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5-1-2016

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Farah Elias Elhannani  
*University of Tlemcen*

Abou Bakr Boussalem  
*University of Mila*

Mohamed Benbouziane  
*University of Tlemcen*

## Recommended Citation

Topics in Middle Eastern and North African Economies, electronic journal, Volume 18, Middle East Economic Association and Loyola University Chicago, May, 2016, <http://www.luc.edu/orgs/meea/>

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# Financial development and the oil curse: Evidence from Algeria

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Farah Elias Elhannani<sup>1</sup>  
Abou Bakr Boussalem<sup>2</sup>  
Mohamed Benbouziane<sup>3</sup>

***JEL Classification:*** O4; O5; G2

***Keywords:*** Oil Curse; Financial Development; Algeria

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<sup>1</sup> Farah ELIAS ELHANNANI is a PhD candidate at the faculty of economics and Management, University of Tlemcen, Algeria Tel: 00213 551 55 47 68, email: faraheliaselhannani@yahoo.fr.

<sup>2</sup> Abou Bakr BOUSSALEM is an assistant professor at the faculty of Economic, University of Mila, Algeria. Tel: 00213 670 01 01 11, email: bakeur87@yahoo.fr

<sup>3</sup> Mohamed BENBOUZIANE is a professor of finance at the faculty of economics and management and director of MIFMA laboratory, University of Tlemcen, Algeria Tel: 00213 561329868, email:mabenbouziane@yahoo.fr .

***Abstract:***

Most of the empirical evidence has shown that the majority of oil dependent countries have the low level of financial development; thus, they are much more volatile and exposed to the oil shocks and the so named “oil curse”. This paper aims to investigate the impact of the Algerian financial system—as one of major oil economies—on the economic growth and escaping the oil curse. Over the past two decades, Algeria has courageously attempted to modernize its financial system despite social strife and challenges posed by the large hydrocarbon sector and an inefficient public sector. In fact, various reforms have been undertaken since the early 1990s to the transition from planned to an open market economy.

So, the first section provides the research background based on a theoretical model and a set of empirical studies about financial development and the oil curse. An analytical framework of the Algerian financial system evolution is provided in the second section, focusing on the two phases: 1990-1999 and 2000-2011. Finally, using an econometric growth regression model to test the impact of financial development in Algeria over the period 1980-2014, the preliminary results show that the financial development enhanced economic growth but it has not contributed in reducing the negative effect of oil rents.

## **I - Introduction:**

The last two decades have witnessed a booming of literature on the relationship between natural resources and economic growth under the so-called “resource curse” hypothesis. What are the main causes beyond such curse and which remedies can be suggested to escape it?

Most of the empirical evidence has shown that the majority of resource dependent countries have the low level of financial development (Gelb 1988, 2010; Sachs and Warner 1997, 2001; Cordon and Neary 1982; Frenkel 2012; Mehlum, Moene and Torvik 2005; Albadawi and Soto 2012). Hence, developed financial institutions are one of the solutions to pulse the economic growth and escape the curse driven by resource rents. Algeria, as one of the major oil exporters and producers countries, has courageously attempted to modernize its financial system despite social strife and challenges posed by the large hydrocarbon sector and an inefficient public sector. In fact, various reforms have been undertaken since the early 1990s to the transition from planned to an open market economy.

This paper aims to investigate in the impact of the Algerian financial system, on the economic growth and escaping the oil curse and seeks to answer the question: *Have the financial reforms contributed in enhancing economic growth, and have they diminished the negative effect of the oil rents?*

To do so, the research is divided into three sections: the first section provides the research background based on a theoretical model and a set of empirical studies about financial development and the oil curse. An analytical framework of the Algerian financial system evolution is provided in the second section, focusing on the two phases: 1990-1999 and 2000-2011. Finally, using an econometric growth regression model to test the impact of financial development in Algeria over the period 1990-2011, the preliminary results show that the financial development enhanced economic growth but it has not contributed in reducing the negative effect of oil rents.

## **II - Research backgrounds:**

### **II-1 - The natural resource curse hypothesis:**

The natural resource curse—or more specifically the oil curse—is a phenomenon which appears in most countries endowed with the natural resources. Such countries suffer from bad performance in their economic growth, in which there exists a negative relationship between the resource abundance and the economic growth (Sachs and Warner 1997, 2001).

There are two know explanations when examining the “oil curse”. The first explanation is purely economic, starting with the “Dutch Disease” (Cordon and Neary 1982), then the

procyclicality of fiscal policy (Kaminsky and Reinhart 2005), and the recent volatility view (Aghion and Banarjee 2005). The second explanation, however, inserts the role of politics and institutional quality to explain that curse.

**The Dutch Disease Channel:**

The Dutch Disease appears when the boom in the resource sector squeezes other non-resource tradable sectors by making a pressure on the real exchange rate (Cordon and Neary 1982). The key variable in this channel is the real exchange rate: a boom in the resource sector boosts the exports of this sector which leads to a real appreciation of the exchange rate through the high inflows of the foreign currency. Such appreciation will hurt the profitability of other non-resource sectors.

**Volatility and procyclicality of fiscal policy:**

Most of commodities, especially oil, are characterized by a high volatility in their prices, such volatility negatively affects the economic growth in resource dependent countries (Aghion and Banarjee 2005). This effect is related with the degree of financial development. Many recent studies have explained the volatility view of the curse.

Aghion *et al.* (2006) showed that macroeconomic volatility driven by exchange rate fluctuations affects growth in countries with thin capital markets. In the same framework, F. Van Der Ploeg and Poelhekke (2008) argued that the volatility of natural resources causes a severe volatility of output per capita. Furthermore, P. Collier and B. Goderis (not dated), in their empirical analysis, showed a positive short term effect of commodity price on output but negative long term effects.

The volatility of the oil windfalls in exporting countries leads to the so-called “procyclicality” of macroeconomic policies and capital flows. Fiscal policy is contractionary in bad times—when the oil receipts decline—and expansionary in good times—in a boom (Kaminsky, Reinhart and Végh 2005). Procyclical capital flows are also resulting from the procyclicality of fiscal policy (Frenkel 2012). As for the monetary policy, its procyclicality is related to the exchange rate regime.

**The political and institutional explanation:**

Beyond the economic explanation of the oil curse, the recent researches found a crucial role of politics and institutions quality in occurring and exacerbating this curse. Strong institutions, governance, democracy and human capital represent key determinants in managing the oil revenues and achieving development in oil rich countries. In fact, an important empirical literature confirmed that.

Mehlum, Moene, and Torvik (2005) argued that natural resource dependence affects growth negatively when institutional quality is bad. Arezki and Gylfason (2011) linked the economic aspect of the curse with the political one, where their empirical results showed that the volatility channel leads to an increase in non-resource growth in democracies but the inverse for the autocracies. Ross (1999) discussed the role of politics in the occurrence of the oil curse through rent seeking behavior. Using a flexible econometric model, Albadawi and A.Soto (2012) found that the existence of the oil curse is conditional on bad political governance.

## II-2 - The theoretical model:

In their famous book about growth and volatility, Aghion and Banarjee (2005) argued that the macroeconomic volatility driven by terms of trade or commodity price shocks may slow innovations and depress growth in economies with poorly developed financial institutions.

To simply understand the argument of Aghion, we pursue the following demonstration<sup>1</sup>:

- The price level  $P_t$  is closed to the nominal exchange rate  $S_t$  :

$$P_t = S_t P_t^* \quad P_t^* \sim 1$$

- The nominal wages  $W_t$  are pre-determined:

$$W_t = \phi A_t E[P_t] \rightarrow W_t = \phi A_t E[S_t] : \phi < 1 \text{ is a constant, } A_t \text{ is the productivity.}$$

- $Y_t = A_t \sqrt{l_t}$  : is the equation of output following the production function where  $l_t$  indicates the employment.

- The profits are determined by:  $\pi_t \equiv A_t S_t \sqrt{l_t} - \phi A_t E[S_t] l_t$

- The next period's value of innovations:  $V_{t+1} = V P_{t+1} A_{t+1} / A_{t+1} = \gamma A_t$

The constant  $\gamma$  is superior to the unity if entrepreneurs have sufficient funds to innovate, otherwise:  $A_{t+1} = A_t$ . Note that firms have sufficient funds (profits plus resource revenues  $Q_t$ ) to innovate if they have enough cash flow to deal with the adverse liquidity shocks which is interpreted by the equation:

- $\mu (\pi_t + S_t Q_t) > z P_t A_t$  :  $\mu$  is a measure of financial development,  $z$  is a random liquidity shock.

- The probability of innovation represented by the cumulative density function:

$$p_t = F\left(\frac{\mu(\pi_t + S_t Q_t)}{S_t A_t}\right) \quad (1)$$

This implies that the higher the profits ( $\pi$ ) and the more developed financial system ( $\mu$ ), the higher the ability of firms to overcome liquidity shocks and thus the higher the probability of innovations.

<sup>1</sup> Van der ploag F., Poelhekke S., "Volatility and natural resource curse", ibid, P6.

- The economic growth rate is given by:  $gt = \frac{E[A_{t+1}] - A_t}{A_t}$   
 $gt = (\gamma - 1)E[p_t]$  (2)

From equations (1) and (2), the economic growth increases with the expected probability of innovation. Consequently, the higher and stable resource revenues eases credit constraints with high developed financial system ( $\mu$ ) which improve the innovations and boost economic growth.

### **II-3 - The relevant literature on the linkage between financial development and resource curse:**

Most of the empirical evidence has shown that the majority of oil dependent countries have the low level of financial development. The literature also argued that financial development and good financial institutions are needed to spur economic growth and escape the natural resource curse.

Using panel autoregressive conditional heteroscedasticity in mean (ARCH-M) for the period 1970-2003, Van der Ploeg and Poelhekke (2008)<sup>1</sup> found that countries with poorly developed financial systems are much more volatile and more exposed to the natural resource curse via volatility channel. They concluded that countries can even turn the curse into a blessing. There is evidence for a positive direct effect of natural resource dependence on growth after controlling for volatility; the key to a turn-around for many resource-rich countries is financial development. Christian Hattendorff (2013)<sup>2</sup> showed empirically that resource-rich countries appear to have a less developed financial system using cross-sectional and panel analysis. The author utilized an instrument for credit demand based on exogenous geographic determinants. In their paper, Hooshmand, Hosseini and Moghani (2013)<sup>3</sup> examined the direct and indirect impact of the oil rent on financial development using Generalized Method of Moments (GMM) for 17 selected oil exporting countries, over the period 2002-2010. The result suggested that oil rent has had a negative effect on financial development (through institutional quality channel and weakening it) and has provided the context of the weakening financial markets in two direct and indirect ways. Using similar methodology (GMM), Bakwena and Bodma (2008)<sup>4</sup> evaluated the role played by financial development in oil vis-à-vis non-oil (mining) economies for the

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<sup>1</sup> Van der ploeg F., Poelhekke S., "Volatility and natural resource curse", university of Oxford, 2008.

<sup>2</sup> Hattendorff, Christian ; "The Natural Resource Curse Revisited: Is There a Financial Channel?"; **Conference Paper**; Session: Economic Development and Technological Change, No. D10-V3; 2013.

<sup>3</sup> Hooshmand, Hosseini and Moghani; "Oil Rents, Institutions and Financial Development: Case Study of selected Oil Exporting Countries"; Research Journal of Recent Sciences ISSN 2277-2502 Vol. 2(12), 100-108, December (2013).

<sup>4</sup> Bakwena and Bodma; "The Role of Financial Development in Natural Resource Abundant Economies: Does the Nature of the Resource Matter?"; BOJE: Botswana Journal of Economics; 2008; PP 16-31.

period 1984-2003. The data revealed that financial development plays a crucial role in influencing the efficiency of investment, thus economic performance of these economies. However, the potency of financial institutions is highly dependent on whether the economy is an oil or non-oil (mining) producer. Bakwena and Seemule (2013)<sup>1</sup> argued theoretically that good institutions remedy the resource curse, and they confirmed empirically their hypothesis using a panel of up to 53 countries over the period 1984-2003.

### **III - Overview on the Algerian financial sector:**

Over the past two decades Algeria has courageously attempted to modernize its financial system despite social strife and unique challenges posed by the large hydrocarbon sector. However, lending by state-owned banks, mostly to public entities, still dominates financial intermediation, financial markets remain in their infancy, and the implementation of otherwise laudable regulatory reforms is lagging. Because of hydrocarbon-funded state support to borrowers and lenders alike, the financial system appears stable although this “stability” carries high costs and distorts risk pricing and governance<sup>2</sup>.

The Algerian financial system is dominated by the banking sector which accounts for 93 percent of total financial system assets. It constitutes of twenty nine (29) banks and financial institutions where: six public banks, 14 private banks with foreign capitals in which one with mixed capital, three financial institutions in which two are public, 5 leasing companies, and one mutual insurance with the status of a financial institution<sup>3</sup>.

**Table1: The structure of the Algerian banking sector.**

	<b>Assets (DZD bn)</b>	<b>Share (%)</b>
<b>Public banks</b>	<b>3,996.6</b>	<b>75.0%</b>
<b>Private banks</b>	<b>959.2</b>	<b>18.0%</b>
<b>Insurance</b>	<b>159.9</b>	<b>3.0%</b>
<b>Other Financial Institutions</b>	<b>213.1</b>	<b>4.0%</b>
<b>Total</b>	<b>5,328.8</b>	<b>100.0%</b>

*Source: International Institute of Finance 2010.*

<sup>1</sup> Bakwena and Seemule; “SUSTAINING NATURAL RESOURCE BOOMS: ARE FINANCIAL INSTITUTIONS A SOLUTION?”; *Int. J. Eco.Res.*, 2013, v4i3, 21-33.

<sup>2</sup> Bakwena and Bodma; “The Role of Financial Development in Natural Resource Abundant Economies: Does the Nature of the Resource Matter?”; *BOJE: Botswana Journal of Economics*; 2008; PP 16-31.

<sup>3</sup> Data are brought from the annual report of the Bank of Algeria (Rapport d’activité 2012).



### **III-1 - The financial reforms during 1990-1999**

After the crisis of 1986 and the failure of the centralized planed system, the Algerian government started to privatize its economy with 1990 as a key transitional year. Algeria implemented several reforms starting by the financial sector under the following objectives<sup>1</sup>: reduction of the direct government intervention and strengthen the role of market forces in the allocation of financial resources, improvement of the financial institutions capacity to mobilize the domestic saving, enhancing the effectiveness of monetary policy instruments, promoting competition among banks, and strengthening their financial soundness. In April 1990, Algeria adopted the law on currency and credit (90-10) to grant greater independence to the central bank (Bank of Algeria since 1990) and strengthen its capacity for banking supervision. Under this law and during the decade of 1990s, the following decisions have been taken:

- Deposit interest rates were fully liberalized and ceilings on lending rates were replaced by limits on banking spreads in 1994.
- The transfer of monetary policy responsibilities to the central banks and the recapitalization of commercial banks.
- Foreign participation in the capital of the domestic banks was allowed since 1994.
- The dismantling of the restrictions on the use of foreign exchange began in April 1994 and an interbank foreign exchange market was established since 1996.

It can be observable that most of the reforms have been applied since 1994 which was the year of starting the programs of structural adjustment instructed by the International Monetary Fund and the World Bank.

### **III-2 - Financial reforms during 2000-2012:**

In this period, the financial reforms continued to be applied under a regulatory and technical framework in which we stress the following points<sup>2</sup>:

- Order 03-11 on Currency and Credit.
- The fivefold increase in the minimum capital requirement for banks and finance companies.

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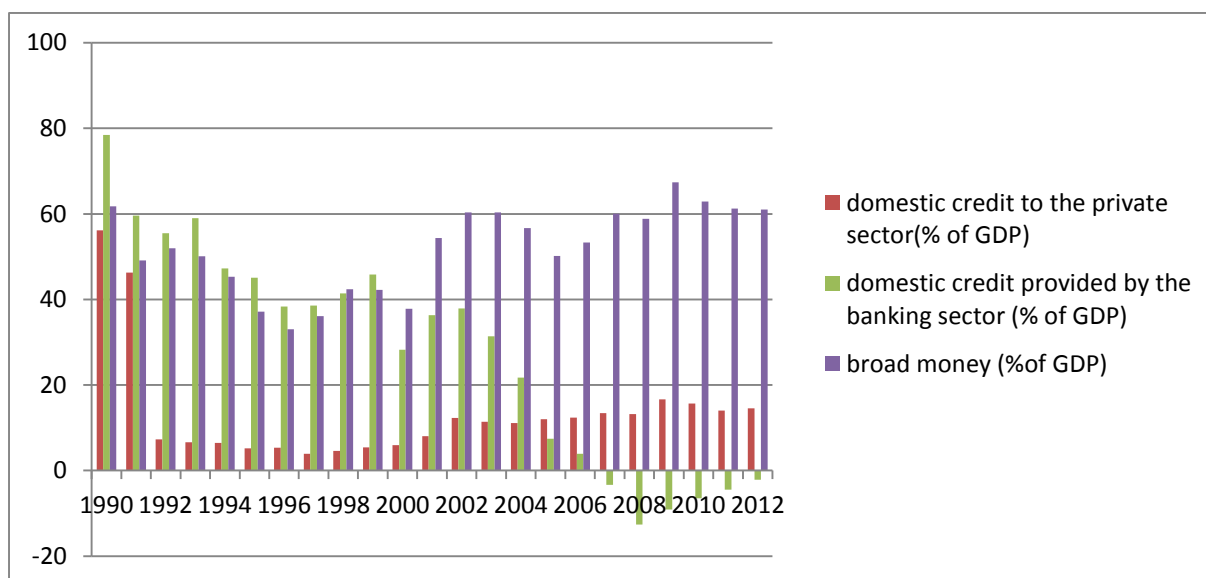
<sup>1</sup> Jbili, Enders and Treichel ; « Financial sector reforms in Algeria, Morocco and Tunisia : a preliminary assessment » ; International Monetary Fund working paper 97/81; 1997; P12.

<sup>2</sup> CGAP; "Microfinance in Algeria: challenges and opportunities"; Joint CGAP and AFD Mission under the auspices of the Ministry of Finance Deputy Minister for Financial Reform; Final Report June 2006.

- The establishment of a real-time gross settlement (RTGS)<sup>1</sup> system for large-value payments in February 2006, and a clearing system for retail payments in the first half of 2006.
- The legislation on mortgage securitization.
- Financial leasing for real estate, factoring, promotion of venture capital.
- The overhaul of the Algiers stock exchange since 2003.
- The fight against money laundering.
- The strengthening of the internal audit function (audit committees) and personnel management function at government banks (performance contracts).
- Order n° 10-04 of August 26<sup>th</sup> 2010 which modifies and completes the order 03-11.

The figure below shows the evolution in the key variables of the banking system during the period of the study:

**Figure 1: the evolution of the banking system's variables 1990-2012**



*Source: Calculated by the author using data from the World Bank.*

<sup>1</sup> *The RTGS16 system* has been operational since early February 2006. It handles large-value interbank payments with a minimum payment amount of DZD 1 million.

## **IV - The econometric study:**

### **IV-1 - Data and methodology:**

To empirically show the role of the financial development in escaping the oil curse, the research tests the effect of two financial development indicators and the oil rents on the Algerian economic growth using growth regression estimated by the ordinary least squares (OLS).

#### **IV-1.1 - Description of the data:**

The data are all taken from the world development indicators (the World Bank data basis) for the period 1980-2014 (35 observations).

##### **Financial indicators:**

In order to show the financial development effect, we use first the domestic credit provided by the banking sector (*Credit*), this variable has been used before by Arezki and Gylfason (2011) and Vand der ploeg and Poalhekke (2008). The second financial indicator used is the domestic credit to the private sector (*Private*). Data are measured as percentage of GDP.

##### **Economic growth:**

The variable is calculated by the annual growth rate of the real gross domestic product per capita at constant 2005 U.S.D.

##### **Oil rents:**

The variable measures the dependence of Algerian economy on oil rents and is calculated by the share of oil rents in total GDP. This variable is used to show the evidence of the oil curse.

#### **IV-1.2 - Methodology:**

The model of the study examines the effect of financial development on the oil curse over the period 1980-2014. To do so, 5 multiple linear regression models have been estimated using the Ordinary Least Squares method estimator.

$$\text{Model 1: } y_t = \beta_1 + \beta_2 y_{t-1} + \beta_3 (\text{oilrent})_t + \mu_t$$

$$\text{Model 2: } y_t = \beta_1 + \beta_2 y_{t-1} + \beta_3 (\text{oilrent})_t + \beta_4 \text{credit} + \mu_t$$

$$\text{Model 3: } y_t = \beta_1 + \beta_2 y_{t-1} + \beta_3 (\text{oilrent})_t + \beta_4 (\text{private})_t + \mu_t$$

$$\text{Model 4: } y_t = \beta_1 + \beta_2 y_{t-1} + \beta_3 (\text{credit})_t + \mu_t$$

$$\text{Model 5: } y_t = \beta_1 + \beta_2 y_{t-1} + \beta_3 (\text{private})_t + \mu_t$$

$\beta_1, \beta_2, \beta_3,$  and  $\beta_4,$  are the parameters to be estimated;

$y_{t-1}$ : is the lagged value of the real GDP per capita growth rate ( $y$ ).

## IV-2 - The empirical results:

The time series analysis for the four variables used indicated the non-stationarity of the series; except the oil rents series; in the level under the ADF and PP unit roots tests, while the 1<sup>st</sup> differenced are stationary which allows us to use these series in the estimation. (The t-statistics and critical values show the stationarity of the 1<sup>st</sup> differenced series for all the variables at the 5% level.)

The following table summarizes the estimation results for the 5 regression models mentioned above:

**Table 2: Summary of growth regressions with OLS estimations (dependent variable: real GDP growth rate (y))**

Independent variables (explanatory)	Model 1	Model 2	Model 3	Model 4	Model 5
Lagged(y) $y_{t-1}$	0.37 (2.16)**	0.35 (2.04)**	0.35 (1.91)*	0.51 (3.25)***	0.48 (2.88)***
Oilrent	0.11 (1.58)	0.12 (1.60)	0.11 (1.53)		
Credit		0.02 (0.5)		0.01 (0.34)	
Private			0.02 (0.38)		0.02 (0.47)
The constant	-0.01 (-1.04)	-0.01 (-1.04)	-0.009 (0.93)	0.004 (1.004)	0.004 (1.04)
R-squared	32%	32%	32%	26%	27%
Adjusted R-squared	27%	25%	25%	22%	22%
F-statistic	7.15***	4.73***	4.68***	5.53***	5.6***

*Values in parenthesis are the absolute values of the t-statistics. \*, \*\*, \*\*\* indicate significance at 10%, 5% and 1% respectively.*

*Source: Author's calculations using EViews 6 program.*

The results for the model 1 shows that the real GDP growth is positively and significantly affected by its lagged value; it also shows no evidence of the oil curse. We found a positive association between oil rents and economic growth which reflects the high dependency of the Algerian economy on the hydrocarbon revenues and this has been during the different phases of the national economy. Meanwhile, the adjusted R-squared indicates that the

variables used contribute with only 25% in the explication of the model, but this ratio is highly significant.

In order to show the role of financial development in the relationship between growth and oil rents (oil curse), models 2 and 3 were specified. The non-significant estimations of these two equations show no contribution of financial development in the oil curse neither through total credits nor through the credit provided to private sector. Model 4 and 5 compare the role of each financial indicator in enhancing economic growth. Model 4 indicates a positive but non-significant effect of credit on economic growth while model 4 is significant at 1% level. This result approve that the Algerian credit policy has not been totally effective to drive the growth so that the national economy can escape the so-called “oil curse”.

### **V - Concluding remarks:**

This paper investigated in the impact of the Algerian financial system, as one of major oil economies, on the economic growth and escaping the oil curse. It tested the effect of two financial development indicators and the oil rents on the Algerian economic growth using growth regression estimated by the ordinary least squares (OLS).

The empirical results showed that the financial sector has no longer contributed in reducing the negative effect of oil rents on economic growth (oil curse) and it has not contribute significantly to enhance economic growth. That is to say, Algeria needs more development in its financial sector. The culture of investment is missed in the national society which makes the credit provided to private sector inefficient. The excluded variable of the institutional quality explains also the non-significant results. The lack of good governance and the existence of corruption impede any path to a development then to efficient financial and monetary policies.

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