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The Interest Rate Pass-through in Algeria: an Econometric Study 1990 – 2010

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Abstract

Among the main interests of the monetary policy after the financial liberalization in 1990 is the effectiveness of financial intermediation, since the lack of financial stability systems in countries may raise reasonable concerns about how monetary policy functions. The study of the relationship between the main benefit of the Central Bank and the interest rates of commercial banks, or what we opt for as the concept of 'Interest rate pass-through', is defined as the quantity and the speed with which rates affect them at the level of business bank, as a result of the major changes in interest rates of the Central Bank.The size and speed which affect their monitoring tools by Central Bank-especially with regard to short-term interest rates-directly on most of the sector financial situations-Trusts and lending rates are the key factors that enable the impact of monetary policy on the real economy.

Keywords: stationary, the simultaneous integration, dynamic multiplier, correction errors model ECM.

1. Introduction

In the wake of financial liberalization and in order to ensure the efficacy of monetary policy, the Bank of Algeria has put a series of measures related to the main rate for the banking sector and lending rates. These measures were put into practice to get fast and important money transmission

Interest rates related to money transmission was investigated in both developing and developed countries. According to Cottarelli, Ferriand Generale (1995) [1], the degree of competition in the banking sector and financial liberalization may affect the price as well.Borio and Fritz (1995) [2], studied the interest rates in12 countries in the Economic Organization of Cooperation and Development (EOCD) and concluded that interest rates on loans applied in these countries affect interest rates cash transport in each country separately. Bernsteinand Fuentes (2003) [3], on the other hand, found that the competitive structure in the banking system may affect the cash Moving your interest rate. Due to these factors, the commercial banks tend to amend the interest rates to have a high percentage of consumer loans and a low percentage of non-performing loans.

A nother focus of research in the private interest rate cash transport in each country is the use of time-series analysis of the overall economy, Cottarelli and Kourelis (1994) [4] estimate the size and speed with which through which reflected changes in key interest rates of the Central Bank on lending rates and rates deposits of individuals on the level of commercial Banks through a sample which consists of 31 countries and using this method multiplier and dynamic error correction model.

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Among the recent studies of private cash of interest in developing countries, Espenoza-vega and Rubucci (2003) [5] investigate cash movement starting from prices policy of the central bank towards the commercial banks of Chile.

Another study was explored by Disiatat's and Vongsinsirkul (2002) who did the same research but this time in Thailand, and the results were not much different from the research in Chile. The study of Espenoza-vegaand Rubucci (2003) put a heavy emphasis on knowing if the interest rate of Chile's monetary system is different from that prevailing in developed economies, and the results were close. On the other side of the coin, Disiatat and Vongsinsirkul (2002) [6] attempt to determine the level of interest rate only before moving to analyze the mechanisms of monetary policy transmission in Thailand. It is to be mentioned at this level that both studies relied on correction errors model MCO to administer interest price of the monitary transmission.

Espenoza-vega and Rubucci (2003) did not only try to estimate interest rate related to monetary transmission, but also raised the issue of the stability of monetary transmission for the studied period (1993-2002). Their results indicate a slow transmission after the Asian financial crisis in1997.Disiatat and Vongsinsirkul (2002) adopted the Error Correction Model MCO with the application of dynamic multiplier method used by Cottarelli and Kourelis (1994). When they put a special interest on monetary transmission as Espenoza-vega and Rubucci (2003), they also attempt to estimate the stability of the monetary transmission of interest rate during the period of the Asian financial crisis. Therefore, they tried to get more precision in their estimates by running a set of down grades for 84 months; their results demonstrate a lower level in interest rate for the period that followed the Asian financial crisis, this was due to the circumstances and the impact of the crisis on the financial intermediation process.

Espenoza-vega, Rubucci (2003) and Disiatat, Vongsinsirkul (2002) display the short comings of the linear methods used in the current researches on the stability of the interest rate in response to changes in the financial and economic systems.

In this paper and to estimate the interest rate related to monetary transmission in Algeria, We will use the methods used by Espenoza-vega, Rubucci; Disiatat, Vongsinsirkul, and Shariman M.N Alwanito to see whether the Changes in economic and financial systems after the financial liberalization in 1990 have affected the size and speed of monetary transmission in Algeria.

2.1. Estimation Methodology Model

To estimate the interest rate of monetary transmission, we will use two methods, as follows:

- Dynamic Multiplier Method
- Error Correction Model (ECM)

a. Dynamic Multiplier Method

This method was adopted by Cottarelli and Kourelis (1994) and is the same way used by Toolsema and others (2001). It has been chosen the quarterly rate of interests in the money market, which reflects the monetary policy of the Central Bank rate for the period studied. The estimation is displayed as follows:

$$Y_t = a_0 + a_1 Y_{t-1} + a_2 M_t + a_3 M_{t-1} + \cdots \ldots + a_{n+2} M_{t-n} + \mu_t$$

Where:

Y_t : interest rates of commercial banks rate (loans or deposits)

M_t : quarterly rate of interbank rates in the money market.

Depending on the above formula, the following can be derived:

- Multiplier effect in the short term: $h_0 = a_2$
- Multiplier in the long term: $h_1 = \frac{1}{1-a_1} \sum_{t=0}^{n} a_{2+t}$
- Number of selected delays depends on the AIC (Akaike Information Criteria) and SIC (Shwartz Information Criteria)

Given the nature of the time series of interest rate, this model can be estimated in the equation, whether in levels or by Calculus at a first place, and if the estimated model is by calculus, there will be a loss of the information contained in the long run at the level of variables, and in order to avoid this problem, we will use the error correction model.

b. Error Correction Model ECM

In order to estimate the phenomen on of monetary transmission from intra-interest rate between Banks to the benefit of lending and borrowing rate for commercial banks, we use a form of Autoregressive distributed lag ADL, which was used by Espenoza-vega and Rubucci (2003) and which is as follows:

$$y_t = \alpha_0 + \alpha_1 M_t + \alpha_2 Y_{t-1} + \alpha_3 M_{t-1}$$

Where: y_t is the interest rates of comercial Banks rate (loans or deposits) M_t: average interbank rates in the money market Selected delay ratio depends on the AIC (Akaike information criteria) and SIC (Shwartz information criteria). According to Espenoza-vega and Rubucci (2003), the ADL in Form A was re-estimated according to error correction model ECM as follows:

$$\Delta y_t = \alpha_1 \Delta M_t + \beta_2 (Y_{t-1} - \beta_0 - \beta_1 M_{t-1})$$

Where:

$$\beta_2 = \alpha_2 - 1 \text{ ، } \beta_1 = \frac{\alpha_1 + \alpha_3}{1-\alpha_2} \text{ ، } \beta_0 = \frac{\alpha_0}{1-\alpha_1}$$

This equation is a simplified version of the dynamic relationship between y_t and M_t, what is between brackets reflects the extent of error correction.Parameters of interest rate:

α_1: impact degree of interest rate related to monetary transmission (during one month)

β_1: long term volume of monetary transmission

β_2: speed adjustment with long-term value

Delay $\frac{1-\alpha_1}{\beta_2}$: Average number of months to reach along-term value

α_1Value is comparable to the effect of the multiplier β_2 in the equation of dynamic multiplier.

3. Data

Data used in these tests represent the data from the International Financial Statistics IMF and the Bank of Algeria taken from the period of 1990 to 2010.The beginning of this period was marked by a shortage of cash stock in commercial banks and thus, the need for central bank intervention through price subtract tool was highly required. By 2001, there have become excess in cash stock in commercial banks as a result of the purchase of the Treasury for all public institutions that had been borrowed by banks from the debt under these circumstances. Therefore, these commercial banks became indispensable for central bank intervention, and this latter start interfering using new methods in the money market to absorb this cash excess.The studied variables are:

MMR: Average money market rates
DISR: discount rate of the Central Bank
LR: Average lending rates of commercial banks
DR: average deposit rates of commercial banks

The average rates in the money market reflects the monthly average of the various interbank interest rates, it refers to MMR (Monney Market Rate), while the average lending rate is the lends that the commercial banks borrow to their customers; and it refers to LR (Lending rate).The average deposit rates thus, refers to interest spaid by commercial banks to their customers for their money deposit (in all its forms); and it stands for DR (Deposit rate) or also called LR and DR for retail prices).

The objective behind these tests is to know the size and speed which affect the MMR on LR and DR (considering that MMR is a variable that refers to the monetary policy). On the other hand, to discover the size and speed which affect the DISR on LR and DR (considering that DISR is a variable that refers to the monetary policy). In order to reach this goal we follow two methods displayed below:

4. Size and Speed MMR and DISR Effect LR and DR (Interest Rate Pass-Through)

4.1. Dynamic Multiplier Method:

To calculate the multiplier, we must use dynamic independence test of Time Series.

A.Test the Stability of the Time Series

With the intention to study the relationship between the interest rate between banks MMR and lending interest rates and borrowing for commercial banks, we need to begin testing the stability of time series to avoid the so-called **false falling**. These tests are divided into two types: Type I tests the presence of roots and marginal tests, it is the ADF (Augmented Dickey-Fuller (1979)) and PP (Phillips et Perron (1988)); while Type II tests stability hypothesis, and it is KPSS test. In case of results accordance, we will be in front of correct results, but in case of difference, then the time series do not contain enough information to judge the preprocessing.

In this case, we must either increase the size of the sample or use simulation methods to correct the possible probabilities in each test.

Table1. Test Results ADF, PP, KPSS

	ADF		**PP**		**KPSS**	
	Level	**1er diff**	**level**	**1er diff**	**Level**	**1er diff**
MMR	-1.027767 [0.9366]	-5.684138* [0.0000]	-1.326134 [0.8784]	-13.02918* [0.0000]	1.443641*	0.159699
DISR	-3.465955 [0.0456]	-15.83518* [0.0000]	-3.468033 [0.0451]	-15.83753* [0.0000]	1.714964*	0.348174
LR	-0.985887 [0.9426]	-13.48057* [0.0000]	0.985887 [0.9426]	-13.47728* [0.0000]	1.381759*	0.207395
DR	-1.915969 [0.6432]	-15.81087* [0.0000]	-1.916659 [0.6428]	-15.81087* [0.0000]	1.381689*	0.218112

Critical values of the KPSS test at 1% and 5% and 10% are respectively 0.73, 0.46, 0.34.
(*)Expresses rejection of the hypothesis

From Table (1), it is clear that the time series (MMR, LR and DR) are primarily stable.

B. Dynamic Multiplier Account

This phenomenon is estimated (monetary transmission) by calculating the multiplier dynamic starting from the average money market rates (MMR) towards the average lending rates and borrowing in markets between Banks (LR and DR).This model shows the extent of retail prices in response to changes in money market rates of speed, in order to be certain about the speed about changes on central bank's policy on retail prices and also the size and the effectiveness of monetary navigation. In this article, we will estimate all the previous equations for the period (1990-2010). By using SIC coefficient (Shwartz Information Criteria), we found that the first equation is characterized by one-way delayed period (see Appendices from 01 to 04), this has led the model as far as rates lending is concerned as follows:

$$Y_t = a_0 + a_1 Y_{t-1} + a_2 M_t + a_3 M_{t-1} + \mu_t$$

The choice of this period was based on the availability of statistics in addition to the fact that Algeria was involved in the negotiations with the International Monetary institutions in order to obtain aid. This was called stand by credit program, and it was meant to grant loans and aid from the International Monetary Fund and the World bank. During this period, Mali's rigidity policy has been applied which was characterized by the expansion of the money supply to monitor the reduction of cash flow, and reduce the public budget and prices release and the application of positive benefit in addition to the emancipation of foreign trade prices size, and also to allow the flow of foreign capital, etc...This period knew as well important and consecutive banking reforms. After cash and loan law in 1990, other complementary reforms came in 1994, 1998, 2001, then in 08.26.2003 and then reforms in 2004 followed by reforms and various measures of the introduction of liquidity in the central bank. In order to incorporate these changes over time we estimated the phenomenon of monetary transmission during the period 1990-2010 (taking into account the division). This was to:

- Know if the monetary transmission is strong in one or both cases,

- Find out if the monetary navigation is stable,
- Know if the size of the monetary navigation is weak compared with financial release and the various successive banking reforms.

B-Retail rates: estimate the phenomenon using a multiplier Dynamic Thanks to the first equation, and because of the stability of the time series, the following results were estimated in the following table:

Table 2. Pass-Through Results

Dynamicmultiplier		**Immediate**	**Long-Run**
Lending Rates (LR)	Average lending rates and borrowing (MMR)	0.15	0.53
	Discount rate (DISR)	0.10	0.91
Deposit rates (DR)	Average lending rates and borrowing (MMR)	0.07	0.69
	Discount rate (DISR)	0.22	1.16

The above tables shows estimation results using the method of multiplier dynamic, and these estimates indicate the presence of a relatively large monetary transfer in the long term, whether MMR or DISR present a variable that refers to the monetary policy compared with the short term. It is worth noting that the transfer is big in the long term especially when DISR is the variable of the monetary policy.

4.2. Sample Error Correction (ECM)

In order to estimate this model, we will go through two phases: the first step is testing the stability of the time series and the second test is the simultaneous integration (i.e., the search for relationships between variables in the long term). Since we have found that the time series are integrated in levels, we will test the simultaneous integration.

A.The Simultaneous Integration Testing

These tests enable us to check the possibility of the existence of relationships between variables in the long term, and thanks to Johannsen tests, the results of the simultaneous integration are presented below:

Table3. Simultaneous Integration Results of the (MMR and DISR and LR and DR)

	Trace		**Max-Egenvalue**	
None	70.87735*	[0.0001]	37.77396*	[0.0014]
At most 1	33.10339*	[0.0126]	23.77253*	[0.0164]
At most 2	9.330854	[0.1444]	7.219812	[0.1444]

(*)Expresses rejection of the null hypothesis

From the previous table we may note that there is synchronous integration in the long term between the variables and this what allows the estimation error correction model.

B. Error Correction Model (ECM)

We will estimate the second and third equation in the period 1990-2010 (taking in to account the division), and using the SIC coefficient (Shwartz Information Criteria), we found that the first equation is characterized by a one-delayed period to become the following model: $y_t = \alpha_0 + \alpha_1 M_t + \alpha_2 Y_{t-1} + \alpha_3 M_{t-1} + \mu_t$

Where:Y_t: Presents interest rates of commercial Banks rate (loans or deposits)

M_t:Average money market rates.

Table4. Error correction Model Results

Dynamic Multiplier		**Immediate**	**Long-Run**	**Speed of Adjustment**	**Mean lag**
Lending Rates (LR)	*Average lending rates and borrowing (MMR)*	0.15	0.54	0.08	10.29
		0.10	0.91	0.08	13.08
	Discount rate (DISR)	0.07	0.69	0.06	15.97
Deposit rates (DR)	*Average lending rates and borrowing (MMR*	0.22	1.16	0.11	11.5
	Discount rate (DISR)	0.15	0.54	0.08	10.29

Throughout this table, we may extract the following observations:

- The size that it responds directly to the borrowing of the average money market rates are relatively larger than the size that responds directly to the price of these rates discount rates,
- the size that responds directly to the lending rates (deposits) of the discount rate is greater than the size that responds directly to these rates average money market rates,
- the size that responds in the long-term average money market rates is less than the size that responds to the retail price of discount rates,
- In case of response in the borrowings of discount price rates and to reach the value in the long term, were quite as low speed and a thirteen-delayed period (13 months), while in case of the borrowing in the average money market rates would require the same speed (slow) and ten-delayed period (10 months)
- In case of lending rates in response (deposits) to the discount rate, it is to get to the value in the long term requires as low speed and a period of eleven and a half delay in anyone of the ten and a half months (11.5 months), While in the case of lending to the average money market rates in response rates, it would require relatively less than the speed of the first case and sixteen-delayed period (16 months).

5. Conclusion

The economic area in general and monetary in particular, knew an almost complete standstill since Independence to the pre-banking reforms in1986, 1988 and the comprehensive reforms of 1990. This period was marked by planned economy and centralized decision, which led to the neutrality of monetary policy. The stability of the discount rate at 2.75% for years was but proof of that. It was the fiscal policy that plays a role in the economy through quantitative listings of money. After the overall financial reforms of 1990, monetary and financial data changed and became subject to the requirements of market economy. The monetary policy starts to act a crucial role in addressing and solving economic crises through its interventions whether directly or indirectly.

Amongst the results of the reforms initiated by the monetary authorities is to re-regulate the money market under the law 08-91 dated in 08/14/1991, and the instruction No. 33-91 concerning the application of the monetary market regulation. The outcome of this reform was to expand the money market through allowing institutional investors and non-bank financial institutions, whose number exceeded 17 interventionists, interfere in the market for the first time.The monetary market was trying to provide banks with cash following the enactment of the necessary possibilities refinancing "rediscount window"

By the year 2001, the overall monetary indicators was improved as a result of high oil prices, this has allowed the public treasury to buy bankrupt public institutions which created a flow of cash in banks. The primary concern of the Central Bank became, then, to find ways to absorb this cash flow. Moreover, discount rate also witnessed consecutive declines that reached 4% in 2004 and remained so to the present time. All these indicators have affected the size and speed of retail rates in response to changes in interest rates of the Central Bank either directly or in the long term, i.e., the size responding directly to the average money market rates are relatively larger than the size responding directly to the price of rates discount; while the size responding directly of lending rates (deposits) to the discount rate is larger than the size responding directly by these rates to the average money market rates.

In the long term, the size that responds to the discount price retail rates is larger than the size that responds to these rates of the average money market rates. In case of response in the borrowings of discount price rates and to reach the value in the long term, were quite as low speed and a thirteen-delayed period (13 months), while in case of the borrowing in the average money market rates would require the same speed (slow) and ten-delayed period (10 months). Besides, in case of lending rates in response (deposits) to the discount rate, it is to get to the value in the long term requires as low speed and a period of eleven and a half delay in anyone of the ten and a half months (11.5 months), While in the case of ending to the average money market rates in response rates, it would require relatively less than the speed of the first case and sixteen-delayed period (16 months), respectively, with a frequent slow speed.

End Notes

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