Bank Lending Channel in MENA Countries: Evidence from Dynamic Panel Model

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Abstract

Most of the works related to monetary policy transmission mechanisms did not take into account the special case of developing countries. In these countries, given their features (exchange rate rigidity, financial fragility, banking prominence, etc.), it seems that the most reliable monetary transmission mechanism is the lending channel.

The purpose of this paper is to focus specifically on this channel in 18 MENA Countries by using a GMM system on dynamic panel aggregated data from 1990 to 2009.

We regress credit volume on the instrument of monetary policy. Meanwhile, we add many control variables to resolve the supply-demand puzzle. Thereafter, we include variables describing the sensitiveness of the lending behavior to the institutional environment quality as well as to key bank characteristics.

Our results suggest that the lending channel is operational in MENA Countries. Moreover, lending activity could be positively affected by an efficient institutional framework as well as the size and liquidity of the banking sector, while, on the contrary, it could be negatively affected by banking concentration.

Keywords: Monetary Transmission Mechanism, Bank Lending Channel, Dynamic Panel Model, GMM, MENA.

JEL classification: C23, E40, E50, G20, O53, O55.

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1. Introduction

Before the 1990's, Emerging Economies (EEs) were characterized by inflation rate volatility and fixed or semi-fixed exchange rate regimes. Domestic economies and financial systems were closed and protected from broad competition and financial markets were immature. Hence, there were major differences in transmission channels between these economies and industrial ones.

However, over the past two decades, substantial economic, financial and institutional changes have been operated in EEs and have affected Monetary Transmission Mechanisms (MTM) that seemed converging to those in developed countries.

Similarly, in developing economies, notably in the most of the Middle East and North African countries (MENA)[1], important changes have doubtless altered transmission channels but, the way of this alteration is up to now uncertain. These changes were especially related to monetary policy framework, macroeconomic conditions as well as financial systems.

For the monetary policy framework, one major change has been the growing emphasis on lowering inflation, either in a formal inflation targeting context or strongly managed exchange rate regimes. For instance, among MENA countries, Egypt and Turkey have adopted inflation targeting while Golf Cooperation Council countries (GCC)[2] have practiced quasi-fixed exchange rate regimes.

As for the macroeconomic environment, important progress to reduce public deficits and central government debts has been made and many efforts to improve good governance have been undertaken. For instance, in Algeria, Qatar and Saudi Arabia, prudent budgetary policies have been recorded due in large part to oil price increases and exchange reserve accumulation. Even in non-oil dependent countries like Morocco and Tunisia, substantial efforts to reduce public deficits and debts have been noticed. Besides, anti-corruption laws, transparency and accountability rules have been reinforced, especially in GCC countries.

Finally, regarding financial systems, the most important change has been the gradual reduction of government intervention and the growth of financial markets. Indeed, bond and equity markets in many countries have been developed and the presence of state-owned financial institutions has declined. For instance, in the North African countries, interest rate

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[1] We limit our analysis here to the following 18 countries: Algeria, Bahrain, Egypt, Iran, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Turkey, United Arab Emirates and Yemen.
[2] Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates.

controls had, by and large, been abolished and the presence of private financial actors has been encouraged, while in GCC countries, financial openness has become substantial.

However, despite these important changes, economists have devoted a rather substantial amount of attention to the MTM in countries with highly sophisticated and well-functioning financial markets. Much less is known about these mechanisms in economies with less developed financial systems. Indeed, at present, the literature lacks a cross-country or cross-regional study able to produce general stylized facts about monetary transmission in these countries. Specifically, in MENA countries, the uncertainty that surrounds the impact of monetary policy on prices and output and the channels through which they occurred remains visible.

This study tries to fill this gap and foster research in this area by showing if MTM, especially the bank lending channel, could work in MENA countries. This attempt is useful for at least two reasons. First, if the bank lending channel seems to be operational, the effectiveness and reliability of monetary policy will depend on the properties of this specific channel. Second, when it proves to be functional, this mechanism can provide to policymakers with an instrument which can be used suitably to boost investment and reduce unemployment.

The rest of the paper is structured as follows: Section 2 offers a brief description of the lending channel as stated in the literature; Section 3 provides an overview of the monetary policy and lending channel in MENA countries; Section 4 sheds light on the empirical methodology by explaining the model specification and presenting the data used to estimate the bank lending channel; Section 5 reports the main results; finally, section 6 presents the main findings and concludes.

2. The Lending Channel: a brief description

The lending channel is one component of a broader credit channel (or a balance sheet channel).[3] This credit channel appears when an interest rate increase causes a decrease in bank's credit supply following deterioration in borrowers' net worth and a decline in collateral values.

In principle, when the central bank purchases government securities in the secondary market from commercial banks for example, the size of banks' deposit base increases. This should increase the volume of resources that banks intermediate, thus increasing banks' supply of loanable funds. Competition among banks would be expected to cause this increased supply

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[3] Mishra, P Peter, J-M and A Spilimbergo (2010): "Monetary Transmission in Low Income Countries" *IMF Working Papers WP/10/223*, October;

of funds to reduce bank lending rates as well as to increase the availability of credit for borrowers. This has an impact on aggregate demand, as the reduced interest rates on bank loans and greater availability of bank credit causes an increase in spending by bank-dependent agents (typically small and medium-sized firms).

It follows that the presence of the lending channel depends on the extent that an expansion of reserves does increase the supply of bank loans, and that an increase in the supply of bank loans reduces the cost of finance for the nonbank sector. This decrease acts on aggregate demand and then boosts economic activity.

From this reasoning, it is clear that there are two chains for the effectiveness of the lending channel: the first one from monetary policy instrument to cost and availability of bank credit and the second one from the cost and availability of bank credit to aggregate demand and activity.

The literature states many factors that can act on these two chains.[4] The characteristic of the banking sector (notably its structure) and the quality of institutional environment are the main factors that can influence the first chain. The idea is that, in a less competitive banking environment, changes in bank costs of funds may be reflected in high profit margins rather than the supply of bank lending. Similarly, in a poor institutional environment characterized by the absence of rules of law and the presence of low transparency and accountability, problems of asymmetric information and costly contract enforcement increase costs of fund and restrict lending activity.

As for the second chain, the main elements that can command it are the soundness of the banking sector, the degree of stock markets' development as well as the importance of government intervention. The appropriate reasoning is that, in the presence of illiquid and under-capitalized banking sector, a tightening of monetary policy may affect severely the lending activity and then the aggregate demand. In the same way, the existence of alternatives to bank financing needs and the presence of a developed equity and bond markets for firms may renders monetary tightening detrimental to the banking sector. Finally, a quantitative orientation of monetary policy and a significant credit control may blur the lending activity.

In this paper, we focus our interest on the first causal chain, that from monetary policy indicator to credit availability.

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[4] See among others Kashyap and Stein (2000), Kwapil and Scharler (2006), Mohanty and Turner (2008), Mishra et al (2010).

3. **Monetary Policy and the Lending Channel in MENA: an Overview**

Generally, in developing countries, exchange rates are pegged or controlled by government and fiscal policies are rigid or unstable. The only short-term stabilization instrument which is often used seems to be monetary policy. Meanwhile, the financial structure suggests that the bank lending mechanism is likely to be the dominant channel of monetary transmission in these countries. In particular, the shallowness of the financial markets and the prominence of the banking sector render credit a dominant financing instrument. What about MENA?

3.1. Monetary policy in MENA

Most of MENA countries share a relatively independent monetary policy which is directed toward price stability. The fulfillment of this objective has been often operated through different market-oriented instruments rather than direct intervention, as was the case until the 1990's.

In Egypt and Turkey, Central Banks have moved to inflation targeting regime in a context of quite flexible exchange rates after many years of exchange rate targeting practices. In order to meet its inflation objective, central bank of Egypt tries to steer short term interest rates while keeping in view the developments in credit and money supply, as well as a host of other factors that could influence the underlying inflation rate. As for the central bank of Turkey, it tries to manage liquidity via intervention in money market. Interest rates are adjusted in response to deviations of inflation from a targeted path allowing monetary authority to manage inflation expectations properly.

In Algeria, Morocco and Tunisia, monetary authorities implicitly target inflation and are slowly moving towards a de facto inflation targeting regime. They are already targeting the real exchange rate in order to maintain competitiveness and avoid currency overvaluation. In particular, to achieve a constant real exchange rate rule, the Moroccan monetary authority acts on inflation differential via the growth rate of M1 but cannot use the exchange rate instrument which is pegged to a basket. However, Algerian and Tunisian monetary authorities try to influence the exchange rate (almost in a decreasing way) via the growth rate of M2 and credits for the formers and via M3 for the latters. In these three countries, the central bank uses indirect control instruments to manage liquidity in the money market. A capital control allows them to conduct an autonomous monetary policy.

In the GCC countries as well as Jordan and Lebanon, exchange rates are pegged to the U.S dollar and monetary policies are subordinated to that of the Federal Reserve. The dollar peg provides the nominal anchor for monetary policy with the exception of Kuwaiti Dinar which

is pegged to an undisclosed basket. This peg regime gives more certainty about future exchange rates and contributes to low inflation rate expectations. Within the limits of the peg, GCC countries operate monetary policy and manage liquidity and credit through interest rates and reserve requirements, loan- to-deposit ratios and other prudential norms. As for Jordan and Lebanon, central banks use respectively certificate of deposit rate and Treasury bill rate to influence liquidity and monetary aggregates. However, varying domestic factors including real economic growth, liquidity conditions, growth of credit as well as inflationary pressures sometimes push interest rates in all these countries to diverge from those in the United States.[5] Finally, in remain countries (Iran, Libya, Sudan, Syria and Yemen), much less is known about the effective monetary regimes. Financial liberalization in these countries is low and government intervention is prominent. Interest rates and exchange rates are rigidly managed and market-oriented monetary policy is quite absent. According to their declarations, monetary authorities often try to influence monetary conditions in the interbank market.

3.2. Lending Channel in MENA

The economic and financial configuration in MENA countries suggests a particular importance of the bank lending channel. Indeed, the prominence of the banking industry comparing to the non bank financial sector is visible. Moreover, financial markets continue to be smaller than in either advanced or emerging economies. Financial integration also seems to be imperfect in these countries and, even when it is deep, it is accompanied by a rigid exchange rate which hampers arbitrage patterns. Finally, exchange rate regimes are fixed and in the reverse case, flexibility is restricted.

Insert Table 1

As shown in Table 1, in MENA countries, the deposit money bank assets as a share of GDP represents 46% on average while the assets of the other financial institutions relative to GDP represent only 11%. Similarly, the value of listed shares to GDP is about 44% on average while it is about 82% and 90% in emerging and advanced economies respectively.

As for financial integration, it is evident that North African countries are characterized by a significantly smaller degree of integration with international capital markets than advanced countries. However, Middle East countries display higher financial integration though not as significant as in advanced economies. On average, Chinn & Ito index (2009) is about 0.22 in

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[5] Espinoza, R; A. Prasad and O. Williams (2010): "Regional Financial Integration in the GCC", *IMF Working Paper 90,* p. 7.

MENA countries while in emerging and advanced economies, the *de facto* financial integration indicator[6] is about 1.03 and 4.4 respectively.

Finally, exchange rate regimes in MENA countries differ from advanced and emerging economies. In fact, as mentioned above, in North Africa, governments tend to restrict exchange rate flexibility while in the Middle East, exchange rates are pegged (case of the GCC) or rigidly managed (case of Iran, Syria and Yemen).

The stylized facts presented above have important implications for the channels of monetary transmission in MENA countries. Specifically, the limited development of financial markets suggests that the long-run interest rate channels should be weak. The exchange rate channel should also be low in countries that maintain fixed exchange rates (although capital mobility is high as is the case of some Middle East countries), but may play a role in monetary transmission in countries with more flexible exchange rates. In addition, financial intermediation continues to prevail and bank financing is still facing low competition from financial markets (except GCC countries). Therefore, we should expect monetary transmission to occur primarily through the effects of central bank actions on the short-term interest rates charged by banks on loans. In other words, the bank lending channel should be the dominant MTM in these countries.

Empirically, the few studies that consider the bank lending channel in the MENA region have been made on the basis of a country's specific perspective. In these studies, the evidence for the effectiveness of this channel has been often confirmed.[7]

Sengonul and Thorbecke (2005) for example investigate how monetary policy affected bank lending behavior in Turkey using monthly balance sheet data for a sample of 60 banks over the period 1997-2001. They find that this channel is operational since restrictive policies impacted banks with less liquid balance sheets.

Similarly, Al-Mashat and Billmeier (2007) investigate the existence of four MTM channel in Egypt. They estimate a reduced-form VAR and identify monetary policy shocks through assumptions about variable ordering (using a lower diagonal, or Choleski decomposition). Their results point to a stronger transmission of the monetary policy stance on output through credit (loans and securities) to the public sector compared to private sector lending. However, while the responses of public and private credit to monetary easing are both positive in the

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[6] Ratio of the sum of gross external assets and liabilities (net of foreign exchange reserves on the asset side and of official borrowing on the liability side) to GDP.
[7] Only Poddar et al (2006) find that the bank lending channel in Jordan is absent since output responses are very weak to changes in lending rates.

medium term, the initial response of public sector credit is negative, pointing to the decoupling of the monetary stance and lending decisions in the public sector.

In the same frame, Boughrara and Ghazouani (2009) test for the presence of the bank lending channel in four MENA countries (Egypt, Jordan, Morocco and Tunisia). They use a panel of bank balance sheet data to estimate the response of bank lending to monetary policy shocks. At the same time, they take into account bank specific differences in the lending reaction to monetary policy actions such as size, liquidity and capitalization. Their results suggest a strong evidence for the presence of a bank lending channel in Jordan, Morocco and Tunisia while this evidence is weak for the case of Egypt. Particularly, bank capitalization in Jordan, bank liquidity in Morocco and bank size in both Jordan and Tunisia appear to play a non negligible role in the lending activity.

Finally, Ziaei (2009) uses cointegrating vectors methodology to test the association between policy rates and bank lending for ten MENA countries. By using dynamic least squares (DOLS), he finds that changes in policy rates moved bank lending in the opposite direction, at least in the short term.

4. **Empirical study**

Conversely to the above-mentioned works relating to MENA countries, our study adopts a cross-regional approach. It is inspired from that of Kashyap and Stein (1995) and tries to test whether there is an effective bank lending channel in the MENA region.

Our specification is then made to check the response of the volume of credit to a variation of the monetary policy instrument. We also introduce a vector of control variables in order to resolve the supply-demand puzzle.

In practice, the supply-demand puzzle results from the fact that it is difficult to know if, after monetary tightening, loan contraction is caused by a decrease in loan supply (bank lending channel) rather than loan demand (interest rate channel). This problem was already mentioned in Romer and Romer (1990), Bernanke and Blinder (1992), Ramey (1993) and Kashyap and Stein (1994) to name but a few works. In these studies, it is conceded that a restrictive monetary policy could affect real economy by shifting the bank loan supply curve to the left. But, at the same time, this restrictive monetary policy could cause a loan demand curve shift to the left which also causes a decrease in bank loans. So, a simple decline in bank lending is not indicative of a leftward shift of the loan supply curve rather than loan demand curve.

The econometric model adopted here concerns 18 MENA countries. It is given by an equation where the loans distributed by banks are regressed on its own lagged values as well as a

lagged monetary policy instrument and a set of macroeconomic variables. The specification is as follows:

$$L_{it} = \alpha_0 + \lambda L_{it-1} + \alpha_1 MP_{it-1} + X_{it-1}\beta + U_{it} \qquad (1)$$

With: $U_{it} = \mu_i + \nu_{it}$ where $\nu_{it} \to N(0, \sigma_\nu^2)$ (i.i.d) and μ_i is a country specific fixed effect.

In Equation (1), countries are denoted i (i = 1…18) and t (t = 1990….2009) indicates the time observation for each variable. L_{it} is the volume of domestic credits provided by banking sector (in % of GDP) while MP_{it-1} is the lagged monetary policy instrument. Finally, X_{it-1} is a set of lagged control variables: real GDP, inflation rate, total exports as a percentage of GDP and bank deposits relative to GDP.

Thereafter, we extend our initial equation by introducing some interactive terms. These terms describe the interaction between some bank characteristics and institutional quality on the one hand and the monetary policy instrument on the other hand. Then, the new specification becomes as follows:

$$L_{it} = \alpha_0 + \lambda L_{it-1} + \alpha_1 MP_{it-1} + \sum_{j=1}^{4} \gamma_j z_{it-1} MP_{it-1} + X_{it-1}\beta + U_{it} \qquad (2)$$

Where L_{it}, MP_{it-1}, and X_{it-1} are the same variables as defined in Equation (1). Z_{it-1} is a set of lagged four indicators: three bank characteristics describing respectively liquidity, size and banking concentration[8] as well as a fourth indicator describing the quality of the institutional environment. $MP_{it-1}z_{it-1}$ is the interaction term between the lagged monetary policy instrument and these four lagged indicators.

4.1. Methodology

Due to the dynamic nature of the model, a correlation between the lagged endogenous variable and the error term leads to biased and inconsistent OLS estimates. In fact, let us assume a basic model like ours which is written as follows:

$$Y_{it} = \alpha Y_{it-1} + \beta' X_{it} + U_{it} \qquad (A)$$

With $U_{it} = u_i + e_{it}$

The inclusion of the lagged dependent variable in the equation implies a correlation between one of the regressors (Y_{it-1}) and the error term (U_{it}) since the lagged dependent variable is function of U_{it-1} which includes the country specific effect (u_i).

$$Y_{it-1} = \alpha Y_{it-2} + \beta' X_{it-1} + U_{it-1}$$

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[8] Our choice of these characteristics (rather than many others) is constrained by data disposal.

With $U_{it-1} = u_i + e_{it-1}$

Because of this correlation, the estimation suffers from the Nickell (1981) bias, which disappears only if T tends to infinity.

In order to account for the autoregressive nature of the model, the preferred estimator in this case is General Method of Moments (GMM) suggested by Arellano and Bond (1991). This estimator basically differentiates the model to get rid of country specific effects or any omitted time-invariant country specific variables.[9]

$$Y_{it} - Y_{it-1} = \alpha(Y_{it-1} - Y_{it-2}) + \beta'(X_{it} - X_{it-1}) + (e_{it} - e_{it-1}) \quad \text{(B)}$$

The problem here is that, by construction, the error term ($e_{it} - e_{it-1}$) is correlated with the lagged variable in difference ($Y_{it-1} - Y_{it-2}$). That is why in the Arellano and Bond (1991) estimator, the first-differenced lagged explanatory variables are instrumented by their past values (in level). It means that ($Y_{it-1} - Y_{it-2}$) and ($X_{it} - X_{it-1}$) are respectively instrumented at least by Y_{it-2} and X_{it-2}.

From an econometric view, the GMM procedure is based on a set of orthogonality conditions between the error terms and some instrumental variables. An estimation procedure is conducted in order to assure convergence of these orthogonality conditions toward zero. Under the hypothesis that model explanatory variables are weakly exogenous and the absence of autocorrelation among error terms, these orthogonality conditions can be applied to first-differenced lagged equation:

$$E[Y_{it-s}(e_{it} - e_{it-1})] = 0 \quad \text{for } s \geq 2 \text{ and } t = 3......T$$
$$E[X_{it-s}(e_{it} - e_{it-1})] = 0 \quad \text{for } s \geq 2 \text{ and } t = 3......T$$

The problem with that estimator is the weakness of instruments. This implies a substantial bias in small samples and the asymptotically weakness of its precision. Moreover, taking the first-differenced lagged equation accounts only for *within* variation rather than *between* one.

The GMM System estimator developed by Blundell and Bond (1998) avoids this problem. This estimator combines and estimates simultaneously two equations. The first one is the first-differenced equation (equation B) where the right-hand-side variables are instrumented by its levels, lagged one period or more. As for the second one, it consists of the equation in level (equation A) with the right-hand side variables being instrumented by its differentiated levels, lagged one period or more.

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[9] Baltagi and alii (2009): "Financial Development and Openness: Evidence from Panel Data", *Journal of Development Economics*, 89, p. 287.

Blundell and Bond (1998) have had tested this method with Monte Carlo simulations and have found that the GMM system is more efficient than the first differenced GMM estimator.[10] In practice, the GMM system estimator has several advantages given that it takes into account country-specific effects, while allowing addressing issues associated with endogeneity, measurement errors, and omitted variables.[11]

A special feature of the dynamic panel data GMM estimation is that the number of moment conditions increases with T. Therefore, a Sargan test is performed to check the overall instruments validity. Moreover, in order to verify the assumption of the absence of serial correlation in error terms, we run a second test called the 2nd order autoregressive test AR(2). Failure to reject the null hypotheses of both tests confirms the validity of the specifications.

4.2. Data sources and variables description

In order to run our econometric models, we gathered data from different sources. According to the availability of these data, the treatment of incomplete panels is imperative. Each variable is then observed over a varying time length and the dynamic panel model for MENA countries is unbalanced.

Our dependent variable L_i, which is approached by the domestic credit provided by the banking sector as a share of GDP, is extracted from World Development Indicators Database of the World Bank (WDI-WB 2010).

As for MP_i, our monetary policy instrument, it is various across countries. It corresponds simultaneously to money market rate (Algeria, Egypt, Lebanon, Morocco, Tunisia and Turkey), repo rate (Kuwait, Qatar and Saudi Arabia), certificates of deposit rate (Jordan, Oman and United Arab Emirates), deposit rate (Bahrain) as well as interbank rate (Libya, Iran, Sudan, Syria and Yemen). We gathered these variables from International Financial Statistics Database of the International Monetary Fund (IFS-IMF 2011), United Nations Database (2011) and various central bank websites.

As regards our set of macroeconomic control variables X_i, we extracted them from WDI-WB Database (2010) except real GDP and bank deposits as a share of GDP which are drawn respectively from the Chelem (2011) and Beck et al (2009) Databases.

With respect to z_i, which describes the three bank characteristics (size, liquidity and bank concentration) as well as the quality of the institutional framework, we resort to the Beck et al

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[10] Blundell, R and S. Bond (1998): "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models", *Journal of Econometrics, 87, N°1*, p. 116.

[11] Kpodar, K and R J Singh (2011): "Does Financial Structure Matter for Poverty: Evidence from Developing Countries", *Policy Research Working Paper 5915, December*, p. 11.

(2009) Database for the first three variables and the International Country Risk Guide -ICRG-Database (2009) for the fourth one.

More precisely, for bank size, we considered the ratio of deposit money bank assets as a percentage of GDP. For bank liquidity, we approached it by the ratio of bank credits to bank deposits. Finally, for bank concentration, we took the assets of the largest three banks as a share of all commercial bank assets.

Concerning the institutional environment indicator, we use a Principal Component Analysis (PCA) to construct it. With this method, we make a weighted average of five institutional proxies: control of corruption, law and order, bureaucratic quality, ethnic tensions and investment profile. However, the problem with the construction of this indicator stems from the heterogeneous scale of the sub-indicators. Indeed, the control of corruption, law and order as well as ethnic tensions are scaled between 0-6, whereas the bureaucratic quality and investment profile are scaled respectively between 0-4 and 0-12. Therefore, before applying the PCA, we unified all the proxies to obtain a sub-indicator scaled between 0-4. To do that, we multiplied the proxies scaled between 0-6 by 2/3 and divided by 3 those scaled between 0-12.

Insert Table 2

Before moving to empirical results, we present some main descriptive statistics for the key variables, except the interaction terms. Table 2 summarizes these statistics. From this Table, we note that the average domestic credit as a share of GDP has been around 53.6 and has varied significantly from -54.8 to 179.88 between 1990-2009. With respect to the lagged monetary policy instrument, it has been equivalent to 7.8% on average and has varied from 3.1% to 16.8% over the whole period. As for lagged growth and inflation, they have increased respectively by 13% and 4.6% during the same period. Lagged growth has varied from -2.17% to 16.8% while lagged inflation has varied expressively from -5.1% to 104.62%. Finally, both lagged exports and deposits relative to GDP have experienced quite similar characteristic over the whole period. For the former variable, it has averaged 38 and varied between 4.3 and 90 while for the latter variable, it has averaged 42.7 and varied between 5.4 and 92.2.

5. **Empirical Results**

As explained above, unlike the different methodology used in previous works on bank lending channel effectiveness, we estimate equations (1) and (2) by using the GMM system method of Blundell and Bond (1998). Our empirical results are exposed in Table 3. In the first column,

we expose the estimation results of equation (1) before introducing the interaction terms in the second column (equation 2). The time span is 1990 to 2009 and is divided into 4 sub-periods of 5 years each.

Insert Table 3

Our coefficients of interest here are those of the monetary policy instrument and the interaction terms. The monetary policy instrument is expected to be negative since monetary tightening lowers loans provided by the banking system. In this case, we can stipulate the effectiveness of the bank lending channel.

With respect to the distributional effects of monetary policy on the lending behavior, it is captured by the interaction of the monetary policy instrument with the individual bank characteristics as well as the institutional framework.

Firstly, we expect the interaction between the bank size and the interest rate to be positive since lending by large banks is less sensitive to monetary tightening relative to small banks. Secondly, we expect the interaction between the monetary policy indicator and liquidity to be also positive because more liquid banks are less sensitive to rigorous monetary policy relative to illiquid banks. This is because more liquid banks are able to provide more lending by drawing down on their stock of liquid assets. Thirdly, we expect the interaction between bank concentration and the interest rate to be positive or negative. This is because, on the one side, bank concentration very often implies an increase of bank size, so the interaction could be positive (as mentioned above). However, on the other side, bank concentration implies that banks act in a non-competitive environment and push them to pass on their costs of funding to their loan rates. In that case, banks are more sensitive to changes in monetary tightening and the interaction could be negative. Finally, we expect the interaction between institutional environment and monetary policy instrument to be positive. Indeed, better institutional quality enhances creditor rights protection and allows banks to be more reliable and trustworthy. Hence, the banking industry would not panic after a monetary shock and continue to provide loans.

Before moving to our main estimation results, it is judicious to note that, basing respectively on the results of the AR (2) test and over-identification Sargan test, we cannot reject neither the null hypotheses of the absence of errors autocorrelation nor the validity of instruments.

From Table 3, column (I), we can notice a negative effect of the monetary policy instrument on the loans distributed by banks, which confirms -a priori- the effectiveness of the bank lending channel in MENA countries. However, as explained above (section 4), we can guess

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the existence of the supply-demand puzzle. That is the reason for introducing our control macroeconomic variables in the specification. After the addition of these variables, our results show that, apart from real GDP, all the other variables are significant and with the expected sign. In particular, even if exports volume, inflation rate and bank deposits matter, monetary tightening causes a reduction in distributed loans, and the bank lending channel remains effective.

Besides, from column (II), we can witness a sensitiveness of the supply of loans to changes in the bank characteristics owing to changes in the monetary policy instrument. In particular, large banks are less sensitive to monetary contraction than small banks since they continue to provide loans even after a monetary shock. Moreover, liquid banks are more able to count on their liquid assets and to pursue their lending activities in a monetary tightening context. Finally, when facing a monetary policy shock, more concentrated banks display a stronger response by cutting credits. Indeed, it seems that banks in MENA countries pass the cost rise of their funding into their lending rate given that they operate in a less competitive environment comparing to other emerging countries.

In the other hand, we can note a sensitiveness of the supply of loans to the quality of the institutional environment. In fact, the results show that the interactive term is positive. In other words, when the property rights are more protected and the rules of law are more prominent, banks are more fortified to confront monetary policy shocks and to continue lending.

6. **Conclusion**

This paper investigates the role of bank lending in the monetary transmission mechanism in 18 MENA countries. We employ aggregate data and use a dynamic panel method from 1990 to 2009.

We estimate a bank loan function that describes a relationship between the volume of credit (as an endogenous variable) and the monetary policy indicator as well as macroeconomic variables (as exogenous ones). Thereafter, we add many variables reflecting the interaction of the monetary policy with the quality of the institutional environment and three main bank characteristics: size, liquidity and concentration. Our intention is to see whether these characteristics influence lending activity after monetary tightening.

The empirical results suggest the existence of the bank lending channel in MENA countries since the effect of the monetary policy instrument on the volume of distributed loans is visible. These results also indicate that lending activity is sensitive to the institutional as well

as the banking framework. In particular, a good institutional environment -characterized by improved transparency and accountability, absence of corruption…- has a positive effect on the lending activity even in the case of monetary tightening. Besides, a solid banking system characterized by big and liquid banks has a positive effect on the bank lending channel while a banking concentration has a negative effect in the case of rigorous monetary policy.

These empirical results allow us to draw some lessons for MENA countries. First, economic policies targeted towards stimulating supply of credit are likely to be an effective tool for expanding credit flows and then for boosting investment and activity. Second, monetary authorities in these countries have to pay much attention to the strengthening of the banking sector. A reinforcement of macro-prudential rules, especially those related to liquidity and size is sine qua non. Finally, a strengthening of the institutional environment seems to be beneficial for the banking sector in particular and the economy as a whole.

However, as mentioned above, our results are about the first link of the lending channel, that from monetary policy indicator to credit availability. But, as we specified, there is a second link between the availability and cost of bank credit and aggregate demand. Therefore, testing the relationship between investment (or activity) and bank loan availability could be important and complementary to our study. Moreover, decomposing our sample into oil and non-oil producing countries could be helpful.

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Appendix:

Table 1: Financial Environment in MENA, Emerging and Advanced Countries (Means)

	1990-2009				
	MENA Countries			*Emerging Countries**	*Advanced Countries**
	Middle East	North Africa	Total		
Deposit money bank assets/GDP	0.47	0.44	0.46	0.63	1.24
Other financial institutions assets/GDP	0.13	0.08	0.11	0.17	0.55
Stock market capitalization/GDP	0.51	0.3	0.44	0.82	0.9
Financial integration (Chinn & Ito Index)	1.15	-0.71	0.22	1.03	4.4

Sources: Beck et al (2010) and Chinn & Ito (2009), author's calculation;
*Mishra et al (2010).

Table 2: Summary Statistics (1990-2009)

Variable	Observations	Mean	Standard Deviation	Min	Max
L_i	72	53,6356	36,88582	-54,83001	179,8807
L_{it-1}	54	54.32305	32.07729	5.086338	179.8807
MP_{it-1}	14	7.852134	4.872321	3.148668	19.8
Y_{it-1}	54	4.601195	2.805442	-2.17698	16.84822
π_{it-1}	54	13.04899	21.92803	-5.180061	104.6279
$Exports_{it-1}$	54	38.01521	19.96357	4.304683	90.00177
$Deposits_{it-1}$	41	42.78202	22.5992	5.433824	92.20397

Y: Real GDP; π : Inflation rate ; Exports : Exportations as a share of GDP ; Deposits : Bank deposits as share of GDP ;

Table 3: Empirical Results

	(I)		(II)	
	Expected sign		Expected sign	
Loans (-1)	(-)	1.754 (0,175)***	(-)	-4,068 (2,269)*
MP (-1)	(-)	-9,761 (5,262)*	(-)	-22,5 (11,258)*
Real GDP (-1)	(+)	-2,697 (2,34)	(+)	-0,277 (1,068)
Inflation Rate (-1)	(+)	13,873 (6,436)**	(+)	55,18 (33,15)*
Exports (% of GDP) (-1)	(+)	1,246 (0,065)***	(+)	1,64 (0,951)*
Bank Deposits (% of GDP) (-1)	(+)	1,62 (0,68)***	(+)	3,86 (2,49)*
Size(-1)*MP(-1)			(+)	1,026 (0,406)**
Liq(-1)*MP(-1)			(+)	0,179 (0,06)***
Bank Conc(-1)*MP(-1)			(+) or (-)	-1,172 (0,67)*
INS(-1)*MP(-1)			(+)	16,624 (4,254)***
Constant		-88,226 (12,5)***		dropped
AR(2)		-1,31 (0,19)		-0,55 (0,583)
Sargan Test		0,39 (0,941)		1,56 (0,32)
Wald Test		18,42 (0,01)		12,77 (0,086)

Notes: Figures in parentheses are robust standard errors, except for Sargan test and autocorrelation errors test of Arellano-Bond (AR2) which are p-value. ***, ** and * denote significant at 1%, 5% and 10%, respectively. The dependant variable is Loans volume distributed. For AR(2) and Sargan test, null hypotheses is respectively absence of second order autocorrelation and validity of lagged variables as instruments. For Wald test, null hypothesis is explanatory variables joint insignificance.