrelated errors***
ARCH	*(0.53)*	*Prob > 0,05*	***Homoscedastic errors***
Jarque-Bera	*(0.19)*	*Prob > 0,05*	***residue is normal***
Notes: The values in parentheses () are the probabilities associated with the test statistics.			

Finally, to study the stability of the model, we use the graphical tests CUSUM and CUSUMQ. It appears from the figures below that the two curves do not intersect the corridor (broken line in red), so the model is structurally (Figure 1) and punctually (Figure 2) stable.

Figure 1: CUSUM test

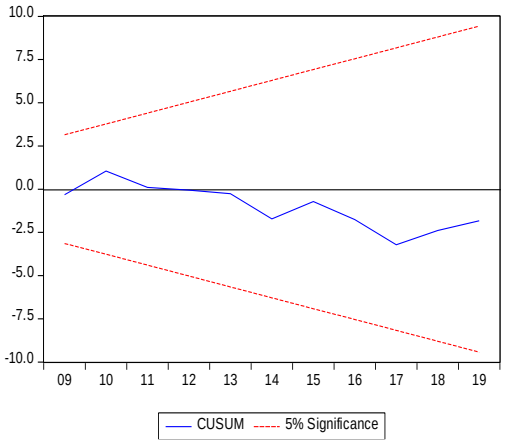
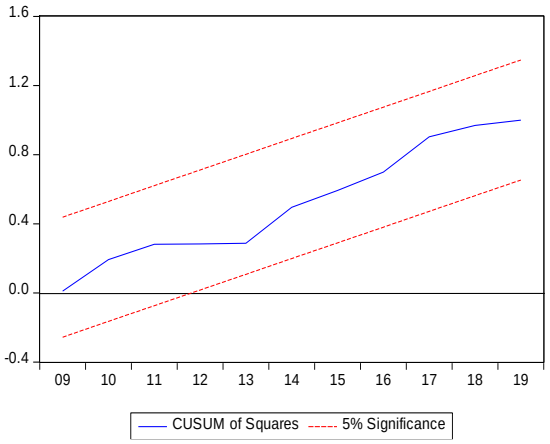


Figure 2: CUSUMQ test



3. ECONOMIC INTERPRETATION OF RESULTS

In order to limit the policy of direct State intervention in the monetary sphere and to create an appropriate environment for monetary stability and the promotion of economic growth, the Mauritanian authorities have undertaken certain financial reform measures, which essentially on the privatization of banks, the liberalization of monetary and foreign exchange policy and the improvement of the supervision of the regulation of the financial system.

Although these measures did not lead to the expected results, they seem to have significant effects on several financial and economic indicators.

3.1. The relationship between savings mobilization and economic growth

According to estimates, the relationship between savings mobilization and economic growth rate has proven to be negative and significant in the short-run, that's to say a 1% increase in the savings mobilization ratio has the effect of a decrease in 0.22% of economic growth rate.

This result was not expected, but it may have the explanation in the fact that the liquidity crises that the Mauritanian banking system undergoes, from time to time, drag in the mud the public confidence in this sector to the point that of depositors withdraw their deposits. This can be the cause of a credit crunch that weakens the ability of companies to invest and households to consume, and consequently the deterioration of economic growth.

3.2. The relationship between private credit and economic growth

Estimates show that credit to the private sector has a significant negative effect on short- and long-run economic growth. Indeed, in the short-run, a 1% increase in the rate of loans granted to the private sector results in a 0.19% decrease in the economic growth rate. In the long-run, a 1% increase in the rate of credit to the private sector generates a decrease of 0.13% in the rate of economic growth.

This result does not conform to what was expected, but it can be justified by the high level of bad debts accumulated in the portfolio of Mauritanian banks, which represented 39%, 30% and 43% of all loans granted. during the years 1992, 1996 and 2000 respectively. What makes banks reluctant to grant loans for fear of bank failure. The origin of these bad debts is the lack of information on the companies and their projects presented for financing. In most cases, not only the banks cannot assess the true

value of these companies and their ability to repay, but also the companies can conceal certain specific information about their present projects.

3.3. The relationship between public expenditure and economic growth

In the short-run, public expenditure has no significant impact on economic growth, despite the positive relationship between the two variables. Unlike in the long-run where a 1% increase in the rate of public expenditure generates an increase of 0.07% in the rate of economic growth, which means that public expenditure promotes economic growth in the long-run.

This result is entirely consistent with the expected sign, and could be justified by the fact that the increase in the share of resources devoted to investment expenditure – for example in infrastructure – will increase the capital stock of the economy by a part. On the other hand, the improvement in the share of social spending – especially in education and health – will contribute to the accumulation of human capital.

3.4. The relationship between trade openness and economic growth

The estimates made show that the relationship between trade openness and the economic growth rate is negative and not significant in the short-run. On the other hand, in the long-run, trade openness has a negative and statically significant impact on economic growth. Une augmentation de 1% du taux d'ouverture commerciale engendre une diminution de 0.07% du taux de croissance économique. This result is not in line with what was expected, but it could find an explanation in the structure of Mauritanian exports and imports.

Indeed, the analysis of the structure of Mauritanian exports, which have a predominance of extractive industries and fishing, shows a weak diversification. This makes the country's economy vulnerable to fluctuations in world prices. Moreover, Mauritanian exports are generally raw products with no added value. Hence, they have a limited contribution to budget revenue and a weak role in job creation.

For imports, they are characterized by a preponderance of food products, the demand for which is not flexible, with very low local production which cannot meet domestic demand. This exposes the economy to external shocks.

4. CONCLUSION

At the end of this study, we can draw the following conclusions: firstly, the results of the Johansen test based on the Trace indicated that at 5% there are four out of eight cointegrating relationships, that is-that is, four relations are non-cointegrated. Therefore, we estimated an error correction model (ECM).

Secondly, the causality study showed that in the short-run only the CREDPRIV and MOBEPA variables are significant with negative effects. On the other hand, in the long -run, it is only the variables TXDEPUB, OUVCOM and CREDPRIV that are significant.

The impact of the first variable was positive while that of the latter was negative. Moreover, the variables INF, M2 and TXSCOL were not significant, neither in the short-run nor in the long-run.

Finally, on the economic level, the model allowed us to observe that:

- A 1% increase in the short-run savings mobilization ratio results in a 0.22% decrease in the economic growth rate.

- A 1% increase in the rate of loans granted to the private sector in the short-run results in a decrease of 0.19% in the economic growth rate. In the long-run, a 1% increase in the rate of credit to the private sector generates a decrease of 0.13% in the economic growth rate.
- A 1% increase in the long-run public expenditure rate generates a 0.07% increase in the economic growth rate.
- A 1% increase in the long-run trade openness rate leads to a 0.07% decrease in the economic growth rate.

REFERENCES

[1] J. A. Schumpeter, *The Theory of Economic Development, published in German (1912), in English*. Cambridge, Mass,.: Harvard University Press, 1934.

[2] R. I. McKinnon, *Money and capital in economic development*. Brookings Institution Press, 1973.

[3] E. S. Shaw, « Financial deepening in economic development », 1973.

[4] J. Greenwood et B. Jovanovic, « Financial development, growth, and the distribution of income », *J. Polit. Econ.*, vol. 98, nº 5, Part 1, p. 1076–1107, 1990.

[5] M. Pagano, « Financial markets and growth: an overview », *Eur. Econ. Rev.*, vol. 37, nº 2-3, p. 613–622, 1993.

[6] R. G. King et R. Levine, « Financial intermediation and economic development », *Cap. Mark. Financ. Intermediation*, p. 156–189, 1993.

[7] S. R. Andersen, *The influence and effects of financial development on economic growth. An empirical approach*. Chr. Michelsen Institute, 2003.

[8] R. G. King et R. Levine, « Finance, entrepreneurship and growth », *J. Monet. Econ.*, vol. 32, nº 3, p. 513–542, 1993.

[9] R. Levine et S. Zervos, « Stock markets, banks, and economic growth », *Am. Econ. Rev.*, p. 537–558, 1998.

[10] T. Beck et R. Levine, « Stock markets, banks, and growth: Panel evidence », *J. Bank. Finance*, vol. 28, nº 3, p. 423–442, 2004.

[11] G. M. Caporale, P. G. A. Howells, et A. M. Soliman, « Stock Market Development And Economic Growth: The Causal Linkage », *J. Econ. Dev.*, vol. 29, nº 1, p. 33-50, 2004.

[12] P. O. Demetriades et K. A. Hussein, « Does financial development cause economic growth? Time-series evidence from 16 countries », *J. Dev. Econ.*, vol. 51, nº 2, p. 387-411, déc. 1996.

[13] J. De Gregorio et P. E. Guidotti, « Financial development and economic growth », *World Dev.*, vol. 23, nº 3, p. 433–448, 1995.

[14] R. D. Harris, « Stock markets and development: A re-assessment », *Eur. Econ. Rev.*, vol. 41, nº 1, p. 139–146, 1997.

[15] A. D. Ahmed, « Financial liberalization, financial development and growth linkages in Sub-Saharan African countries: An empirical investigation », *Stud. Econ. Finance*, vol. 27, nº 4, p. 314–339, 2010.

[16] R. Levine, *Financial development and economic growth: views and agenda*. The World Bank, 1999.

ANNEXES

Table 4: Model estimation

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	*0.149291*	*0.120972*	*1.234103*	*0.2429*
DLTXDEPUB	*0.052383*	*0.038364*	*1.365401*	*0.1994*
DLOUVCOM	*-0.042133*	*0.037059*	*-1.136921*	*0.2797*
DINF	*-0.021299*	*0.091102*	*-0.233788*	*0.8194*
DLCREDPRIV	*-0.189941*	*0.053568*	*-3.545812*	*0.0046*
DLMOBEPA	*-0.225076*	*0.058542*	*-3.844659*	*0.0027*
DLM2	*-0.044295*	*0.062689*	*-0.706582*	*0.4945*
DLTXSCOL	*0.041116*	*0.050110*	*0.820523*	*0.4293*
TXPIB(-1)	*-0.990786*	*0.137711*	*-7.194660*	*0.0000*
LTXDEPUB(-1)	*0.074465*	*0.031739*	*2.346151*	*0.0387*
LOUVCOM(-1)	*-0.074745*	*0.036749*	*-2.033925*	*0.0470*
INF(-1)	*0.076719*	*0.128177*	*0.598542*	*0.5616*
LCREDPRIV(-1)	*-0.132303*	*0.069377*	*-1.907030*	*0.0480*
LMOBEPA(-1)	*0.059234*	*0.051085*	*1.159514*	*0.2708*
LM2(-1)	*-0.067559*	*0.065849*	*-1.025958*	*0.3269*
LTXSCOL(-1)	*0.141362*	*0.051973*	*2.719928*	*0.0699*
R-squared	*0.967896*	*Mean dependent var*		*0.001441*
Adjusted R-squared	*0.924118*	*S.D. dependent var*		*0.061890*
S.E. of regression	*0.017049*	*Akaike info criterion*		*-5.018260*
Sum squared resid	*0.003197*	*Schwarz criterion*		*-4.250356*
Log likelihood	*83.74651*	*Hannan-Quinn criter.*		*-4.789922*
F-statistic	*22.10916*	*Durbin-Watson stat*		*2.485471*
Prob(F-statistic)	*0.000005*			