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### ***Efficiency of Monetary Policies in a Changing Macroeconomic Environment***

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**FEMISE**  
**INTERNAL CONSULTATION**  
**FEM31-25R**

**EFFICIENCY OF MONETARY POLICIES IN A  
CHANGING MACROECONOMIC ENVIRONMENT**

**FINAL REPORT**

**Executive summary**

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**MARCH 2009**

## ***Introduction***

Recently, the governments of Egypt, Morocco and Tunisia announced that they are preparing to switch to IT. It is a monetary policy whose fundamental goal is to keep the inflation rate (suitably defined) within a certain publicly announced band around a target rate. The band allows the central bank some flexibility in responding to departures of the actual inflation rate from the target rate. Although the principle of IT is simple, the success of a central bank in implementing it requires certain preconditions. Are these preconditions fulfilled or could they be fulfilled soon enough in these three countries? This report is mainly about their readiness for IT. Indeed, some of the preconditions may be achievable gradually but over a relatively short transition period while some others are not so easy to fulfil. In particular, financial soundness is a major prerequisite, and it is a fact that, although these three countries implemented many important financial reforms, their financial systems remain in various ways rather vulnerable. Fiscal deficits, high public debt and/or severe rates of non performing loans (NPLs) held by the banking system are among the main indicators of this vulnerability.

The first fundamental precondition of IT is the independence, accountability and transparency of the central bank. The central bank must be independent in order to be able to adjust freely the instruments of its monetary policy and therefore to be credible. The concept of independence is often divided into goal and instrument independence (DeBelle and Fischer, 1994). In the case of IT, instrument independence is the most crucial since the inflation target is by definition the single main goal of monetary policy. Independence means that the central bank should have enough power and strength to resist any external pressure to deviate from the chosen objective, it also means that the public believes that it is free to make decisions solely in accordance with the requirements of IT, and hence it is in particular free to decide whether or not and when to finance a government budget deficit. It follows that fiscal discipline is a pre-requisite for the credibility of the central bank's independence.

Accountability and transparency of the central bank are corollaries of its credibility and independence. An independent central bank has to be accountable for its actions to the public concerning the successes and failures of its policy. The public must have the capacity, through its elected representatives, to control and ultimately punish incompetent policymakers in order to create better incentives for them to do their jobs well (Mishkin, 2002). Monetary policy decisions must also be communicated in a clear and regular manner to the public and particularly to financial markets and private economic decision-makers. Transparency should focus on the policy analysis and the operational objectives of the central bank in order to reduce the inflation bias and uncertainties in financial markets (Faust and Svensson, 2001). A transparent monetary policy means that policy decisions (usually changes in short-term interest rates) should not contradict the expectations of the market. Thereby, transparency lowers the cost of achieving the inflation target.

The efficiency of the central bank depends on the degree of development of the country's financial markets and its stability. It has been shown that the most serious economic contractions arise when there is financial instability (Mishkin, 2002).

Banks that are badly managed, or are under stress for any reason, are likely to lobby the government for relief through any available channels and to undermine the functioning of monetary policy. Higher short term interest rates intended to reduce inflationary pressures are then likely to put fragile banks under more stress and to hurt them more severely. The US experience, in the 1980s with the crisis of the savings and loans associations, and again in the current year (2007-2008) with the sub-prime loan crisis, shows that if a central bank decided to fight inflation, badly managed financial institutions would be put under severe stress and some of them would fail leading to uncertainty and instability.

A fragile banking system may also be unable to deal with free capital mobility and exchange rate volatility since IT cannot succeed unless a flexible exchange rate regime is put in place and only one main target of monetary policy and a single nominal anchor are adopted. In the presence of free capital mobility, stabilisation of the exchange rate subordinates monetary policy to its requirements and may lead to intolerable deviations from the inflation target, which will destroy the credibility of the central bank's commitment to IT. Nevertheless, According to Mishkin (2002, 2004), the exchange rate flexibility condition may be weakened, and a trade-off between the inflation and exchange rate objectives may be considered within an adapted IT framework.

The existence of a well developed financial system also depends on the soundness of fiscal policy. Fiscal dominance may threaten financial stability since it means that high pressures are put on the financial system and not only on the central bank to finance the government budget deficit. Fiscal discipline is a main pillar for the credibility of the central bank's independence and the viability of the country's financial institutions, as it signifies that the central bank and the banks will not be forced eventually to finance government budget deficits by printing money as happened, for example, in Turkey in the 1990s and many other countries before and after.

However central bank independence and fiscal discipline do not imply that monetary and fiscal policies should be totally disconnected. In fact, the lack of harmony with regard to the relationship between the CB and the Ministry of Finance might constitute a potential difficulty. Different views between the monetary and fiscal authorities can in fact send wrong signals to the financial markets as well as to the public. These considerations need to be taken into account, not only in the design of an IT strategy, but also in any monetary strategy.

The report is organized in two parts. **Part one is about preparing for IT while part two is about Monetary transmission mechanisms.**

## ***I. Preparing for IT***

The first part of the report is about country cases. It includes three separate papers on Egypt, Morocco and Tunisia where the authors try to assess to what extent these countries are prepared and how well they are preparing for the transition to a formal inflation targeting regime (IT). These countries can learn from other experiences, in particular the Turkish, which is presented in the fourth paper. The titles of the papers are the following:

1. Readiness to Inflation Targeting: the Case of Egypt

2. Monetary Policy and the preparation for Inflation Targeting in Morocco
3. Readiness of Tunisia for Inflation Targeting
4. Formal Inflation Targeting Experience of Turkey: 2006-2007

In Egypt, the objective of the central bank was set within the context of a general program to move to inflation targeting (IT) once the fundamental machinery needed for its implementation is installed (CBE, 2005). During the transition period, the monetary authority intends to meet its inflation stabilization objective through the management of the short-term interest rates and the control of other factors and shocks that might affect the inflation rate (CBE, 2005). Many reforms and a lot of actions have been taking by the Egyptian authorities to prepare for IT. However, Central bank independence in Egypt has been rather hindered by fiscal dominance and the pressure due to high budget deficits and public debt. Although serious steps have been taken recently under a new law committing the country to the achievement of price stability as the primary objective, prohibiting credit extension to the government, and strengthening central bank independence, Egypt does not yet satisfy some essential IT requirements, including the central banks independence requirement. The existence of a rather fixed exchange rate regime currently constitutes another important obstacle.

The Egyptian monetary policy had been for along time and until recently without a clear anchor for inflation expectations. Even in 2008, the monetary policy strategy carried out by the Egyptian monetary authority is still far from being ccoherent and the CBR does not seem to be the main guide for public's inflation expectations. Inflation reached a record level of 23 percent in August 2008, a level which has not been reached for at least the last two decades. Despite the reforms undertaken especially since 2003, a lot remains to be done in order to build up the central bank's credibility.

The level of public debt and budget deficit remain too high. As long as they remain so high the country should not engage in IT. The ongoing rise in the public debt, which inevitably increases the domestic interest rates and may lead to a slower economic activity, could force the central bank to lower the real interest rate and hence to raise the level of inflation.

The absence of a clear cohesive policy framework and the weakness in terms of CB independence reflect a lack of political willingness. Is the Egyptian government really inclined to carry out a policy such as IT? The recent small increases of the interest rate decided by the CBE (during June, July and August 2008) in order to combat inflation seem to indicate that CBE is still reluctant about immediate policy choices and perhaps more about strategic choices and namely switching to IT.

The situation is somehow similar in Tunisia. Recently, the government of Tunisia announced that it is also preparing to move to IT after an indeterminate transition period, and to move to full liberalisation of capital mobility and full convertibility of the Tunisian Dinar (TND).

Although many financial reforms have been undertaken in Tunisia, many of the preconditions for IT are not yet fulfilled. In particular, the central bank of Tunisia

(BCT) lacks independence, and the country lacks a strong and transparent financial system. The banks, which dominate this system, remain fragile, and the severity of their non-performing loans (NPLs) problem undermines their effectiveness in performing their role as the most important channel of financial intermediation and transmission of monetary policy signals. The current situation suggests that Tunisia must undertake major reforms before it adopts a full fledged IT policy. There is serious doubt about the transparency, accountability and independence of its central bank (BCT). The lack of a clear performance indicator, the lack of independence from the executive branch of the government and the composition of its board compromise its independence and its credibility. The governor of the BCT is appointed by government decree and is responsible for the management of all the affairs of the bank. He is assisted by a board whose members are appointed by the government. Many reforms have been implemented and laws passed to change and modernize the Tunisian financial system over the last decades. For instance, prior to 1995, the BCT and the ministry of finance in Tunisia controlled on behalf of the government almost every aspect of bank credit and management, and the banks were required to allocate a large portion of their wealth to buy government debt and to finance government projects. This has changed quite radically In July 2001 when the Tunisian government introduced a new banking law, (Law 2001-65) in order to strengthen bank supervision and to help banks deal with the new economic and regulatory environment. However, not all Basle II principles are yet satisfied and, based on the statistics on non-performing loans (NPL), both for private and public banks have high NPL rates. Not surprisingly, public banks have a higher ratio (19.7% in 2006) than private banks (18.7% in 2006). Obviously, the central bank is not using all its legal powers and instruments to rigorously implement the existing regulation and avoid such a low performance.

Targeting broad money growth, in addition to pursuing a highly managed exchange rate regime, has long been the core of the BCT's monetary policy. Since the early 1990s Tunisia has followed a constant real effective exchange rate rule in an effort to index its nominal exchange rate to the domestic price level in order to protect the competitiveness of Tunisian producers.

It is remarkable that the procedure for competitive tenders actually followed since the mid 1990s has generally been such that the BCT maintains the previously applied interest rate and asks banks to specify only their demand for liquidity. This amounts to a de facto control of short term interest rates. Given that banks are quite dependent on its resources, the BCT usually satisfies their liquidity requests in order to keep interest rates stable. BCT's policy seems to be driven also by the fear of financial system instability and by the government's economic development policy and its fiscal deficit than by the rules of its monetary policy. As a result of various contingencies and the government need to meet the financial exigencies of its liabilities, the BCT had to meet requests for liquidity put forward indirectly by the government through the commercial banks, and hence to deviate from its money target. Banks had to supply credits to meet government needs and other demands backed by the government authorities. BCT does not supply funds directly to the government.

It may be argued that the fiscal reforms implemented during the 1990s established new rules and institutions that have led to more fiscal discipline and contributed to the lowering of the inflation rate. The government has also adopted relatively more transparent and more market-based debt management instruments. The government is now required to issue and sell new bonds on the open market to finance its deficit. These reforms led to the development of the government debt market and

improved the incentive for the government to master its deficit and to practice fiscal discipline. However, these improvements do not mean that monetary policy had been completely freed from fiscal dominance.

Morocco and its central Bank, Bank El-Maghrib (BAM) seem be the candidate most fit for IT in the region and the most likely to switch to this regime in the near future. BAM has since 2005 made significant efforts and significant progress towards meeting the pre-requirement of IT. It has radically changed its chart, developed its technical and forecasting capacity regarding the key macroeconomic variables. It started producing and publishing inflation forecasts. The fiscal deficit as well as the public debt observed in Morocco have been under control since 2006 consistently with the requirements of IT. The BAM monetary policies as well as the changes in monetary instruments are announced through regular public information services (annual report, BAM website...). The BAM issues statements to the public on the progress towards meeting monetary policy objectives. The BAM has enhanced significantly its transparency and communication strategy. It is transparent about its objectives (thanks to the 2005 new statutes) as well as about its technical procedures (the model) it utilizes to reach these goals. BAM started establishing systematic and relatively accurate forecasts of inflation and a estimate of how inflation is likely to be affected by changes in the monetary policy instrument. Yet, before 2005, its financial system and policies and its fiscal and inflation indicators had not been less fragile than Tunisia's. This means that progress is possible.

The Turkish experience is even more meaningful with this respect. It shows that it is possible to move from a highly unstable macroeconomic situation, characterized by high fiscal deficit and public debt and high inflation, to a much more stable one and to fulfill most of the major IT conditions in a reasonable transition period. Nevertheless, Turkey is still facing major challenges and its experience with IT, short for the moment, is to be observed and examined more closely.

## ***II. MONETARY TRANSMISSION MECHANISMS AND THE EFFECTIVENESS of THE MONETARY POLICY in Egypt, Morocco and Tunisia***

Understanding and measuring the time lag between a monetary policy decision and its impact on the main nominal and real macroeconomic variables is what the analysis of MTMs is all about. How does a change in the policy interest rate decided by the central bank affect key macroeconomic variables, including the exchange rate, the volume of loans and above all the inflation and output? The purpose is not only to identify these impacts but also to measure their intensity. This is of course essential for successfully conducting monetary policy in general, and more so in the case of inflation targeting. With this respect, a lot remains to be done in the region; at this stage, we still wonder which channels and mechanisms are really operating and which channel is the most important? And then, what makes this channel more prevailing?

Two main approaches are possible for identifying and analyzing MTMs. The first approach adopted by Boughzala relies on micro data mainly on banks and when

possible on firms and other investors, and adopts a panel data set up. The second approach, adopted by Boughrara, relies on macro time series data and applies various types of VAR models; the latter is the most widely used.

**The first paper**, entitled “MTM and the Imperfection of the Banking System” has a wider geographical coverage but its field of investigation is more limited. It tries only to explore how and to what extent changes in the short-term nominal interest rate decided by a central bank leads to changes in the banks lending interest rate and consequently in the volume of loans they effectively provide to investors (firms and households). The second paper, entitled “Monetary Transmission Mechanism Analysis in Egypt, Morocco and Tunisia” is more comprehensive.

The first paper argues that monetary policy effectiveness depends on which monetary transmission mechanisms (MTM) are operational and on how efficient they are and that MTMs vary across countries and are not equally efficient across countries, in particular in the European Union (EU) countries compared to MENA countries.

MTMs operate mainly through the banking system, be it for the interest rate channel or the credit channel. What makes these channels more efficient in some countries, and what to do in order to improve their effectiveness through the improvement of the performance of the banking system? How fast do banks reflect changes in the interest rate decided by the central bank (CB) in their lending activities and/or their own rates (mainly their loan rates)? And what determines the speed of their response? This is the main concern of the first paper which restricts its interest to cases where the monetary instrument used by the CB is the interest rate and where the monetary policy objective is to reach an inflation target and/or a real output and employment target (assuming that output and employment are strongly linked) and relies on the traditional interest channels and the credit channel. Hence, by exploring the reaction of the banking system to the central bank policy actions the paper indirectly measures the impact of monetary policy on inflation and real economic variables. One of the main objective of this work is to test to what extent the banks' response depends on the banking market structure and the type of competition (imperfection), on the type of risks banks deal with. Banks' response depends on the structure and quality of their assets (that is the quality of their loans and how much and which type of securities they hold...) and on their liquidity (Ehrmann M., Gambacorta L., Martinez-Pagés J., Sevestre P., Worms A., 2001). Indeed, banks that can obtain liquidity at the inter-bank market or by easily selling assets on the financial market would be less dependent on the CB financing and might respond more slowly to monetary policy shocks, especially in the case of an interest rate increase, and, so they would continue to supply loans. Through this investigation, the aim is also to compare countries from the MENA region (Egypt, Morocco, Jordan, Lebanon, and Tunisia) to some OECD countries (France, Germany and the UK) whose financial market and banking systems are highly developed. Most of the selected MENA countries are undergoing important financial and monetary reforms and envisaging IT.

A specific model is constructed, focusing on the banking structure and assuming imperfect competition in the banking market. Different specifications were tested using a rich panel data. The simplest is a regression of loans on the central bank rate (CB rate) and the loan rate, the volume of deposits, the bank's total assets, non interest income for the bank, which reflects its non lending activities in the financial market, and a country dummy, which lumps together EU countries opposed to the MENA (non EU) countries.

Given the endogeneity of the loan rate a one period lagged rate is introduced instead, but this variable does not seem significant after all! The country dummy systematically has a positive and significant sign showing the superior performance of the EU countries. The other signs are as also as expected and explained above. When a two stage estimation method or a GMM method is used, basically the same results are confirmed.

The second paper, entitled “MTM in Egypt, morocco and Tunisia”, tries to investigate the four major conventional transmission channels, namely the exchange rate channel, the interest rate channel, the lending channel, and the stock market channel. Far from describing all the transmission mechanisms, these channels are more likely to be operating in the panel countries considered. To what extent these transmission channels (e.g. interest rates, exchange rates, credit aggregates, stock market indexes...) matter will is first tested using Granger causality tests. A more formal analysis will be based on SVAR models.

The results reported on Table 1 clearly corroborate the preliminary conclusion regarding the degree of the interest rate pass-through in all countries. Overall, they indicate that the pass-through is incomplete to all retail rates (deposit and lending rates). It is worth noting however that the magnitudes of pass-through coefficients associated to deposit rates are weaker than those associated to the credit rates. For instance, the long-run pass-through effect in case of Egypt is around 0.31 for lending rate and 0.11 for deposit rate. This implies that 31 per cent of any money market rate change is passed through to the lending rate in the long –run, and only 11 per cent of the policy rate is passed through the deposit rate. The pass-through in Morocco is slightly superior to that in Egypt. Approximately 40 per cent of the change in the Moroccan policy rate is passed through the lending rate whereas 33 per cent is passed through deposit rate. Likewise, the pass-through degree in Tunisia is not significantly different from that recorded in Morocco.

**Table 1:** Interest Rate Pass-through

	Egypt	Morocco	Tunisia
Lending Rate	0.31	0.4	0.39
Deposit Rate	0.11	0.33	0.27

Source: Author's calculation

Stickiness of retail rates in the case of Egypt, Morocco and Tunisia is due to the presence of adjustment costs associated with changing retail rates to customers and this may lead to the smoothing of retail interest rate changes with respect to changes in the policy rate (which could play the role of the marginal cost of funds). It is also caused by to the lack of competitiveness among banks. Indeed, the lesser the degree of competition, the higher this spread is likely to be. In the panel countries considered in this paper, the lack of competition is due, to a great extent, to regulation (case of Egypt), to collusion on the part of financial institutions or fixed costs of entering the market (Tunisia and Morocco), and to the ‘gentleman’s agreement’ (Tunisia). Besides, the monopolistic or oligopolistic structure of countries’ banking systems explains the small pass-through degree because in such banking, retail rates won’t move significantly and

quickly in response to changes in money market rates. Cette situation reflète aussi une faible crédibilité du système financier dans ces pays.

Finally, the finding of a weak interest rate pass-through could be explained in Egypt, Morocco and Tunisia by the fact that the monetary institution lacks credibility; in such case, economic agents may misperceive temporary policy rate shocks as being permanent. Overall empirical results on long-run interest rate pass-through seem to indicate that the central banks policy rates do not seem to rapidly determine the market lending and deposits rates. Yet, we would expect interest rate pass-through to have improved in recent years given the improvement in the specific features of the monetary framework, banking sector and economic conditions.

The next and main step in analyzing MTMs is to examine the impact of policy measures on the key economic variables, primarily inflation and the activity level. A natural extension of the analysis of interest rate pass-through lies in analyzing the complete interest rate channel of monetary policy, from policy rate changes to movements in the consumer price index and changes in the level of economic activity.

In line with the above explanation, we start the empirical analysis of the MTM in Egypt by considering the baseline model which include in the VAR the oil price and the US federal funds rate in order to avoid well-known empirical anomalies such as price puzzles. All the variables are considered in level and in log except for rates. All the data used are from IMF International financial statistics CD ROM (July 2008). Dates are monthly and cover the period 1997:01-2007:12. The other data we used in the case of Egypt are a measure of real activity, proxied by GDP deflated by the whole sale price index (RGDP); prices proxied by the whole sale prices (WPI); a nominal exchange rate, proxied by bilateral U.S. dollar (ER), and a stock market index proxied by the Cairo and Alexandria Stock exchange index (CASE).

The response of prices to an increase in the monetary policy measure (the Treasury bill rate) is significant and quick- prices start to decrease after about one quarter or so; the monetary policy seems effective in bringing down prices. The strong deflationary impact of a tightening on the WPI is intuitive and consistent with earlier findings (Rabanal, 2005 and Al-Mashat and Billmeier, 2007). As for the response of real activity, it stands out from the IRFs pattern that the policy rate fails to impact on real activity. While the reaction of the real activity to an exchange rate hike is not significant, it appears to be consistent with prior expectations especially after one year or so; the activity start to decline just after one year. Overall, these findings are consistent with the theory and free from any puzzle.

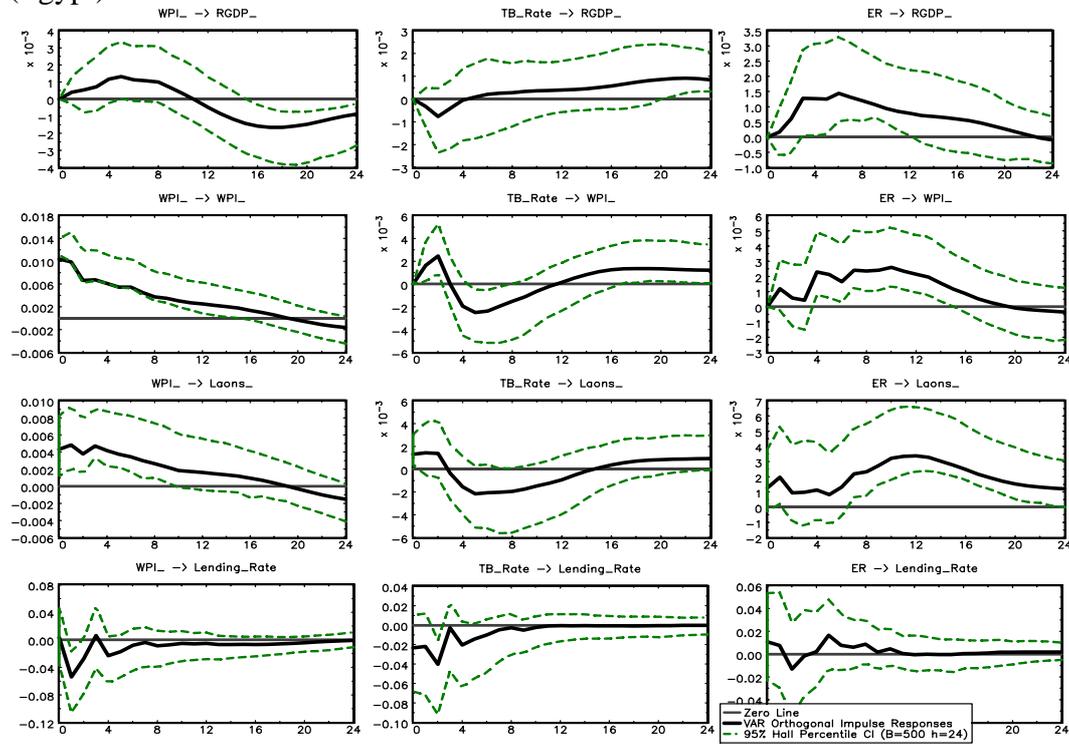
To shed light on the existence of the lending channel in Egypt, we include into the baseline model loans quantity (Loans) and loans price (proxied by lending-rate). The ordering of the variables is chosen on the basis of the speed with which the variables respond to shocks like in the case of the channel considered above. The focus here is on the identification puzzle, that is on the supply-versus-demand of loans puzzle. A contraction of bank loans for itself is not necessarily a consequence of leftward shift of the supply schedule. Thus, testing the supply view requires identifying the supply and demand schedule of bank loans. If the lending channel of monetary policy is dominant, a leftward shift of the supply schedule must be clearly observed following a monetary

tightening. For the study of the lending channel to be meaningful, it might be also worthwhile to test the effectiveness of monetary policy. Thus, the lending view will be accepted if and only if:

- H1: the quantity of bank loans LQ does not increase
- H2: the price of bank loans LP rises, and
- H3: real output Y decreases following a monetary tightening.

For the purpose of testing H1 to H3 statistically, the VAR is estimated to stimulate impacts of monetary policy on the economy. Simulating the dynamic responses of macroeconomic variables to monetary policy shocks is equivalent to calculating the impulse response functions (IRFs) of those variables to an innovation to the measure of the stance of the monetary policy.

**Figure 3:** Selected IRFs responses of the augmented VAR (Egypt)



It stands out from the empirical results that the existence of the lending channel in Egypt is very weak. While hypothesis H1 (loans do not decrease) can be supported by data, hypothesis H2 (loans price as measured by the Lending\_Rate variable increases) cannot. In addition, the real activity does not seem to depress as suggested by the theory leading thereby to rejecting hypothesis H3. The response of real activity does seem to be amplified significantly when accounting for the lending channel. Hence, the lending channel in Egypt can hardly be supported by data. Bank loans do not seem to react subsequent to an interest rate hike. Some of the reasons that could explain such a

finding are the high volume of non-performing loans, and the under-developed state of the financial market.

Nevertheless, the CBE has come a long way in developing its set of monetary instruments, but these instruments still lack effectiveness as the diverse channels of monetary transmission are not operating effectively and properly. Improving the performance of these channels will be paramount for a successful transition to a full-fledged inflation targeting monetary policy framework in Egypt. Uncertainty in the channels of interest rate policy may be caused by a strong and fast-working exchange rate channel. Indeed, the exchange rate channel continues to play an important role in the transmission of the monetary stance, as it magnifies the impact of policy shocks drastically.

The same methodology is applied to Morocco and Tunisia. The Moroccan monetary authorities have pegged the Dirham to a basket of currencies where the (nominal) exchange rate fluctuates within a narrow band. Under this exchange rate regime, the strength of the exchange channel is expected to be negligible if not absent. To verify this, to the basic VAR model was added the nominal effective exchange rate (NEER) as a potential transmission variable.

The VAR simulations related to the exchange rate channel (see figure x) indicate that a restrictive monetary policy (as measured by one standard deviation hike) is insufficient to impact significantly on the effective nominal exchange rate (**see figures 1.a and 1.b**). On the other hand, the depreciation of the currency seems to have significant effects on real activity in Morocco. The depreciation of the currency depresses real output. A depreciation has an asymmetric impact on prices. As to the reaction of output it does not seem to vary when including the NEER variable in the baseline model. This would indicate that the exchange rate channel is not operative. Overall, these findings corroborate to some extent the a priori belief about the strength of the exchange channel in Morocco. At best, the contribution of the exchange channel in propagating the impulses of the monetary policy in Morocco negligible. The absence of role of asset prices in transmitting monetary shocks is not surprising either given that share ownership is low, and that firms' reliance on equity financing has not been so significant compared to bank credit. The role of asset prices in the propagating the effects of the monetary policy might increase in the future in line with the continued developments in capital markets.

In the case of Morocco, the monetary policy appears to be relatively more effective in impacting on real activity when compared with case of Egypt. Two channels are operative, namely the traditional interest rate channel and the bank lending channel. These two channels co-exist. However it remains to be seen which of them is the most dominant. The finding relative to the existence of the bank lending channel in Morocco does not surprise seeing that Moroccan system is more structured and healthy than that of Egypt or Tunisia and the level of NPLs is more manageable.

In Tunisia, the response of price loans depicts a clear tendency to increase subsequent to a tight monetary policy. This reaction is immediate and statistically significant at 5 per cent level. In other words, the response of price loan is such that  $\partial E(LP_{t+i}|\Lambda_t)/\partial u_t^R > 0$  for  $i=1,2,\dots,16$  implying that H2 cannot be rejected. Furthermore,

bank loans IRFs show that loans quantity does not increase. Rather, it exhibits a clear downward tendency, which thought non statistically significant for the eight first quarters becomes significant at the latest:  $\partial E(LQ_{t+i}|\Lambda_t)/\partial u_t^R = 0$  for  $i=1,2,\dots,8$  and  $\partial E(LQ_{t+i}|\Lambda_t)/\partial u_t^R < 0$  for  $i=9,10,\dots,16$ . Therefore, H3 cannot be rejected. Seeing that the hypotheses H1, H2 and H3 cannot be rejected, one may conclude that the lending channel is operative in Tunisia. When considered together the patterns of price loan and bank loans it appears that the supply schedule for bank loans shifts left following a monetary tightening. Thus, data do support the lending (supply) view in the case of Tunisia. It is worth noting that this finding does not imply the rejection of the money view. We can even state is that the lending channel is not only operative but also dominant. The empirical findings relative to the case of Tunisia are not really so different from those of Egypt and Morocco. Neither the exchange rate channel nor the asset price one seems to be operative in Tunisia. These findings are in line with previous studies.

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**French**

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**MARCH 2009**

## *Introduction*

Les gouvernements d’Egypte, du Maroc et de la Tunisie ont récemment annoncé qu’ils se préparent pour changer de politique et passer à la politique de ciblage d’inflation (CI). Il s’agit d’une politique monétaire dont l’objectif principal est de maintenir le taux d’inflation autour d’une cible à l’intérieur d’un intervalle bien défini et publiquement. Annoncé. Cet intervalle doit être assez réduit tout en laissant à la banque centrale une certaine flexibilité et la possibilité de tenir compte d’autres objectifs macroéconomiques. Quoique le principe de base de la politique de ciblage d’inflation soit simple certaines conditions sont requises pour la réussite de sa mise en œuvre. Ces conditions sont elles remplies ou pourraient elles l’être assez rapidement par ces tris pays ? Ces pays sont-ils prêts pour cette transition ? Ce rapport cherche principalement à répondre à cette question. En effet, certaines conditions sont relativement faciles à remplir, peut être progressivement mais dans des délais proches, d’autres semblent bien plus difficiles. En particulier, la solidité du système financier est une condition préalable dont la réalisation est un vrai défi. Dans ces trois pays, le système financier demeure plutôt fragile malgré tous les efforts et toutes les réformes qu’ils ont réalisées au cours des dernières décennies. Le niveau du déficit budgétaire et de la dette publique ainsi que le taux de mauvaises créances détenues par les banques constituent selon le pays et à des degrés divers des indicateurs de cette fragilité.

L’indépendance et la transparence de la banque centrale constituent une autre condition fondamentale de CI. La banque centrale doit être assez autonome pour pouvoir adapter librement le choix de ses instruments en fonction des objectifs attendus en vue d’assurer sa crédibilité et pour qu’elle puisse être tenue comptable de son action. Alors qu’on distingue souvent entre indépendance en matière de choix des instruments et indépendance en matière de choix des objectifs (Debelle and Fischer, 1994), dans le cas de CI le critère des instruments est plus déterminant dans la mesure où la cible d’inflation est par définition l’objectif fondamental et primordial. L’essentiel c’est que la banque centrale soit dotée du pouvoir lui permettant de résister contre toute pression externe la poussant à dévier par rapport à son objectif fondamental et que le public croit qu’elle a la liberté d’agir conformément aux exigences de sa stratégie et qu’elle n’est pas obligée de financer le déficitaire budgétaire de l’État quelque soit son niveau. C’est pourquoi la discipline budgétaire est un corollaire de l’indépendance de la banque centrale. De même, la transparence de la banque et son obligation de rendre compte centrale au public à travers des instances représentatives sont indissociables de cette indépendance. Dans sa version formelle et explicite, le CI, impose que des mécanismes d’incitation et de sanction soient mis en place pour que la banque centrale soit amenée à se comporter conformément à son objectif et que les décisions de politique monétaire soient régulièrement et clairement communiquées au public, notamment au système financier (Mishkin, 2002). Les communiqués de la banque centrale doivent éclairer le public sur la politique adoptée et les objectifs opérationnels afin de réduire au maximum le biais inflationniste et les incertitudes au sein du système financier. Une politique monétaire transparente signifie que les décisions prises par la banque centrale ne sont pas en contradiction avec les anticipations du marché et de ce fait elles contribuent à la réduction du coût du contrôle de l’inflation.

L’efficacité de la banque centrale et de la politique monétaire dépend aussi du niveau de développement du système financier et de sa stabilité. Les crises les plus graves se déclenchent suite à l’instabilité du système financier (Mishkin, 2002). Les banques qui sont en situation de stress, ou qui sont mal gérées, risquent de demander

l'aide de l'État d'une manière ou d'une autre et de le pousser à dérégler la politique monétaire. Si la banque centrale décide d'augmenter le taux d'intérêt en vue de contrecarrer l'inflation cela pourrait fragiliser davantage les banques en difficulté et les pousser à réagir dans le sens contraire à celui souhaité. L'expérience internationale, y compris celle des Etats-Unis démontre que les mesures de lutte contre l'inflation (notamment l'augmentation du taux d'intérêt) affaiblissent les institutions financières les moins bien gérées et mettent certaines d'entre elles en péril, ce qui provoque un processus d'instabilité financière.

Un système financier aurait aussi de la peine à s'adapter à la liberté du mouvement des capitaux et à la flexibilité du taux de change qui font partie des composantes d'une stratégie de CI. CI n'est pas compatible avec un régime de change fixe puisque cela reviendrait à avoir deux cibles nominales en même temps, quoique selon Mishkin (2002, 2004), la condition de flexibilité du taux de change devrait peut être nuancée dans le contexte des pays en développement.

La solidité du système financier est par ailleurs indissociable de la solidité de la politique budgétaire. La dominance fiscale est une menace pour la stabilité de tout le système financier puisque la pression de contribuer au financement du déficit budgétaire va peser non seulement sur la banque centrale mais aussi sur les banques et le reste des institutions financières. La discipline budgétaire est un principal pilier de la crédibilité et de l'indépendance de la banque centrale et de la viabilité des institutions financières du pays.

Cependant, l'indépendance de la banque centrale et la discipline budgétaire n'impliquent pas que la politique monétaire et la politique budgétaire doivent être totalement séparées. En fait l'harmonisation de ces deux politiques est nécessaire et tout désaccord entre le ministère des finances et la banque centrale envoie vers le public et le marché. Il est évident que ce principe ne s'applique pas seulement au cas de la politique de CI ; c'est un principe général pour n'importe quelle politique monétaire cohérente.

Le rapport est présenté en deux parties: la première porte sur le processus engagé par l'Egypte, le Maroc et la Tunisie en vue de se préparer au passage au CI et tire des leçons de l'expérience de la Turquie qui a déjà terminé sa phase transitoire au régime de CI explicite depuis 2006. La deuxième partie examine principalement les mécanismes de transmission de la politique monétaire de ces trois pays.

## ***1. La préparation au CI***

Cette partie se compose d'études de cas sous forme d'articles séparés. Dans les trois articles consacrés respectivement à l'Egypte, le Maroc et la Tunisie, les auteurs essaient d'évaluer dans quelle mesure ces pays parviennent à se préparer à la transition au CI explicite. Ces articles s'intitulent comme suit :

5. Préparation au ciblage d'inflation : cas de l'Egypte,
6. Politique monétaire et passage au CI au Maroc
7. Préparation au ciblage d'inflation en Tunisie

Le quatrième article traite le cas de la Turquie qui a déjà achevé sa phase transitoire et adopté pleinement cette stratégie. L'article sur la Turquie a pour titre :

8. L'expérience de ciblage d'inflation de la Turquie : 2006-2007

En Egypte, l'objectif de la Banque centrale égyptienne (CBE) est actuellement établi dans le cadre du programme de passage au CI qui aura lieu dès que le dispositif nécessaire est mis en place (CBE, 2005). Au cours de la phase transitoire, l'autorité monétaire égyptienne se propose de se baser désormais notamment sur la gestion du taux d'intérêt de court terme et s'est engagée dans une série de réformes. Cependant la CBE demeure sous le poids de la dominance budgétaire à cause du haut niveau du déficit budgétaire et de la dette publique du pays. Certes, quelques étapes importantes ont été franchies dans le sens du passage au CI. Dans le cadre d'une nouvelle législation la stabilité des prix a été instituée comme l'objectif principal de la banque centrale et l'octroi de crédits à l'État par la CBE a été interdit tout en affirmant le principe de l'indépendance de CBE ; néanmoins l'Egypte ne satisfait pas encore certaines conditions essentielles, y compris l'indépendance de CBE. La persistance du régime de change fixe peut être vue comme un autre obstacle.

Il semble en outre que le comportement de la CBE soit caractérisé par une absence d'ancrage clair des anticipations en matière d'inflation. L'inflation a atteint un niveau record de 23% en août 2008 et le niveau du déficit public et de la dette demeure élevé. Il en découle que le taux d'intérêt risque d'augmenter entraînant une nouvelle augmentation de la dette et la tentation de réduire le taux d'intérêt du côté de la banque centrale et l'accélération de la spirale inflationniste. Tout cela reflète peut être une insuffisance au niveau de l'engagement de l'État en faveur du CI. En fait, la CBE a décidé d'augmenter son taux directeur mais il s'agit d'une faible baisse, ce qui confirme sa réticence en matière de choix de politique et peut être concernant la transition au CI.

La situation en Tunisie est aussi marquée par la faiblesse de l'engagement en faveur du CI. Le gouvernement a certes annoncé qu'il se prépare à son adoption, concomitamment avec l'assouplissement du mouvement des capitaux et le passage à la pleine convertibilité du dinar tunisien, après une période transitoire mais, malgré toutes les réformes économiques et financières qu'il a mises en œuvre, plusieurs conditions essentielles du CI n'y sont pas satisfaites. En particulier, la Banque Centrale de Tunisie (BCT) ne jouit pas de l'indépendance nécessaire et le système financier est fragile et peu transparent. Le système bancaire, la principale composante du système financier, est fragile et le haut niveau des mauvaises créances qu'il détient réduit son efficacité et l'empêche de servir pleinement de canal de transmission de la politique monétaire.

Il ressort de l'analyse de la situation actuelle que la Tunisie doit entreprendre d'importantes réformes avant d'adopter pleinement la stratégie CI. D'abord, il faudra renforcer la transparence et l'indépendance de la BCT. L'absence d'un indicateur de performance bien défini et son étroite dépendance du pouvoir exécutif compromettent son indépendance et sa crédibilité. Le gouverneur de la BCT est désigné par le pouvoir exécutif et centralise l'essentiel du pouvoir. Les membres du conseil d'administration de la BCT sont eux aussi nommés par le gouvernement.

Toutefois, au cours de cette décennie plusieurs réformes ont été réalisées en vue de moderniser le système financier. Plus particulièrement, presque tous les aspects du fonctionnement des banques étaient jusqu'à 1995 étroitement contrôlés par la BCT et le ministère des finances. Cela a profondément changé. En outre depuis 2001 une nouvelle loi bancaire a été introduite permettant de renforcer la supervision bancaire et de les adapter à leur nouvel environnement mais pas assez pour se conformer à toutes les normes du comité Bâle (Bâle II).

Les statistiques indiquent que le taux de mauvaises créances s'est situé autour de 19% en 2006 un peu plus élevé pour les banques publiques (19.7%) que pour les

banques privées (18.7%). Il s'avère que la BCT ne parvient pas à employer les moyens que lui attribue la loi pour éviter ce fléau.

La politique de la BCT était pendant une longue période basée sur deux piliers : cibler le taux de croissance de la masse monétaire et contrôler le taux de change effectif réel.

Pour contrôler l'évolution de la masse monétaire la BCT adopte la procédure des appels d'offre mais telle qu'elle était suivie depuis le milieu des années 90 elle aboutit, de facto, plutôt à la stabilisation du taux d'intérêt du marché monétaire. Les banques étant dépendantes de la BCT obtiennent les liquidités dont elles ont besoin au taux en cours. Given that banks are quite dependent on its resources, the BCT usually satisfies their liquidity requests in order to keep interest rates stable. On peut aussi dire que dans la pratique la politique de la BCT est déterminée plus par les besoins de l'Etat et ses programmes que par les cibles monétaires quoique sa performance concernant la stabilisation du taux de change réel est jugée très satisfaisante.

Il est à noter que la BCT ne fournit pas de fonds directement à l'État. Il est clair aussi que les réformes poursuivies depuis les années 90 ont institué des règles assurant plus de discipline budgétaire et par voie de conséquence à des d'inflation plus réduits. Le gouvernement a en outre adopté un mode de gestion de la dette de l'État conforme aux principes et mécanismes du marché en rendant la dette de l'État commercialisable sur e marché financier, ce qui est de nature à inciter l'État à maîtrise son déficit. Toutefois malgré ce progrès la politique monétaire n'était pas totalement à l'abris de la dominance budgétaire.

Au Maroc La banque centrale, Bank ElMaghrib (BAM) se présente comme le candidat de la région le mieux préparé au passage au CI. Depuis 2005, d'important progrès ont été accomplis en vue de remplir les conditions de sa réussite. Faisant suite à une profonde refonte de son statut, elle a développé ses capacités d'analyse et de prévision des principales variables macroéconomiques et a déjà commencé la publication systématique de prévisions sur l'inflation. Les décisions se politique monétaire prises par la BAM sont régulièrement publiées. Ainsi la BAM a enregistré un progrès notable en matière de transparence et de relation publique. De même, plus d'indépendance lui est attribuée. Le déficit budgétaire et la dette publique sont ramenés à des niveaux confortables. Pourtant, avant 2005, le système financier et la politique monétaire du Maroc n'étaient pas nettement plus solides qu'en Tunisie ;<c'est dire qu'un progrès rapide est possible pourvu que l'État s'y engage.

L'expérience Turque est encore plus significative de ce point de vue. Elle montre que l'évolution est possible ; d'une situation de fragilité et d'instabilité financières il est possible de passer à une situation nettement plus solide et plus stable. La Turquie était caractérisée par de hauts niveaux de déficit budgétaire et d'inflation et a traversé une série de graves crises. Et c'est après la crise de 2000 que ses autorités ont pris la résolution de prendre les mesures nécessaires à la transition au CI achevée e 2006. L'article sur la Turquie apporte une première évaluation de cette expérience de CI évidemment encore à son début.

## ***II. LES MECANISMES DE TRANSMISSION DE LA POLITIQUE MONETAIRE en Egypte, au Maroc et en Tunisie.***

L'analyse des mécanismes de transmission de la politique monétaire (MTM) porte principalement sur la compréhension et la mesure des décalages temporels entre le

moment où une décision de politique monétaire est prise et celui où ses effets sur les variables macroéconomiques de base nominales et réelles se produisent. En particulier il s'agit de comprendre les impacts d'un changement du taux d'intérêt directeur sur les variables macroéconomiques clés, y compris sur le taux de change, le volume des crédits et surtout sur le taux d'inflation. On ne se limite pas à l'identification de ces impacts ; il est important d'en mesurer l'ampleur, ce qui est essentiel à la conduite de toute politique monétaire, encore plus du CI. Dans les pays objet de ce rapport on est cependant encore au stade de l'identification des mécanismes en vigueur et des variables les plus concernées. Quels sont les canaux en vigueur et lequel est prépondérant, cela reste à clarifier.

A cet effet, deux approches sont adoptées dans ce rapport pour analyser les MTM. La première (article de Boughzala) est basée sur des données individuelles portant sur un panel de banques complétées par des données sur les entreprises. La seconde approche (article de Boughrara) est basée sur des séries temporelles plutôt macroéconomiques et estime divers modèles VAR. Cette dernière approche est la plus couramment utilisée dans la littérature.

**Le premier article** basé sur la première approche s'intitule « MTM et les imperfections du système bancaire ». Il a une couverture géographique plus étendue mais adopte un champ d'investigation plus restreint. Il cherche à répondre à la seule question suivante : dans quelle mesure un changement du taux d'intérêt directeur (de court terme) de la banque centrale se transmet au taux débiteur des banques et par la suite sur le volume des crédits qu'elle accorde principalement aux entreprises ? A quel vitesse les actions de la banque centrale se reflètent à travers les taux et le volume des crédits des banques ? On y développe l'idée que l'efficacité de la politique monétaire dépend des MTM opérationnels et qu'elle varie d'un pays (ou groupe de pays) à un autre. En particulier les MTM fonctionnent d'une manière plus efficace dans certains pays de l'union Européenne que dans d'autres situés dans la région MENA. En plus de l'Egypte, du Maroc et de la Tunisie on a inclus la Jordanie et le Liban. Du fait que la politique monétaire se transmet principalement à travers le système bancaire la structure et l'efficacité du marché bancaire s'avère déterminante. On suppose que le taux d'intérêt directeur est le principal instrument de la banque centrale et on se limite à l'exploration de la réaction des banques en terme de volume de crédit, ce qui nous renseigne sur l'impact attendu sur l'inflation et le niveau d'activité économique. La réaction des banques va dépendre de la structure du marché bancaire (plus ou moins concurrentiel), de la nature des risques adoptés par les banques et la qualité de leurs actifs, de leur niveau de liquidité (Ehrmann M., Gambacorta L., Martinez-Pagés J., Sevestre P., Worms A., 2001). En effet, les banques les plus liquides ou qui ont un accès plus facile à des ressources liquides, par exemple en échangeant facilement des actifs sur le marché financier, sont moins dépendantes de la banque centrale et réagissent moins vite à ses décisions. Elles pourront en particulier continuer à offrir le même volume de crédit au même taux d'intérêt.

Le modèle utilisé dans ce travail suppose que la concurrence dans le marché bancaire est imparfaite et permet d'envisager et de tester diverses spécifications moyennant une riche base de données (bankscope). La plus simple suppose que les crédits bancaires dépendent du taux de la banque centrale, du volume de dépôts de la banque, de ses actifs, de ses revenus ne provenant pas des intérêts reçus, et d'une variable dummy correspondant au pays ou groupe de pays (UE ou MENA) auquel la banque appartient. Le taux débiteur étant une variable endogène il est introduit avec un retard mais son coefficient s'est avéré peu significatif alors que le taux de la banque

central est significatif et avec le signe attendu. De même, le coefficient de la variable dummy est significatif et confirme bien que le système bancaire européen transmet plus et plus vite les actions annoncées par la BC. Tous les autres coefficients ont aussi le signe attendu et sont significatifs.

**Le deuxième article** est intitulé «Analyse des mécanismes de transmission de la politique monétaire en Egypte, au Maroc et en Tunisie» et explore divers canaux de transmission. Il examine les quatre canaux classiques relatifs aux TMT, à savoir le canal du taux de change, le canal du taux d'intérêt, le canal des crédits et le canal du marché financier. Ce sont les canaux les plus susceptibles d'être fonctionnels dans les pays considérés sans couvrir tous les canaux potentiels et possibles. L'importance de ces canaux est appréciée à l'aide de tests de causalité de Granger et plus formellement de modèles VAR structurels.

Les résultats montrent que le pass-through du taux d'intérêt est incomplet pour tous les taux de détail et dans tous les pays ; c'est-à-dire que les mesures prises par la banque centrale ne sont transmises que partiellement à travers les banques aux taux débiteurs, et encore moins au taux créditeurs. En Egypte l'impact sur les taux sur les crédits est de 31% alors qu'il n'est que de 11% pour les taux sur les dépôts. Au Maroc, le pass-through du taux d'intérêt est un peu plus élevé, approximativement 40% au lieu de 33%. Celui de la Tunisie n'est pas statistiquement différent de celui du Maroc.

**Table 1:** Pass-through du taux d'intérêt

	Egypt	Morocco	Tunisia
Lending Rate	0.31	0.4	0.39
Deposit Rate	0.11	0.33	0.27

Source: Author's calculation

. La rigidité des taux de détail peut s'expliquer par les coûts d'ajustement de ces taux et par la faible concurrence entre les banques, laquelle est reflétée par l'ampleur du spread. La faiblesse de la concurrence et le caractère oligopolistique du marché bancaire sont renforcés par la réglementation, les collusions, les ententes entre les banques (en Tunisie notamment) et par le coût fixe associé à l'accès au marché. Il est permis néanmoins de s'attendre à un renforcement du canal du taux d'intérêt suite à l'amélioration de l'environnement économique et financier.

Ceci étant l'essentiel de l'analyse consiste à examiner la transmission de l'effet du taux d'intérêt sur les niveaux des prix et de l'activité économique.

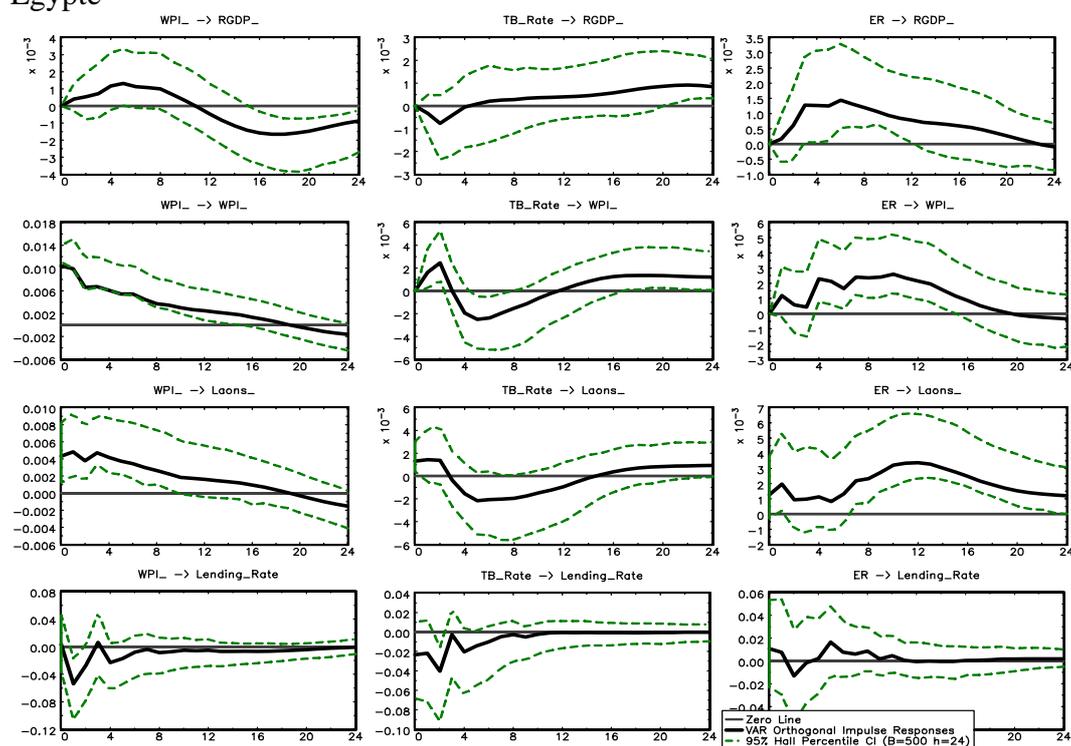
A cet effet, d'abord une situation de référence (base line) est établie sur la base d'un modèle VAR incorporant le prix du pétrole et le taux directeur des Etats-Unis afin d'éviter certaines anomalies telle que l'énigme des prix. Les données sont mensuelles, couvrant la période 1997:01-2007:12, et sont extraites du CD ROM des statistiques financières du FMI (Juillet 2008). Le niveau d'activité est indiqué par le PIB et celui des prix par l'indice des prix de gros (WPI). Pour le cas de l'Egypte, le taux de change (ER) est celui du taux par rapport au dollar US et l'activité du marché financier est représentée par l'indice de la bourse du Caire et d'Alexandrie (CASE).

Il ressort aussi que les prix réagissent vite à la politique monétaire. Suite à une augmentation du taux d'intérêt, le niveau des prix commence à baisser après un peu près un trimestre. Ceci est conforme à des résultats obtenus précédemment (Rabanal, 2005

and Al-Mashat and Billmeier, 2007). En revanche, la réaction du niveau d'activité à la variation du taux de change est lente ; il faut attendre une année pour observer cette réaction.

Afin de détecter le canal du crédit, le modèle de base est augmenté en y introduisant le volume des crédits et le taux d'intérêt débiteur des banques. L'accent a été mis sur la séparation de l'effet sur la demande de l'effet sur l'offre de crédits, sachant que la variation observée est à priori une résultante de ces deux type d'effets. Cela nécessite l'estimation de la courbe de demande et de la courbe d'offre de crédits. On dit que le canal de crédit est dominant si l'effet d'offre domine l'effet de demande.

**Figure 3:** fonctions de réponses pour certaines variables clés en Egypte



Ces réactions suggèrent que le canal des crédits est très faible en Egypte et l'effet sur les variables réelles n'est pas amplifié suite à la prise en considération du canal des crédits. Dans le cas Egyptien, cela peut s'expliquer par le haut niveau des mauvaises créances et par la fragilité du système financier, et ce malgré tous les efforts fournis par la CBE de développer ses instruments de politique monétaire.

La même méthodologie est appliqué aux cas du Maroc et de la Tunisie. Le Maroc a depuis longtemps adopté un régime de change plutôt fixe où le Dirham est rapporté à un panier de devises et doit être maintenu dans une étroite bande. Sous un tel régime, il n'est pas surprenant que le pass-through du taux de change soit faible. A l'aide du VAR de base augmenté en y introduisant le taux de change effectif nominal cette hypothèse a été bien vérifiée.

De même il n'est pas surprenant que le canal du marché financier (ou des actifs financiers) demeure négligeable compte tenu de la faiblesse des tels titres dans le

patrimoine des ménages et que les entreprises comptent peu sur le financement direct à travers le marché obligataire. Cependant, il est probable que ce canal puisse se développer prochainement. Cependant, la politique monétaire semble bien exercer un effet plus significatif sur les variables réelles qu'en Egypte. Les canaux les plus effectifs au Maroc sont ceux du taux d'intérêt et du crédit mais il n'est pas assez clair lequel est dominant. Le résultat relatif au canal des crédits est conforme au développement relativement plus rapide du système bancaire marocain et à son assainissement relatif.

En Tunisie, la réaction du niveau des prix à la politique monétaire tend à augmenter. Cette réaction est immédiate et significative à 5%. On peut aussi soutenir que le canal des crédits est opérationnel en Tunisie. On peut même dire que le canal des crédits est dominant. Rappelons que cela n'est pas en contradiction avec le fonctionnement du canal du taux d'intérêt. Cependant, En Tunisie, le canal du taux de change et le canal du marché financier ne semblent pas opérationnels, ce qui confirme des résultats précédemment obtenus.

**FEMISE  
INTERNAL CONSULTATION**

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**EFFICIENCY OF MONETARY POLICIES IN A  
CHANGING MACROECONOMIC ENVIRONMENT**

**FINAL REPORT**

**LAHCEN ACHY, ADEL BOUGHRARA**

**MONGI BOUGHZALA, HASAN ERSEL, FATIH ÖZATAY**

**MARCH 2009**

# ***Introduction***

**Mongi BOUGHZALA**

This report is organized in two parts

## ***PART I:***

Recently, the governments of Egypt, Morocco and Tunisia announced that they are preparing to switch to IT. It is a monetary policy whose fundamental goal is to keep the inflation rate (suitably defined) within a certain publicly announced band around a target rate. The band allows the central bank some flexibility in responding to departures of the actual inflation rate from the target rate. Although the principle of IT is simple, the success of a central bank in implementing it requires certain preconditions. Are these preconditions fulfilled or could they be fulfilled soon enough in these three countries? This report is mainly about their readiness for IT. Indeed, some of the preconditions may be achievable gradually but over a relatively short transition period while some others are not so easy to fulfil. In particular, financial soundness is a major prerequisite, and it is a fact that, although these three countries implemented many important financial reforms, their financial systems remain in various ways rather vulnerable. Fiscal deficits, high public debt and/or severe rates of non performing loans (NPLs) held by the banking system are among the main indicators of this vulnerability.

The first fundamental precondition of IT is the independence, accountability and transparency of the central bank. The central bank must be independent in order to be able to adjust freely the instruments of its monetary policy and therefore to be credible. The concept of independence is often divided into goal and instrument independence (Debelle and Fischer, 1994). In the case of IT, instrument independence is the most crucial since the inflation target is by definition the single main goal of monetary policy. Independence means that the central bank should have enough power and strength to resist any external pressure to deviate from the chosen objective, it also means that the public believes that it is free to make decisions solely in accordance with the requirements of IT, and hence it is in particular free to decide whether or not and when to finance a government budget deficit. It follows that fiscal discipline is a pre-requisite for the credibility of the central bank's independence.

Accountability and transparency of the central bank are corollaries of its credibility and independence. An independent central bank has to be accountable for its actions to the public concerning the successes and failures of its policy. The public must have the capacity, through its elected representatives, to control and ultimately punish

incompetent policymakers in order to create better incentives for them to do their jobs well (Mishkin, 2002). Monetary policy decisions must also be communicated in a clear and regular manner to the public and particularly to financial markets and private economic decision-makers. Transparency should focus on the policy analysis and the operational objectives of the central bank in order to reduce the inflation bias and uncertainties in financial markets (Faust and Svensson, 2001). A transparent monetary policy means that policy decisions (usually changes in short-term interest rates) should not contradict the expectations of the market. Thereby, transparency lowers the cost of achieving the inflation target.

The efficiency of the central bank depends on the degree of development of the country's financial markets and its stability. It has been shown that the most serious economic contractions arise when there is financial instability (Mishkin, 2002).

Banks that are badly managed, or are under stress for any reason, are likely to lobby the government for relief through any available channels and to undermine the functioning of monetary policy. Higher short term interest rates intended to reduce inflationary pressures are then likely to put fragile banks under more stress and to hurt them more severely. The US experience, in the 1980s with the crisis of the savings and loans associations, and again in the current year (2007-2008) with the sub-prime loan crisis, shows that if a central bank decided to fight inflation, badly managed financial institutions would be put under severe stress and some of them would fail leading to uncertainty and instability.

A fragile banking system may also be unable to deal with free capital mobility and exchange rate volatility since IT cannot succeed unless a flexible exchange rate regime is put in place and only one main target of monetary policy and a single nominal anchor are adopted. In the presence of free capital mobility, stabilisation of the exchange rate subordinates monetary policy to its requirements and may lead to intolerable deviations from the inflation target, which will destroy the credibility of the central bank's commitment to IT. Nevertheless, According to Mishkin (2002, 2004), the exchange rate flexibility condition may be weakened, and a trade-off between the inflation and exchange rate objectives may be considered within an adapted IT framework.

The existence of a well developed financial system also depends on the soundness of fiscal policy. Fiscal dominance may threaten financial stability since it means that high pressures are put on the financial system and not only on the central bank to finance the government budget deficit. Fiscal discipline is a main pillar for the credibility of the central bank's independence and the viability of the country's financial institutions, as it signifies that the central bank and the banks will not be forced eventually to finance government budget deficits by printing money as happened, for example, in Turkey in the 1990s and many other countries before and after.

However central bank independence and fiscal discipline do not imply that monetary and fiscal policies should be totally disconnected. In fact, the lack of harmony with regard to the relationship between the CB and the Ministry of Finance might constitute a potential difficulty. Different views between the monetary and fiscal authorities can in fact send wrong signals to the financial markets as well as to the

public. These considerations need to be taken into account, not only in the design of an IT strategy, but also in any monetary strategy.

This part of the report devoted to country cases. Three separate papers on Egypt, Morocco and Tunisia try to assess to what extent these countries are prepared and how well they are preparing for the transition to a formal inflation targeting regime (IT). These countries can learn from other experiences, in particular the Turkish, which is presented in the fourth paper.

- 1. READINESS TO INFLATION TARGETING: CASE OF EGYPT**
- 2. Monetary Policy and the preparation for Inflation Targeting in Morocco**
- 3. Readiness of Tunisia for Inflation Targeting**
- 4. Formal Inflation Targeting Experience of Turkey: 2006-2007**

## ***PART II:***

The second part is constituted of two papers on the monetary transmission mechanisms and effectiveness of monetary policies in Egypt, Morocco and Tunisia. The two papers follow distinct but complementary approaches.

Understanding and measuring the time lag involved between a policy action and its impact on various key variables, including the exchange rate, the volume of loans and above all the inflation and output levels and measuring the intensity of this impact is essential for the successful conduct of any sound monetary policy and more so for IT. More generally, a good knowledge of the monetary transmission mechanisms (MTM) is crucial for implementing IT. These two papers tackle this issue.

- 5. MONETARY TRANSMISSION MECHANISMS AND THE IMPERFECTIONS OF THE BANKING SYSTEM**
- 6. MONETARY TRANSMISSION MECHANISM ANALYSIS IN EGYPT, MOROCCO AND TUNISIA**

# PART I

## COUNTRY STUDIES

### READINESS FOR INFLATION TARGETING: THE CASE OF EGYPT

Adel BOUGHRARA and Mongi BOUGHZALA<sup>1</sup>

December, 2008

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#### Abstract

This study investigates the readiness of Egypt for inflation targeting (IT). Central bank independence in Egypt has been mainly hindered by fiscal dominance through monetization of high budget deficits and public debt. Although serious steps have been taken recently under a new law committing the country to the achievement of price stability as the primary objective, prohibiting credit extension to the government, and strengthening central bank independence, Egypt does not yet satisfy the requirements, including the independence criteria. The existence of a rather fixed exchange rate regime currently constitutes another important obstacle.

**Key words:** Egypt, inflation targeting, fiscal dominance, central bank independence, pass-through.

**J.E.L. Classification:** E50, E52, E58, E61.

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<sup>1</sup> A. Boughrara's contribution to this paper is the more important

## **1. Introduction**

The main objective of the Central Bank of Egypt CBE has been officially to keep inflation low and stable. That objective was set within the context of a general program to move to inflation targeting (IT), once the fundamental machinery needed for its implementation is installed (CBE, 2005). During the transition period, the monetary authority intends to meet its inflation stabilization objective through the management of the short-term interest rates and the control of other factors and shocks that might affect the inflation rate (CBE, 2005).

The economic literature provides a long list of requirements countries wishing to engage successfully in an IT strategy.<sup>2</sup> Some are structural requirements and more IT-specific. These include: public announcement of medium term inflation targets, institutional commitment to price stability as the primary goal of monetary policy to which other goals are subordinated, namely: increased communication with the public and markets about the plans and decisions of the central bank and increased accountability of the central bank for attaining its inflation objective. As emphasized by Mishkin (2000) IT entails is much more than a public announcement of numerical targets for inflation for the year ahead. The IT regime has the potential to reduce the likelihood that the central bank would fall into the time-inconsistency trap if indeed it increases transparency and the accountability of the central bank, particularly for countries with a long history of monetary mismanagement and credibility issues. Other requirements often cited for a successful IT regime, but not IT specific, include non fiscal dominance, a well-developed and deep financial system, a reasonably well-developed ability to forecast inflation, and well understood transmission mechanisms between monetary policy instruments, inflation and other key macroeconomic variables.

The preparedness of Egypt for inflation targeting has recently been the focus of several studies, most importantly Al-Mashat (2008), Al-Mashat and Billmeier (2007), El-Refaie (2001), Kamaly and Farrag (2005), Moursi et al. (2007) and Noureldin (2005). The purpose of this paper is mainly to provide further insight as to the readiness of the Egyptian monetary authority to move to inflation targeting. To this end, it starts with a systematic retrospective on monetary policy conduct in Egypt during the past two decades and on the key relevant institutional and macroeconomic variables determining the probability of success of this strategy in Egypt, including the exchange rate regime, fiscal policy and the financial system. The paper does not try to compare IT to alternative strategies and, thus, does not discuss the relevance of choosing IT rather than any other strategy.

The remainder of the paper is organized as follows: the next section (section 2) describes the Egyptian monetary framework, institutions and monetary policy instruments. Section 3 surveys the evolution of the exchange rate regime since the 1990s. Section 4 analyzes the financial sector with a special focus on the banking system. The Egyptian fiscal policy is analyzed in section 5. Sections 6 investigates empirically the exchange rate pass-through and

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<sup>2</sup> See Schaechter et al (2000), Jonas and Mishkin (2003) and Cararre et al (2002) for a discussion of requirements for a successful IT regime.

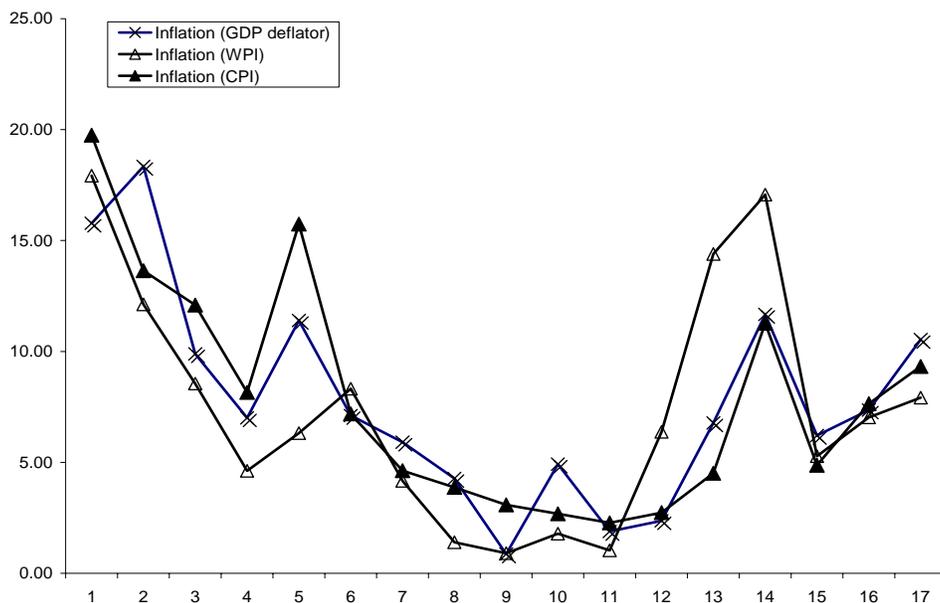
the interest rate pass-through. Section 7 draws an assessment of the technical ability of the CBE to pursue the IT strategy, concludes and provides some policy recommendations.

## 2. Monetary policy framework and evolution

### 2.1. The conduct of the monetary policy in Egypt

Egypt's monetary policy was reformulated in the 1990s to support the exchange rate peg. Provided that the central bank had sufficient reserves, any disequilibrium in the money market was resolved mainly by changes in the foreign reserves held by the central bank. Under these conditions, the monetary policy was geared mainly according to the needs of the exchange rate policy and not of the domestic markets.

**Figure 1:** Inflation dynamics (Egypt)<sup>3</sup>



Source: IMF's International Finance Statistics CD-ROM (July 2008) and authors' calculations

However, when the peg was challenged amid the external shocks of late 1997, the economic policy had to be revised. Between 1996 and 2005, the CBE's operational target was excess reserves of banks, and given the strong link between monetary aggregates and inflation, growth in M2 was the intermediate target. In the beginning of 2000s the CBE allowed for more exchange rate flexibility; and consequently, monetary policy started to aim curbing inflation (see figure 2), but without totally abandoning the exchange rate target. Hence, the effectiveness of this new policy was limited. It was in fact concerned

<sup>3</sup> In addition, the dynamics of real interest rate indicate that it were negative as of December 2004; also, the slowdown in broad money growth had ceased, asset prices had surged, and the available measures of inflation did not show a declining trend.

simultaneously with achieving multiple and contradictory objectives: containing inflation, boosting growth, stabilizing the exchange rate and backing up the banking system. Consequently, the central bank credibility was not improved.

Moreover, the CBE lacked the appropriate instrument to manage liquidity. In particular, the treasury bill market was not transparent. In addition, the main interest rates have been to a large extent administrated and far from reflecting market conditions. The thin and shallow monetary market has induced an extremely variable interbank rate. During the 2000-2005, the monetary framework was characterized by the use of multiple variables with a special focus on M2 aggregate, which turned to be significantly correlated to inflation.

## **2.2. CBE Independence**

In September 2002, President Mubarak placed the CBE under his direct authority rather than that of the prime minister. As per the new Unified Banking Law, the president directly appoints both the governor of the CBE and its board. However, there are no statutory rules governing the appointments. In addition, under emergency laws, the president has the capacity to overrule any CBE decision under any circumstances.

The governor of the CBE is appointed by the president based on the nomination of the prime minister. The board of the CBE in the new 2005 law still includes three government representatives who have voting power (from the ministries of finance, planning and foreign trade) and are nominated by their respective ministries and appointed by the president. The board also includes eight independent experts appointed by the president without necessarily consulting with the governor. It is clear that the number of CBE board members that are nominated by the executive branch exceeds largely those that are nominated by other bodies. The tenure of all board members is four years (with the possibility of renewal), which is reduced from five years in the previous legislation, thus making it shorter than the electoral cycle of five years. Unlike the previous legislation, the new law does not explicitly prohibit the removal of any board-member including the governor during their tenure. It only indicates that the president can accept their resignations.

In addition, the tenure of CBE governors stated in the CBE 2003 charter is 4 (renewable) years. Again, their term in office is even shorter than the election cycle of the main exclusive body (the President) in the appointment process. The CBE laws allow for direct government representatives on the board, and not for any private sector representatives. As for the removal of the board members or of the CBE governor it was not subject to any regulation. With respect to this issue, Law 2003 did not make any improvement when compared to Law 1975. The latter explicitly stated that the governor cannot be dismissed during his term in office. Therefore, the CBE cannot be considered as politically autonomous.

**Table 1:** The Board size and composition (CBE versus other central banks)

Country	Board size	Governor	Vice Governor	Members	Government representatives	Meeting Frequency
Turkey	9	Appointed by the decree of the Council of Ministers (5 years)	2 Vice Governors (do not vote)	6 members elected by the General Assembly. Their term office is 3 years	No	1/ Month
Morocco	9	Appointed by the King (6 years)	1 Vice Governor	6 members appointed by the Prime Minister (of which 03 are nominated by the governor). Their term office is 6 years.	1 non voting member	1/ Quarter
Tunisia	11	Appointed by the President (6 years)	1 Vice Governor	8 members appointed by the Prime Minister. Their term office is 3 years	1 non voting member	1/ Month
Egypt	16	Appointed by the President (4 years)	2 Deputy governors	8 members appointed by the President without necessarily consulting with the Governor. Their term in office is 4 years	3 voting members are nominated by their respective Ministries (Trade, Finance and Planning) and appointed by the president. The Chairman of the Capital Market authority	2/ Month

Source: compiled by the authors

The prime minister no longer interferes in CBE operations, and the cabinet appointed has shown far more interest in fiscal concerns than in monetary policies.

As discussed earlier, the actual objectives and targets of the CBE remain ambiguous as the governor has not made any official announcements detailing the new monetary framework. In addition, the fact that the coordination council is headed by the prime minister, with three government ministers as members, compromises actual target independence, especially in the absence of a clear and announced nominal anchor such as the exchange rate.

As far as the use of the monetary instruments, the current Law (Law 2003) has granted the CBE with power of freely using monetary policy instruments that enables it to set and execute monetary policy, but this power is not absolute. The Law states that this should happen in accordance with the government (through a committee of nine members who are mostly government officials). Obviously, this might undermine the CBE independence.

Concerning the accountability and transparency issue, Law (Law 1975 and the laws thereafter) stipulated provisions for the appearance of the CB governor before the people's assembly, in addition to reporting to the government. Also, to ensure transparency the CB is required to publish its financial statements certified by external auditors periodically. It should be emphasized however that transparency means also that the central bank should explain its operational framework; that is, it should be transparent about its objectives, the models it uses and also about the assessment of the economic situation. The bank should be also transparent about the monetary strategy it follows. One main component of transparency is

communication; that is the CB should communicate (regularly) with the public via media and press releases in a clear and understandable way. This does not seem to be fully the case of Egypt. The CBE is not transparent about its objectives, models and strategy. Although the current governor of the bank has already achieved some improvements in management and transparency it is not clear yet to what extent the current government is willing to strengthen the CBE's autonomy.

Communication<sup>4</sup> policy is absolutely crucial because it conveys fundamental information which can ease the coordination of agents' expectations and because accountability and communication are mutually reinforcing. With this respect, the CBE performance is very modest. For instance, the CBE website does not contain information that may feed public's expectations. From 2001 to 2003, the CBE tried to implement a new communication strategy consisting of making continuous press releases; the outcome was often contradictory and unclear statements.

Overall, the conduct of monetary policy conduct in Egypt has been characterized by a lack of consistency and transparency and communication. The CBE does not communicate its intentions nor does it disclose its targets. The multiple objectives and the paucity of the toolkit the CBE has used have contributed a lot in eroding its credibility. Consequently, inflation was high and the CBE responded to such inflation developments only after they occur<sup>5</sup>).

### **2.3 The CBE monetary instruments**

The instruments available for the CBE are limited. As discussed earlier, TBs were heavily used as an instrument of monetary policy, while open market operations do not really exist due to the inactive secondary market for TBs. In late 2005, this situation was improved with the introduction of the reverse repos, which would allow the CBE some flexibility in injecting liquidity according to market conditions. Also, until the introduction of the overnight deposit facility in January 2006, the CBE could not influence the short-term interest rate quickly and efficiently.

From 1990 to 2005, the CBE relied on the discount rate as a monetary policy instrument. This rate was gradually lowered from 19.8 percent in 1992 to approximately 9 percent by the beginning of 2006 with the hope of promoting investment. The discount rate is often considered as a poor operational monetary policy instrument because it is usually subjected to strong administrative control. Consequently, shocks in the discount rate do not

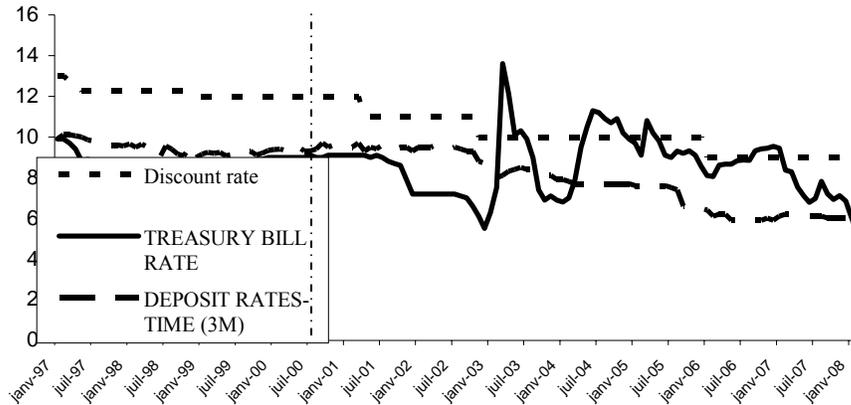
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<sup>4</sup> There is a consensus around the fact that the communication of the central bank with the public and with the markets is a key element of the success of inflation targeting. Most of the time, inflation 'targeter' central banks have published inflation reports, monetary policy statements, central bank board meetings minutes, forecasting models used and inflation beliefs, the likelihood of target misses, the improvements made in central bank's underlying economic and econometric model and so forth.

<sup>5</sup> Look for instance to the reaction of the CBE to the recent surge inflation having occurring during 2008.

always account for variation in the monetary stance (Bernanke and Mihov, 1998). To reduce the rigidity in the discount rate, the CBE linked it to the interest rate on Treasury Bills. This resulted in a steady decline in the interest rate on Treasury Bills, which decreased starting 1992 to less than 10% in 2002. The interest rate on Treasury Bills began to recover once again in 2002 only to attain a maximum in the following year.

**Figure 2:** Main interest rates



Source: IMF's International Finance Statistics CD-ROM (July 2008) and authors' calculations

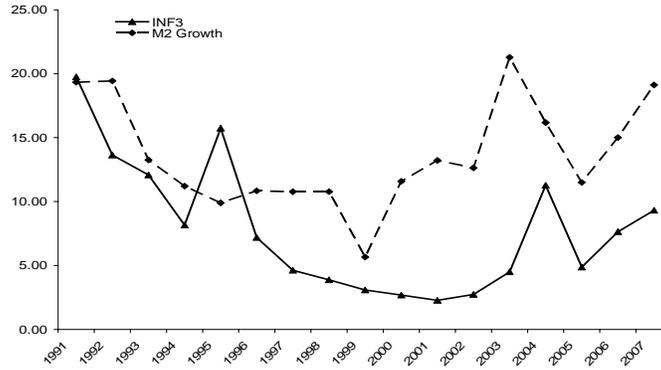
Open market operations are an important instrument that affects the short run nominal interest rate through their capacity to absorb and manage excess liquidity in the economy and to sterilize the effect of increases in international reserves. Open market operations in Egypt depend on a number of tools including repurchasing of Treasury bonds, final purchase of Treasury Bills and government bonds, foreign exchange swaps and debt certificates (Abu El Eyoun, 2003). The use of open market operations became consistent with the liberalization of the interest rates once the CBE resorted to the market as a means of financing government debt. The primary dealers system, which became effective in July 2004, increased the importance of the open market operations as an instrument of monetary policy.

In 1997/1998, the CBE increased its dependence on an alternative instrument, the repurchasing operations of Treasury Bills (repos), to provide liquidity and to stimulate economic growth. The value of these operations increased significantly in 1999/2000. The reliance on repos, nonetheless, started to decrease in 2000/2001 reaching a minimum in 2002/2003. In 2003/2004, the CBE introduced the reverse repos of Treasury Bills and permitted outright sales of Treasury Bills between the CBE and banks through the market mechanism.

On June 2, 2005, the CBE introduced an interest rate corridor and two standing facilities, namely the overnight deposit and lending rates. If suitably designed, this new monetary policy framework should in principle allow the CBE to strengthen the effectiveness of its actions. By setting the overnight deposit and lending rates, the CBE determines a 2 percent width corridor within which the overnight interbank rate fluctuates. Thus, moving up (moving down) these two key interest rates bring about an upward (downward) pressure on the market interest rate. The latter rate has become the new operational target for monetary

policy instead of excess reserves. Moreover, the CBE issued its own securities, the CBE notes, to manage market liquidity. These new instruments, whose maturities varies from one week and three months, were introduced instead of the Treasury Bills reverse repos (and deposit auctions) in order to further stimulate the money market.

Figure 3: Evolution of inflation and M2 growth in 1990-2007



Source: IMF’s International Finance Statistics CD-ROM (July 2008) and authors’ calculations

Since its introduction, the corridor system turned out to be effective in smoothing significantly the interbank rate variations. It is worth noting, however, that the interbank market is not the only solution to inject liquidity in the market, and to reduce the exchange rate fluctuations. It is one of many components of an integrated system which should include all market operators. Publics' confidence in the local market policies is also an integral part of that system.

The domestic and foreign currency required reserve ratios represented another key instrument of monetary policy. During the period 1990-2005, the domestic and foreign required reserve ratios ranged between approximately 14-15 percent and 10-15 percent, respectively. The changes in the required reserve ratios alone have not been sufficient to determine the variance in the reserves as the formula employed in the calculation of the reserve ratio was subjected to several revisions during 1990-2005.

### 3. The exchange rate policy

The Egyptian pound has been pegged more or less explicitly to the U.S. dollar during most of the recent period, starting in the mid-nineties, and one can distinguish four distinct periods:

At the beginning of the 1990s, Egypt officially implemented a managed float regime, with the exchange rate acting as a nominal anchor for monetary policy. Yet, in reality, the country was adopting a fixed exchange rate regime with the authorities setting the official exchange rate without regard for market forces. This resulted in a highly stable exchange rate for the Egyptian pound against the US dollar and a black market for foreign exchange (El-Asrag, 2003). In February 1991, a dual exchange rate regime, which included a primary restricted market and a secondary free market, was introduced to raise foreign competitiveness and to simplify the exchange rate system. The two markets were unified in October 1991. Since then up until 1998, the Egyptian pound was freely traded in a single

exchange market with intervention by the authorities limited to keep the exchange rate against the US dollar within the boundaries of an implicit band (ERF and IM 2004).

During the period 1997-2000, the pound was de jure and de facto pegged to the U.S. dollar. Balance of payments deficits led to a substantial loss of reserves. Cumulative devaluations of the pound by around 8 percent were intended to avert a dry-up of foreign reserves, but could not prevent the emergence of a parallel exchange market. The move from the managed float system to a flexible exchange rate regime denotes a transformation from an implicit policy rule to a non-committal absence of a monetary policy rule (Bartley 2001 and Mundell 2000).

In 2001 and 2002, the exchange rate was set to crawl within horizontal bands, in an unsuccessful attempt to reduce continued shortages in foreign exchange. Activity in the parallel market expanded significantly to the extent of trading at a 15 percent premium over the official rate in 2002. Meanwhile, domestic prices remained surprisingly stable until the second half of 2002, reflecting a very slow pass-through from the series of step devaluations starting in April 1999.

In January 2003 the authorities decided to adopt a new exchange rate policy under which the exchange rate was allowed to float, entailing an immediate depreciation of 17 percent. However, the lack of credibility in this new system and public expectations of a further drastic depreciation led to the hoarding of foreign exchange receipts and speculative activities in the face of an inoperative interbank market. As a consequence, the pound continued to depreciate another 16 percent through the end of 2004. Finally, in December 2004, the CBE officially launched a new interbank foreign exchange market that accommodated all foreign exchange transactions between banks with the support of ample U.S. dollar liquidity related to an improved current account position after the substantial depreciation (32 percent against the U.S. dollar) in early 2003.

Within one quarter of the launch of the foreign exchange interbank market in December 2004, that is in 2005, the pound appreciated by about 7 percent, with a corresponding disinflationary impact on domestic prices. Between February 2005 and July 2007, however, the nominal exchange rate versus the U.S. dollar has been broadly stable, limiting exchange rate effects on domestic prices. Only very recently, in the mid-2007, has the bilateral exchange rate incurred some volatility, chiefly in the form of appreciation in the context of sizeable capital inflows and outflows.

Despite the liberalization of the pound in 2003, the CBE has in fact continued to maintain exchange rate stability as one of its key objectives during the following years, 2004 and 2005. It is more or less difficult now to construe how the CBE plans to bring about exchange rate stability without frequently resorting to direct controls. We suspect that in the coming months, the CBE might still choose to keep a tight grip on the foreign exchange market. In theory, efficient monetary policymaking, however, tolerates intervention in the foreign exchange market only by means of policy measures. Hitherto, the CBE has a good record on that account. For instance, the fears of dollarization that followed the liberalization of the pound, prompted the CBE to tighten monetary policy through an increase in the rate of interest (CBE 2004/2005).

## I.

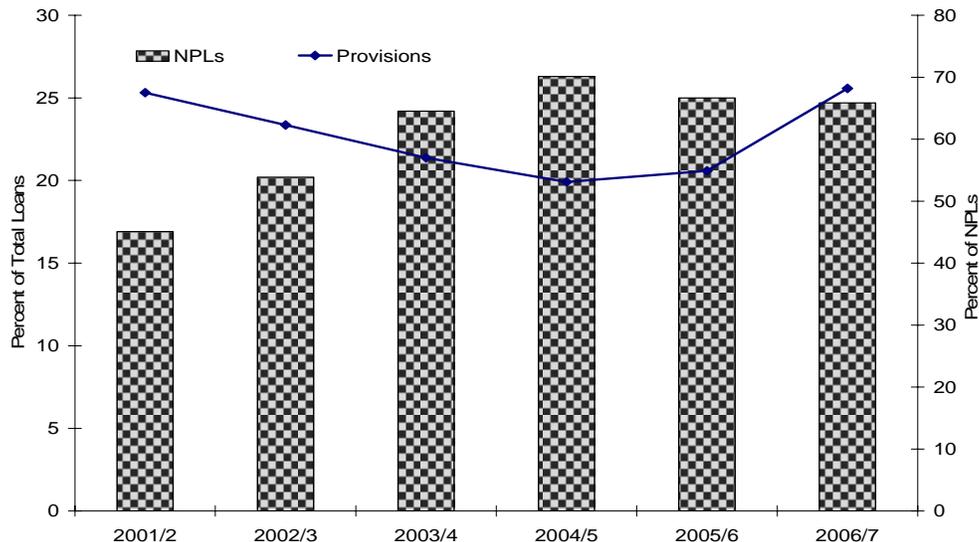
### 4. The financial sector

Like in most MENA countries, the banking sector is the main component of the Egyptian financial sector. It currently accounts for around 80% of the sector's total assets. As of June 2006, the banking sector consists of the CBE, 43 banks, of which 18 banks are Commercial Banks, 22 are Investment and Business Banks; the other three are Specialized Banks. In addition, two more banks were established under private law and are not registered with CBE. Within these main categories of banks' types or groups there are various sub-groups of banks according to the form of ownership, (i.e. public, private or joint venture banks), or according to the currency of their activities transactions (i.e. local banks and foreign (off-shore) banks). The four large state-owned banks controlled about 50 percent of assets. The Egyptian banking sector had total deposits of EGP 569 billion with a loan to deposit ratio of 57% at the end of 2006.

The imprudent lending by the domestic banks is a fundamental weakness in the Egyptian banking system, especially for the state-owned banks which control the majority of bank assets, while most private banks prefer short-term commercial lending to large and medium private enterprises. It is admitted that the state-owned banks have large non-performing loans due to their lack of rigorous credit policies and because they have often allocated credits to inefficient state enterprises on government instructions.

The overall level of non-performing loans (NPLs) has exceeded the 20 percent level (compared to 5% globally), and the provision level remains below the global level (Figure 4), despite the increased banking supervision and privatization.

**Figure 4:** NPLs evolution in Egypt.



Source: IMF's International Finance Statistics CD-ROM (July 2008) and authors' calculations

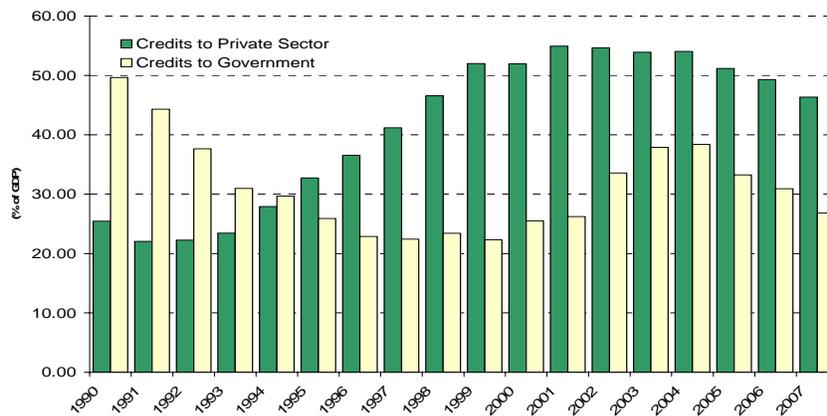
Safety of the banking system necessitates a stronger compliance with prudential regulations. The banking system is to be cleaned up and its stability is to be improved by

having effective enforcement mechanisms of the regulations. Indeed, two main factors do not help the Egyptian banking system to stand on its feet, at least in the near future: a high rate of non performing loans and slow and expensive procedures of the commercial judicial system.

Figure 5 shows that the growth rate of total domestic credit has a positive trend over the 1990s. It also shows a big jump in the growth of total domestic credit by the end of 1997. Some economists refer the large increase in domestic credit in 1997 to the increase in the defaults rate which led to ‘rolling over’ loans. On the other hand, although Figure 4 shows that private credit has steadily grown over the 1990s, the growth of private credit ranges between 5 to 10 percent since 1992. In fact the growth rate of private credit has declined since 1999.

The state dominated Egyptian banking sector has been accused to be one of the main causes hampering the development of the private sector. State-owned (commercial) banks favor government projects and provide the government with the funds it requests to cover its fiscal deficit.

**Figure 5:** Credit dynamics 1990-2007

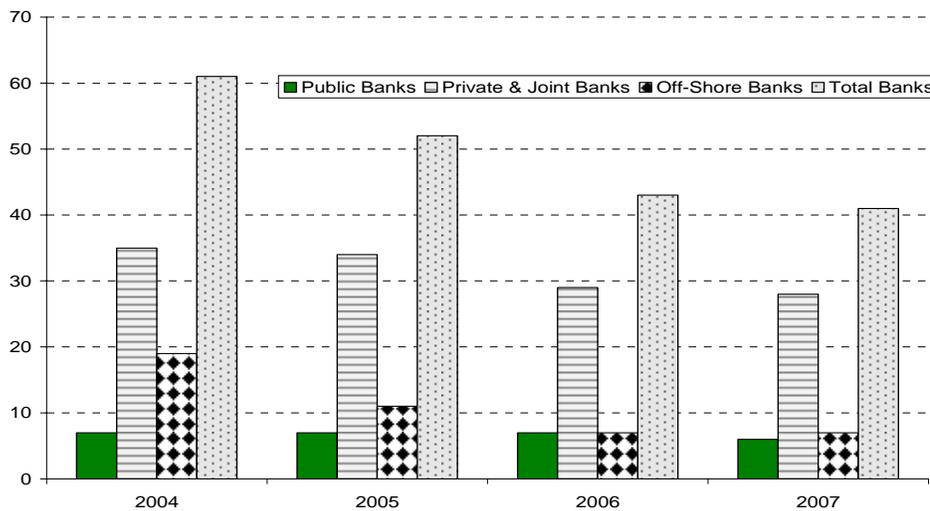


Source: IMF’s International Finance Statistics CD-R0M (July 2008) and authors’ calculations

Thanks to the new banking law, the CBE has decided to increase the minimum capital requirement from EGP 100 million to EGP 500 million for domestic banks, and from US\$ 15 million to US\$ 50 million for branches of foreign banks. The CBE has strengthened the supervisory and regulatory framework, and compensated for the state-owned bank’s non-performing exposure to public sector enterprises. The government also intends to sell off all its minority stakes in banks and to privatize the joint ventures. The CBE plans to improve corporate governance and the monitoring of the banks’ credit positions through the modernization of the banks’ information system, by linking up of bank branch networks to the bank head offices which, in turn, will be linked to the CBE network. These measures have led weak and undercapitalized banks to merge with other banks or ceasing its operations; some banks have restructured through early retirements schemes and through hiring of well

experienced bankers and outside consultants. As a result, the number of banks reduced from 57 in 2004 to 34 by the end of 2007. Will these measures lead to boosting private sector development, this remains to be proved.

**Figure 6:** The evolution of the number of banks: 2004-2007



Source: IMF's International Finance Statistics CD-ROM (July 2008) and authors' calculations

The Insurance sector is regulated and supervised by the Egyptian Insurance Supervisory Authority (EISA). EISA has the authority to license and to delicense insurance undertakings, the approval of directors and senior management of insurance companies, and the supervision of their activities. Foreign investors can acquire 100% of the shares of an Egyptian insurance company. The Egyptian insurance industry is still small and its contribution to the financial sector and the economy is well below its potential (less than 5% in 2007), given the size of the Egyptian economy and its level of development. While there are 20 insurance companies in Egypt, the sector is dominated by three state-owned insurance companies.

With respect to capital markets, Egypt has had two stock exchanges, namely the Alexandria stock exchange, which was established in 1883, and the Cairo stock exchange, which was established in 1903. The two markets merged later to form the Cairo and Alexandria Stock Exchanges (CASE). The Capital Market Law No. 95 of 1992 established

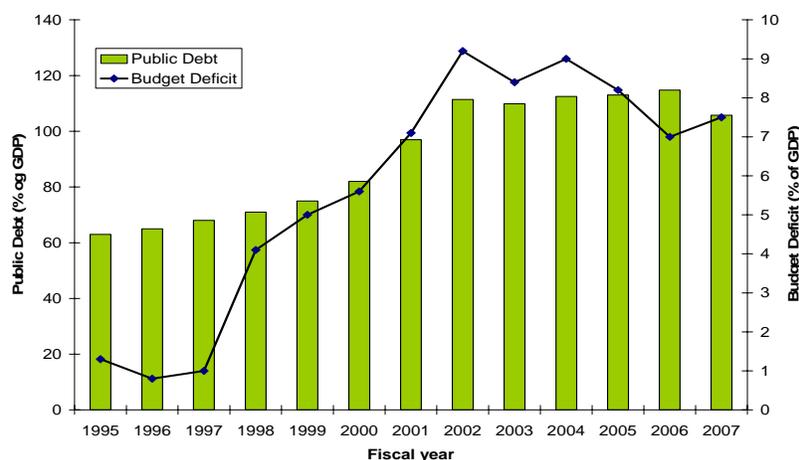
the Capital Market Authority (CMA) as an autonomous regulatory agency and provides for the free entry of foreign financial services companies. As of 31 December 2006, the market capitalization was US\$ 93.6 billion with 595 companies listed. The stock market offers a variety of products including equities (common and preferred stocks) and certificates on the CASE 30 and GDR (Global Depository Receipt) that allow Egyptian companies to access international markets. The performance of the stock exchange is tracked by two main indices: the CASE 30 Price Index, which includes the top-30 companies in terms of liquidity and activity. Dow Jones CASE Egypt Titans 20 Index, introduced in April 2006, represents blue-chip stocks traded on the CASE which are selected based on rankings by float-adjusted market capitalization, sales/revenue and net profit.

### **5. Fiscal policy**

The lack of a strong fiscal position may hamper the conduct of an independent monetary policy. In other words, fiscal dominance is not consistent with a demanding monetary policy strategy such as IT. Fiscal dominance means that high pressures are put on the financial system and on monetary policy to finance the government fiscal deficit, and is in practice narrowly related to other factors that are often inter-related, namely a shallow capital markets, a fragile banking system, insufficient fiscal resources and an ineffective fiscal administration. The weights of public sector borrowing requirements on the financial system must not be so high, and there should not be heavy reliance on the seigniorage revenues. If these conditions are not met, the fiscally driven inflation process undermines the effectiveness of the monetary policy. In case of large budget deficits, central banks are required to finance public sector deficits through money creation, which would lead to high inflation (Mishkin and Savastano (2001)). Such situation may cause depositors and other creditors to pull their money out of the banking system because of the suspicion. That is, fiscal imbalances may lead to banking and financial crises that may erode all chances of controlling inflation. The resulting banking crisis would then cause a contraction of lending and thereby depressing economic activities. When public debt is large the central bank will be reluctant to raise its rates when necessary to contain inflation because such raise will burden the cost of debt service and lead to an even higher debt level. In turn, higher debt will lead to an exchange rate depreciation via its effects on capital outflow.

The Egyptian budget deficit has indeed exhibited an upward trend since 1997 and has been near 8 percent in the 2005-2007 period . Before 1997 the budget level was relatively under control as it did not exceed 2 per cent. Egypt has reached a very high budget deficit level, especially since 2000, and the public debt is high, exceeding 80 percent since 2000 (see figure 5).

**Figure 7:** Selected fiscal indicators 1995-2007



Source: IMF's International Finance Statistics CD-ROM (July 2008) and authors' calculations

**Table 2: Selected Macroeconomic Indicators 1991-2007**

Year	GDP Growth	Inflation (GDP Deflator)	Inflation (CPI)	Inflation (WPI)	Credits to Private Sector	Credits to Central Government	Current Account Balance	M2 Growth (percentage)	Seigniorage
1991	1.11	15.78	17.92	19.75	22.06	44.31	1.69	19.34	0.99
1992	4.48	18.34	12.12	13.64	22.27	37.64	2.02	19.43	1.23
1993	2.90	9.89	8.55	12.09	23.45	30.98	1.46	13.25	1.64
1994	3.97	7.01	4.61	8.15	27.90	29.69	0.02	11.21	1.60
1995	4.64	11.40	6.32	15.74	32.73	25.89	-0.12	9.90	1.05
1996	4.99	7.11	8.32	7.19	36.53	22.87	-0.08	10.84	0.96
1997	5.49	5.91	4.17	4.63	41.18	22.41	-0.28	10.77	1.27
1998	7.54	4.27	1.40	3.87	46.55	23.40	-0.89	10.78	1.14
1999	6.11	0.87	0.90	3.08	52.00	22.31	-0.53	5.66	1.24
2000	5.38	4.92	1.79	2.68	51.95	25.50	-0.29	11.58	0.76
2001	3.52	1.88	1.03	2.27	54.93	26.22	-0.11	13.22	10.19
2002	3.19	2.37	6.37	2.74	54.66	33.57	0.16	12.63	9.65
2003	3.19	6.78	14.39	4.51	53.90	37.88	0.90	21.28	10.55
2004	4.09	11.67	17.06	11.27	54.04	38.40	0.81	16.18	4.36
2005	4.47	6.21	5.28	4.87	51.17	33.25	0.39	11.49	3.93
2006	6.84	7.36	7.03	7.64	49.29	30.93	0.43	15.00	12.14
2007	7.09	10.54	7.92	9.32	46.36	26.81	n.a	19.12	7.24

Source: IMF's International Finance Statistics CD-ROM (July 2008) and author's calculation.

Notes: Credits to Central Government and Credits to Private Sector are expressed as share of GDP.

Given this situation, the Egyptian government needs to move to more transparent and more market based debt management instruments and to further develop its debt market, through negotiable and more attractive government bonds. Above all, it needs to take actions in favor of more fiscal discipline.

## **6. The monetary transmission mechanisms (MTM): the Exchange Rate and the Interest Rate Pass-Through**

It is commonly admitted that among the serious obstacles central bankers face when implementing their monetary policy, are the uncertainties surrounding the MTM. Such

uncertainties weaken the effectiveness of the policy actions and postpone the credibility-building. Despite its strategic importance, The BCE's knowledge about how its decisions impact upon the goal variables is uncertain. There is no precise idea about the most prevailing channel and about the lags for the policy to achieve its objectives.

This section examines the dynamic relationship between the exchange rate, the interest rate and prices in Egypt.

### **6.1. The exchange rate pass-through**

In theory, the movements in the nominal exchange rate since 2000 should have affected domestic prices and inflation through changes in import prices (both final and intermediate goods), as well as through expectations. The inspection of the data does not seem to fully confirm this idea: inflation as measured by the consumer price index (CPI) remained remarkably low and stable from 2000 to 2003, despite the sizable cumulative depreciation of the pound. CPI inflation started rising only after July 2003. The effects of the 2000–04 exchange rate movements on the wholesale price index (WPI) appear to have been quantitatively larger than on the CPI, but also exhibited long lags.

Hundreds of theoretical and empirical papers analyzing the pass-through issue have been published dealing with developed countries but far fewer in developing countries and even fewer in the MENA region, including in Egypt.

The expression “exchange rate pass-through” is generally used to refer to the effects of exchange rate changes on import and export prices, consumer and wholesale prices, investments and growth and trade volumes. Our primary focus is on the effects on prices (consumer and wholesale) because they are essential for IT and for the debate about appropriate monetary and exchange rate policies.

In an economy characterized by a high degree of pass-through, raising interest rates may have adverse effects on the traded-goods sector because of the link between prices and the exchange rate. In this sense, a low exchange rate pass-through is thought to provide greater freedom and allows for an independent monetary policy and thus makes the implementation of inflation targeting easier.

The pass-through in Egypt is found to be relatively high. Indeed, about 30 per cent of change in the exchange rate is passed through to wholesale price after just one year. After two years, the share of changes in the exchange rate that passes through prices increases to about 32%.

However, only 18 per cent of the exchange rate variation is passed through consumer prices, and will reach the wholesales level after two years. The relatively high degree of the country's openness and its heavily dependence on imports- especially food and basic commodities- suggest that domestic prices is highly sensitive to exchange rate movements. The degree of pass-through to inflation in Egypt is also influenced by the existing market structure. There is strong evidence on monopolistic competition among importers, who by exploiting market power, can maintain their margin profit by fully passing on costs associated with exchange rate depreciation to domestic prices. Also, the relatively large degree of

dollarization (foreign currency deposits over broad money)<sup>6</sup> contributed significantly to strengthen the pass-through.

**Table 3: Forecast Error Variance Decomposition**

Variance Decomposition of Output (RGDP)					Variance Decomposition of Output (RGDP)				
Months	RGDP_	WPI_	TB_Rate	ER	Months	RGDP	CPI	TB_Rate	ER
1	100	0	0	0	1	100	0	0	0
6	93	0	3	4	6	84	0	13	2
12	72	4	5	19	12	68	9	20	2
18	72	5	5	19	18	60	11	25	4
24	67	4	4	24	24	57	19	19	5
Variance Decomposition of Prices (WPI)					Variance Decomposition of prices (CPI)				
Months	RGDP_	WPI_	TB_Rate	ER	Months	RGDP	CPI	TB_Rate	ER
1	13	87	0	0	1	99	1	0	0
6	10	70	5	15	6	66	17	13	4
12	6	49	17	28	12	35	15	33	18
18	11	38	16	35	18	28	16	28	29
24	17	33	18	32	24	33	13	26	28
Variance Decomposition of policy Rate (TB_Rate)					Variance Decomposition of policy rate (TB-Rate)				
Months	RGDP_	WPI_	TB_Rate	ER	Months	RGDP	CPI	TB_Rate	ER
1	0	0	1	0	1	1	0	99	0
6	3	1	77	19	6	7	2	67	24
12	5	1	72	20	12	13	2	63	22
18	7	1	72	19	18	22	2	57	19
24	8	2	69	21	24	28	2	53	17
Variance Decomposition of Exchange Rate (ER)					Variance Decomposition of exchange rate (ER)				
Months	RGDP_	WPI_	TB_Rate	ER	Months	RGDP	CPI	TB_Rate	ER
1	0	0	6	94	1	1	0	3	95
6	2	0	6	91	6	1	0	4	95
12	5	0	4	90	12	3	1	4	93
18	16	0	5	79	18	4	2	7	87
24	16	1	5	77	24	7	11	8	75

Source: Author's calculation

Source: Author's Calculation

RGDP: rate of growth of domestic product (output), WPI: whole sale price index, TB rate: Central bank policy rate, ER: exchange rate.

<sup>6</sup> The average dollarization ratio has been relatively stable about 25 per cent during 2000-2006.

## 6.2. The interest rate pass-through

When studying channels of monetary transmission it is important to assess how the CB main rate (policy rate) affects other retail interest rates. Economic agents (households, firms...) take into consideration in their consumption and investment decisions the lending rates. Assessing the strength as well as the speed with which central bank main rate changes affect lending rates is a main step in the monetary transmission analysis.

When studying channels of monetary transmission it is important to assess how the central bank main rate (policy rate) affects other retail interest rates. Specifically, it is desirable for policymaker to have a clear picture on how changes to the policy rate affect the lending rates banks and other financial intermediaries charge to businesses and consumers. Economic agents (households, firms...) take into consideration in their consumption and investment decisions the lending because these rates impacts on inflation with some lag. Assessing the strength as well as the speed with which central bank main rate changes affect lending rates is a preliminary step in the monetary transmission analysis.

In textbooks, the interest rate charged by commercial banks is usually assumed to be a function of the marginal cost of funds to the lenders. The cost to a bank of borrowing from other banks or the cost of using the central bank short-term lending facility can be useful proxies of the opportunity cost of funds for banks. Then changes in these rates can be expected to be passed through to market lending rates. The expression “pass-through” is used to refer the metric that measures the strength of connection between the policy rate and a detailed rate. A high pass-through heightens this connection while a low one lowers the connection. Pass-through is complete when a movement in the policy rate leads to a one for one change in lending rates.

Several factors may determine the extent to which the policy rate pass-through to lending rates, and the effectiveness of the policy rate itself may vary over time especially when it comes to countries undertaking reforms or with underdeveloped financial markets. It may be argued in the case of countries like Egypt that the lack of competition the spread between the policy rate and the lending rates becomes high and the adjustment of the latter to the former becomes slow. This may explain the slowness of the adjustment of bank lending rates following a change in the policy rate.

The current liquidity state in the Egyptian the banking sector is likely to be another explanation. A lasting excess liquidity in the banking sector as in the case of Egypt during 2000-2007 could render the policy rate ineffective.

## **9. Main finding, policy implications and concluding remarks**

The Egyptian monetary regime had been without a clear anchor for inflation expectations for some time, especially during the period 1991-2005 and more recently since 2007. By 2008, the monetary policy strategy carried out by the Egyptian monetary authority is still far from being clearly defined and the CBR does not seem to be the main guide for public's inflation expectations. Inflation reached a record level of 23 percent in August 2008, a level which has not been reached for at least the last two decades. Despite the reforms undertaken especially since 2003, a lot remains to be done in order to build up the central bank's credibility.

The level of public debt and budget deficit remain too high. As long as they remain so high the country should not engage in a monetary strategy such as IT. The ongoing rise in the public debt, which inevitably increases the domestic interest rates and may lead to a slower economic activity, could force the central bank to lower the real interest rate and hence to raise the level of inflation.

Many factors are eroding the central bank credibility and making the transition to IT less feasible. Some are institutional and/or structural. As for the institutional factors, the most important of them are the absence of a clear cohesive policy framework and the weakness in terms of CB independence, which reflect the lack of political willingness. The fragile fiscal position and banking system are the main structural causes that should be pointed out. It does not make any sense to debate on strengthening monetary authority's credibility while public debt reaches more than 100 per cent. Likewise, it is almost impossible to sustain a coherent monetary strategy with an unsound banking system.

Thus, much efforts and more work need to be done in all these areas to make monetary operations more effective, increase interest rate and exchange rate flexibility, and effectively anchor inflation expectation. Is the Egyptian government inclined to carry out such policies? The recent small increases of the interest rate decided by the CBE (during June, July and August 2008) in order to combat inflation seem to indicate that CBE is still reluctant about immediate policy choices and perhaps more about strategic choices and namely switching to IT.

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**Appendix 1: Data Description and Sources**

**Appendix 2: The degree of interest rate pass-through calculation**

To obtain a better sense of how sensitive lending rates in Egypt, Morocco and Tunisia are to policy rates, the speed and size of the pass-through will be calculated and compared to those of other emergent countries. To this end, both the long- and short-run dynamics of administered rate changes are examined. First, the long-term relationship between the administered rates and the market rate could be formulated according the following ARDL(m,n) model:

$$y_t = \alpha_0 + \sum_{i=1}^m \alpha_i y_{t-i} + \beta_0 x_t + \sum_{i=1}^n \beta_i x_{t-i} + u_t$$

Where  $y_t$  represents the lending rate rates;  $x_t$  denotes the policy rate (which is assumed to be exogenous);  $u_t$  is the disturbance term;  $m$  and  $n$  indicate the optimal lag lengths. The long-run equilibrium associated with Eq.(1') could be expressed as:

$$y^* = \theta_0 + \theta_1 x^* + u^*$$

Where  $\theta_1$  stands for the long-term multiplier, which has to be calculated as:

$$\theta_1 = \frac{\beta_0 + \sum_{i=1}^n \beta_i}{1 - \sum_{i=1}^m \alpha_i}$$

A full pass-through in the long run is reflected by  $\theta_1=1$ . An imperfect pass-through ( $\theta_1<1$ ) could be caused by a less than perfect elasticity of demand for banking products, the existence of market power, lack of market contestability, switching costs, or information asymmetries. If the long-term pass-through is found to be overshooting ( $\theta_1>1$ ) in lending markets which is less likely in case of Egypt, this can be interpreted as a situation where banks increase lending rates to compensate for higher risks instead of rationing credit.

# MONETARY POLICY AND THE PREPARATION FOR INFLATION TARGETING IN MOROCCO

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## ***I. Introduction***

Morocco's financial and banking sector have been undergoing major structural transformations for the last two decades. The central bank is also preparing for the transition

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to a more flexible exchange rate regime and for the adoption of an inflation-targeting framework (IT). Two rounds of reforms were completed and targeted mainly the banking sector.

The first one took place in the early nineties with the adoption of the 1993 banking law that unified the banking sector by abolishing sectoral specialization and implementing prudential regulation in line with international standards. Ever since, the banking sector started to play more effectively its role in providing funds to the private sector, which recorded substantial growth compared to funds allocated to the government. Their share in GDP went up from 31.5 percent in 1983 to 40.7 percent in 1993 before reaching more than 60 percent in 2007. Monetary authorities increased their use of indirect instruments in managing money supply through an active use of reserve requirements and a more market-based liquidity management using auctions and open market operations.

The second round of reforms is more recent and started in 2006 with the promulgation of a new legal framework for the banking sector as well as for the central bank. The aim was to create a unified legal body applicable to all credit institutions including non-bank financial institutions, and to provide the central bank with full supervisory autonomy in issuing licenses, prudential regulation, and in ensuring the management of credit institutions in difficulty and deciding about non-compliance sanctions. The new legal framework has also strengthened Bank Al Maghrib independence, and explicitly stipulated "price stability" as its main objective. In order to avoid any potential conflict of interest regarding its supervisory functions, the central bank has sold its capital shares in all the credit institutions in which it was previously involved. Finally, Morocco has issued an anti-money laundering law consistent with international standards.

In the context of the preparation for the transition to IT, Moroccan authorities started to examine options for further opening of the capital account through progressive elimination of the remaining restrictions on residents' transactions. This move is expected to deepen the foreign exchange market and to improve, in the medium term, the economy-wide risk management and liquidity management. The central Bank had also to adapt the strategic framework of its monetary policy and to implement a set of criteria for assessing inflationary risks. In particular, the bank is putting special emphasis on understanding the transmission mechanisms of monetary policy.

Prior to 2006, the central bank based its intervention mechanisms on monitoring monetary aggregates. A reference value (target) was set at the beginning of each financial year, and the central bank had to meet the target. The new approach is more complex and allows for identifying various factors that contribute to inflationary pressures and monitoring a set of real and financial indicators constructed on the basis of a forward-looking approach. This exercise leads to more accurate inflation forecasts and to a better assessment of risks that may threaten price stability.

However, many issues with respect to monetary policy in Morocco are not yet resolved. Morocco is increasingly open to trade and foreign investment and to various other external shocks, yet, its labor market and its exchange rate regimes remain rather rigid. Moreover, little room is left to the fiscal policy in managing exogenous shocks. Thus, an inappropriate monetary policy choice may worsen its ability to react to exogenous shocks and may lead to lasting damaging effects in terms of output growth, and employment.

The purpose of this paper is to examine monetary policy design and implementation in Morocco prior and after the reforms in order to assess the preparation and the readiness of this country for IT.

The paper also tries to contribute to the identification of the monetary policy transmission mechanisms in Morocco over the last decade using a structural vector auto-regressive model designed for this purpose.

The rest of the paper is organized as follows. The next section (Section 2) examines monetary policy instruments and conduct in Morocco prior and after the reforms, and analyzes the effectiveness of this monetary policy in terms of its impact on money aggregates and inflation. Section three's focus is on Morocco's readiness for inflation targeting; it reviews the basic prerequisites for a successful inflation targeting implementation. Section four deals with monetary policy transmission mechanisms, while the last section concludes.

## ***II. Monetary policy conduct***

Monetary policy in Morocco has always aimed to curb inflation but with changing instruments. For a long time the monetary authorities have relied on fixing a target for annual growth in the monetary supply. Moreover, since 1998, the government has not to ask for any

special advances from the Central Bank since 1998, and the “Public Treasury” has been financing its deficit exclusively by domestic market resources.

Prior to 2006, the central bank based its monetary policy on the monitoring of the monetary aggregates in relation to a target value set at the start of the financial year. Recently, the central bank has adopted a new approach which allows for taking into account the various factors contributing to inflationary pressures. These factors are identified using screening indicators relating to both the real and financial spheres. These indicators are examined on the basis of a forward-looking approach and used in the preparation of forecasts and the establishment of the balance of risks likely to affect price stability.

Overall, monetary policy has been decisive in controlling inflation in Morocco and keeping the value of the Dirham relatively stable, and it has led to a high degree of monetary discipline. The monetary authority was able, to a large extent, to keep money supply under control except in 1990 and 1991 where the gap between the targeted and the effective rates were significant. The widening of the gap is mainly due to the effect of the abolition of the credit ceiling system implemented in 1990.

**Table 1:** Monetary aggregate targets and effective rates

Year	Money aggregate targeted	Target rate	Effective rate
1986	M2	16	15.9
1987	M2	10	9.7
1988	M2	13	14.7
1989	M2	11	11.8
1990	M2	10	18.5
1991	M2	7	16.8
1992	M2	6	9.3
1993	M2	8.2	8.7
1994	M2	8-10	10.2
1995	M3	5-7	7
1996	M3	7	6.6
1997	M3	7	8.1
1998	M3	8	6
1999	M1	7-8	11.5
2000	M1	6-7	8.2
2001	M1	9-10	15.9
2002	M1	6.5-7.5	9
2003	M1	7.5-8.5	9.6
2004	M1	6.5-7.5	9.7
2005	M1	6.5-7.5	14.8
2006	M3	7.5-8.5	17

*Source:* Various issues of the central bank (Bank Al Maghrib) annual reports (1986-2006)

The central bank started reforming its monetary policy framework in June 1995. The initial purpose was to provide the central bank with market-based tools to control liquidity, and, indirectly, inflation. However, monetary policy tools set in 2005 were mainly focused on liquidity injection and not so much on liquidity absorption in periods of excess cash on the money market. In addition, banks were penalized by a very high interest rate applied on overnight central bank lending. Consequently, banks tended to rely more on interbank money market. For instance, interbank interest rates were permanently below central bank interest rates over the period 2001-2004. In order to deal with those issues and allow the central bank to adequately manage liquidity; a second round of reforms of monetary policy was launched in 2004.

**Table2:** Selected Macroeconomic indicators prior to reforms

Year	GDP growth rate	Inflation rate	Monetary growth	Credit to private sector as a share of GDP	Budget balance as a share of GDP
1983	-0.6	6.21	17.7		-7.8
1984	4.3	12.45	10.2		-6.0
1985	6.3	7.73	13.2		-7.3
1986	8.3	8.73	16.9		-7.7
1987	-2.5	2.70	9.9		-4.5
1988	10.4	2.37	15.2		-3.2
1989	2.4	3.14	12.2		-5.1
1990	4.0	6.91	21.5	32.0	-2.2
1991	6.9	7.99	16.8	35.2	-2.1
1992	-4.0	5.74	9.3	39.3	-1.4
1993	-1.0	5.2		40.7	-2.61
1994	10.4	5.1		39.9	-3.19

*Source:* Authors' computation from the World Bank Indicators database (2001) and various issues of the Bank Al Maghrib report.

## 2.1. The First round of reforms

Over the first round of reforms, three types of instruments were introduced: regular monetary policy instruments, fine tuning instruments and intraday operations.

## **a. Regular monetary policy instruments**

All regular monetary policy instruments of the Moroccan central bank (BAM) are based on repo (repurchase) transactions. In a repo transaction, the commercial bank (cash taker) sells government bonds to the cash provider. At the same time, it enters into an agreement to repurchase the same amount of government bonds of the same type from the central bank at a subsequent point in time. The cash taker pays interest (repo rate) for the duration of the transaction. Two instruments were offered in that regard.

### *Seven days liquidity auctions<sup>9</sup>*

The central bank determines the quantity of money to be injected in the money market on the basis of a liquidity assessment exercise. Banks request a certain amount of liquidity at a fixed price (repo rate). If demand exceeds the BAM's intended auction volume, all offers received from its counterparties that exceed a minimum amount are reduced proportionately. Otherwise they obtain the full amount for which they have submitted an offer. The repo rate serves to set the "floor rate" for the central bank interventions.

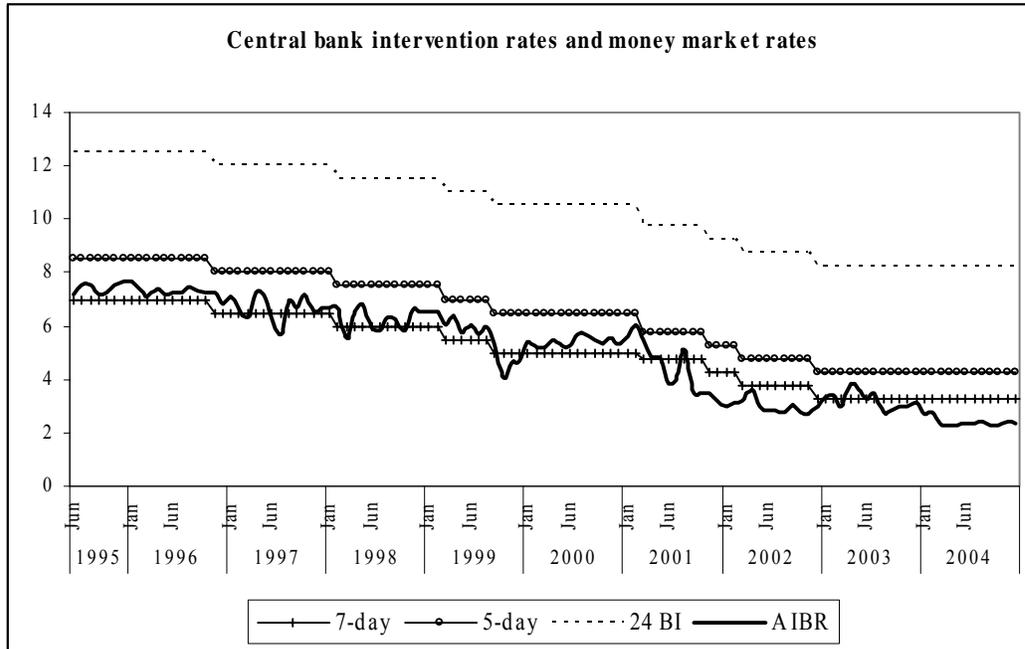
### *Five days liquidity purchase*

If commercial banks need more liquidity, they can apply for it before the central bank under the "five days liquidity purchase". However, the central bank may decide not to supply the total amount requested by commercial banks depending on the prevailing monetary conditions. Interest rates to be paid (purchase rate) are higher in comparison to the repo rate. Purchase rate determines the ceiling rate for the central bank interventions.

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<sup>9</sup> This tool is also known as the "seven-day advances on calls for tenders"

**Figure 1: Central Bank rate and money market rate**



Source: Bank Al Maghrib Report (various issues)

Note: 7-day: repo rate, 5-day: purchase rate, 24 BI: overnight rate on advances initiated by commercial banks, AIBR: monthly interbank average interest rate.

## II.

### b. Fine-tuning operation

In order to smooth the effects on interest rates caused by unexpected liquidity fluctuations in the market, the central bank can rely on fine-tuning operations. Practically, fine-tuning operations are open market operations (OMO) carried out on an ad hoc basis with the objective of managing the liquidity situation in the market.<sup>10</sup>

By purchasing government securities, the central bank provides liquidity in to the market, which increase reserves and ease credit. Conversely, by selling government securities, the

<sup>10</sup> OMO involve the purchase or sale of government securities by the central bank. Each purchase or sale affects the volume of reserves available in the banking system, and therefore the liquidity of the whole economy.

central bank absorbs existing liquidity and tightens credit conditions. The BAM used open market operations for the first time in 1999 to absorb excess liquidity generated by the sale of the second mobile license.

### **c. Overnight operations**

Banks may rely on overnight advances from the central bank. However, these advances are granted at much higher interest rate.

## **2.2. The Second round of reforms**

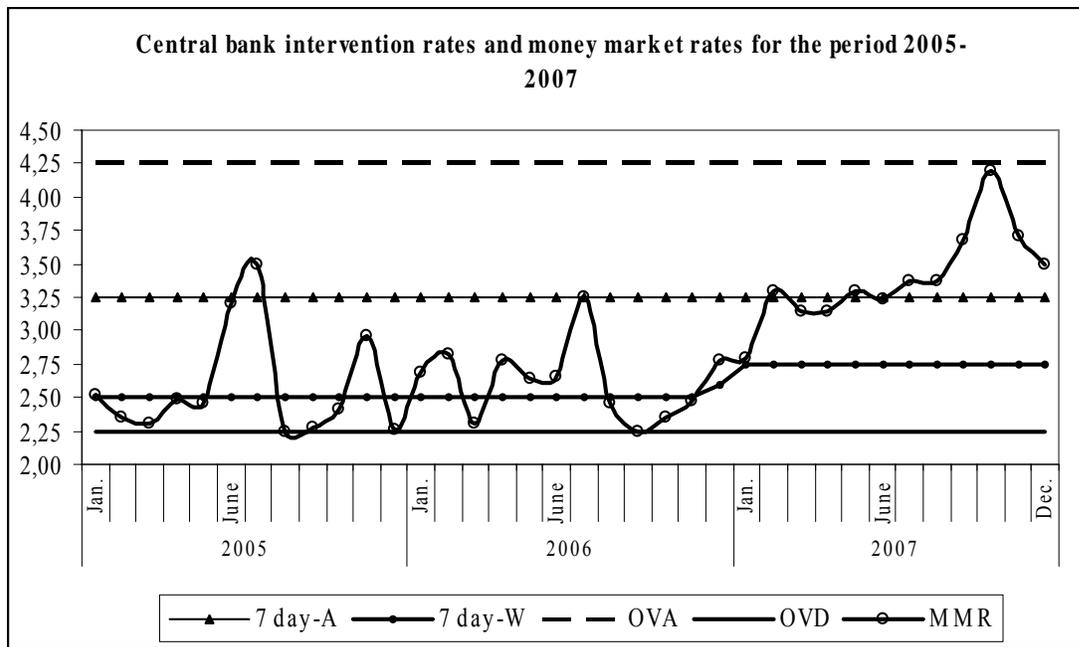
The package of monetary policy tools designed in 1995 was skewed toward the central bank as a “liquidity provider”; no regular instrument was set to allow the central bank to play its role as a “liquidity absorber” in case of excess cash on the money market. Moreover, banks that need to adjust their liquidity position through overnight operations were penalized. The interest rate applied on overnight central bank lending was 500 and 400 basis points above “repo” and “purchase” rates respectively. In the meantime, no overnight deposit instrument was offered by the central bank for banks with excess liquidity.

As a consequence, banks tended to rely more on interbank money market. For instance, interbank interest rates (IIR) were permanently below central bank interest rates over the period 2001-2004 while normally in an appropriately designed system, IIR should be located between central bank policy rates (repo and repurchase rates).

Excess liquidity generated by exceptional growth in foreign reserves over the period 2000-2004, which represented roughly the equivalent of 50 percent of money supply growth rate, contributed to magnify available monetary policy tools’ weaknesses.

To accommodate excess liquidity, the central bank had to reduce its intervention rates from 6 percent for its auction rate in January 1999 to 3.25 percent in December 2002 after six successive cuts, and from 7.5 percent to 4.25 percent for its ceiling rate over the same period. The central bank had to rely frequently on the ad hoc instrument of “liquidity withdrawal” to be able to closely monitor money market. For instance, from September 2001 to December 2002, operations of liquidity withdrawal were conducted at weekly basis. Over the same period, no money was injected by the central bank through its regular instruments.

**Figure 2: Central Bank and money market rates for the period 2005 -2007**



Source: Bank Al Maghrib Report (various issues)

Note: 7 day-A: rate on seven day advance auctions; 7-day-W: rate on seven day deposit auctions, OVA: overnight interest rate on BAM’s advances, OVD: overnight interest rate granted by BAM on banks’ deposits, MMR: monthly average of interbank interest rate.

To be able to exert some control over the overnight rate, the central bank introduced a 24 hours deposit facilities in 2004. The purpose of this instrument is to offer a 2.25 percent return for banks having excess liquidity and limit the downward trend of overnight rate on interbank operations. The central bank has also introduced swap operations on foreign exchange and raised reserve requirement ratio from 14 percent to 16.5 percent.

**Table 3:** Selected Macroeconomic indicators after reform

Year	GDP growth rate	Inflation rate	Monetary growth (M3)	Credit to private sector as a share of GDP	Budget deficit as a share of GDP
1995	-6,6	6,1	7,0	45.7	-4,39
1996	12,2	3,0	6,6	44.4	-3,01
1997	-2,2	0,9	16,2	47.5	-3,4
1998	6,8	2,9	6,0	48.7	-2,5
1999	-0,7	0,7	10,2	53.1	-4,3
2000	0,9	1,9	8,4	57.7	-6,5
2001	6.3	0.62	14.2	54.5	
2002	3.2	2.8	6.3	54.4	-4.3
2003	6.1	1.2	8.7	55.9	-3.3
2004	5.2	1.5	7.8	56.7	-3.0
2005	2.4	1.0	14.0	62.1	-4.0
2006	8.0	3.3	17.0	61.1	-1.7

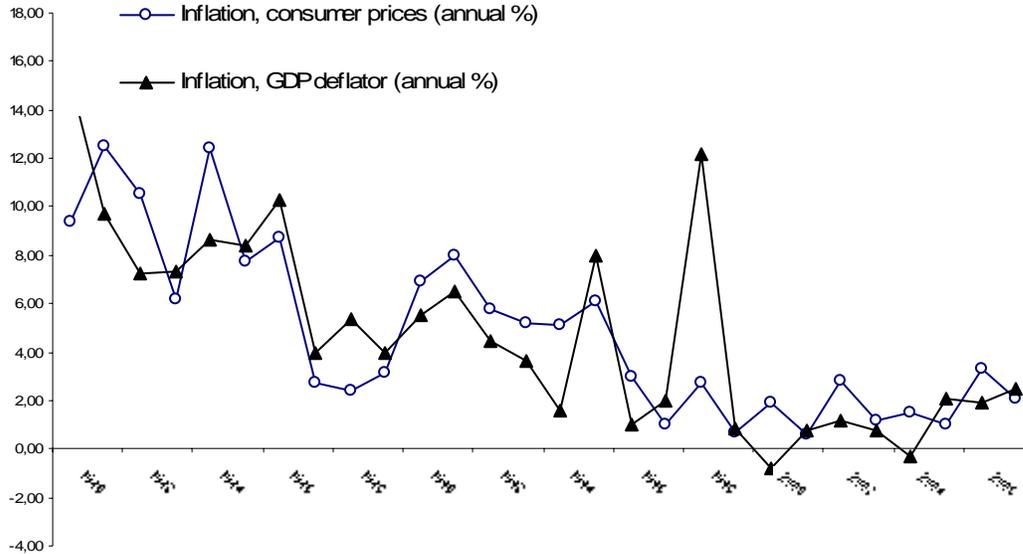
*Source:* Authors' computation from the World Bank Indicators database (2001) and various issues of the Bank Al Maghrib report.

The operational framework continues to be based on the Bank's interventions on the money market to keep the overnight rate at a level compatible with the Board's decisions.

To meet this objective, the central bank uses a set of **intervention instruments**, consisting mainly of:

- **7-day operations on call for tenders:** the rate of which is set at 3.25% for *liquidity advances* and ranges between 2.50% and 3.25% for *liquidity withdrawals*.
- **Fine-tuning operations:** in particular repurchase operations of treasury bonds carried out on the central bank's initiative to manage **the interbank rate**.
- **24-hour advance and deposit facilities:** these tools allow the central bank to limit the effects of unforeseen fluctuations of liquidity supply and demand on the behaviour of overnight rate.
- Finally, the new Statutes grant the central bank the possibility of **issuing its own debt instruments** in order to regulate the money market. So far, the Board has decided not to use this instrument.

**Figure 3:** Inflation dynamics: 1980-2007.



### ***III. Readiness of Morocco for inflation targeting***

It has been shown that in order to successfully implement the IT strategy, a set of institutional and economic prerequisites must be fulfilled. In this section, we examine whether inflation targeting is feasible in Morocco by analyzing various prerequisites for successful inflation targeting framework on the basis of existing theoretical and empirical literature.

#### **3.1. Institutional pre-requisites**

The first prerequisite for any country considering the adoption of IT is Central Bank independence.

### a. Central bank independence

The concept of independence could be better judged and assessed if scrutinized with circumspection. Independence is defined according mainly to criteria namely: political vs. economic independence (see for instance Grilli, Masciandro, and Tabellini, 1991) and goal vs. instrument independence. This latter dichotomy is the most widespread in the economic literature (Debelle and Fischer, 1994). Goal independence, which reflects the Central bank's freedom to determine the final objective of the monetary policy, is less crucial in the case of IT since the main goal is pre-determined and does not have to be set by the central bank alone. It is commonly admitted that Central banks are more independent when they are instrument - independent; that is, when it is free to choose the means (tools or instruments) by which it seeks to achieve the pre-determined goals.

The new statutes of the central bank (Law n° 76-03) passed in 2006, which replaced the previous 1959 law, have strengthened Bank Al Maghrib independence. They granted the central bank complete autonomy in selecting appropriate financial instruments to meet its monetary objectives. The central bank's board was changed removing several government officials from its composition. The only exception is the director of the "*Treasury and external finance department*" within the Ministry of Finance, who continues to act as a member of the board but does not enjoy any voting powers during meetings related to monetary policy decisions.

**Table 4:** Formulation and Implementation of the monetary policy

Country	Formulation & Implementation of MP
Egypt	<ul style="list-style-type: none"><li>• "The Bank shall be concerned with formulating and implementing the monetary, credit, and banking policies" (Article 4).</li><li>• "The Bank shall set, in agreement with the government, the objectives of the monetary policy, through a coordinating council to be formed by decree of the President of the Republic" (Article 5).</li></ul>

<b>Morocco</b>	<ul style="list-style-type: none"> <li>● The new Statutes of the BAM regard price stability as the fundamental objective to be pursued by the central bank in cooperation with the Ministry of Finance.</li> </ul> <p>“In order to achieve price stability, the BAM determines and pursues the monetary policy instruments defined in Article 25...” (Article 6).</p> <p>“...Without compromising the objective of price stability, the BAM achieves its mission within the context of economic and financial policy of the government”.</p> <p>(Article 6)</p>
<b>Tunisia</b>	<ul style="list-style-type: none"> <li>● The Central Bank of Tunisia (BCT) is, in practice, responsible for the formulation and conduct of monetary policy. The Law No. 58-90 which established the CBT, and which was modified on November 3, 1988, indicates that "the central bank's general mission is to defend the value of the currency and to watch over its stability. In this regard, it controls currency in circulation and credit distribution [...]."</li> </ul>
<b>Turkey</b>	<ul style="list-style-type: none"> <li>● “...determine and implement monetary policy” (Article 4)</li> <li>● “The Bank shall determine the inflation target together with the Government...” (Article 4 II b)</li> <li>● In case of disagreement between Governor and Board, the Prime Minister shall act as an arbitrator” (Article 26.2)</li> </ul>

In order to avoid any potential conflict of interest regarding its supervisory functions, the central bank has sold its capital shares in all the credit institutions in which it was previously involved. Under the revised Banking Act, the National Credit and Savings Council is no longer consulted on the directions and implementations of monetary policy, nor is the Credits Institutions Committee asked for its opinion on the technical aspects of policy instruments.

The degree of Bank El Maghrib independence will be measured with three types of indices constructed on the basis of a questionnaires (see appendix A).<sup>9</sup> The first index discards the political aspects and therefore assigns equal weights to goal independence questions as well as to those related to economic independence; it is the Debelle-Fisher (DF) index. The second index we constructed is called the Buba index; it aims at measuring the gap between the ancient Bundesbank, widely known for being independent, and any other given Central Bank. To construct such an index, only questions for which the Bundesbank makes positive scores should be considered; these questions are assigned equal weights (details in Appendix D). Finally, an index that takes into consideration all the questions and assigns to them the same weight is computed; we called it General (G) index.

According to the Buba index, as well as the DF index, the BAM seems to be independent. According to these two indexes BAM scores better than some inflation targeters banks (such as Czech Republic, Hungary and Poland). According to the DF index, the BAM is also instrument-independent. By discarding the questions related to political independence, the DF index seems to indicate that the BAM is rather independent. However, the BAM governor is appointed by royal decree (*dahir*) and is accountable to the king and is the chairman of the central bank board and responsible for ensuring its proper functioning. The new Statutes of BAM do not specify the term, conditions or causes for dismissal of the governor. These features suggest that BAM perhaps remains under the executive dominance and raises questions about its accountability.

**Table 5:** Board composition and voting rules in morocco, Tunisia and Turkey

Country	Board size	Governor	Vice Governor	Members	Government representatives	Meeting Frequency
Turkey	9	Appointed by the decree of the Council of Ministers (5 years)	2 Vice Governors (do not vote)	6 members elected by the General Assembly. Their term office is 3 years	No	1/ Month
Morocco	9	Appointed by the King (6 years)	1 Vice Governor	6 members appointed by the Prime Minister (of which 03 are nominated by the governor). Their term office is 6 years.	1 non voting member	1/ Quarter
Tunisia	11	Appointed by the President (6 years)	1 Vice Governor	8 members appointed by the Prime Minister. Their term office is 3 years	1 non voting member	1/ Month
Egypt	16	Appointed by the President (4 years)	2 Deputy governors	8 members appointed by the President without necessarily consulting with the Governor. Their term in office is 4 years	3 voting members are nominated by their respective Ministries (Trade, Finance and Planning) and appointed by the president. The Chairman of the Capital Market authority	2/ Month

**Table 6:** Rules for dismissal

Country	Rules for dismissal
<b>Egypt</b>	<ul style="list-style-type: none"><li>• The Law 2003 neglected mentioning of any regulations concerning the dismissal of the CBE governor or any of the board members. “The resignation of the Governor shall be accepted by decree of the President of the Republic” (Article 16)</li></ul>
<b>Morocco</b>	<ul style="list-style-type: none"><li>• The new Statutes of BAM do not specify the term, conditions or causes for dismissal of the governor or any of the board members.</li></ul>
<b>Tunisia</b>	<ul style="list-style-type: none"><li>• Article 9 (of Law No. 88-119 which amended the Law No.58-90) states only that “The governor shall be dismissed by a decree...” and no further details given.</li></ul>
<b>Turkey</b>	<ul style="list-style-type: none"><li>• In cases of violation of incompatibility clauses (Article 28)</li><li>• Inability to perform duties (Article 28)</li></ul>

## **b. Accountability**

It is widely recognized that a central bank with a considerable autonomy to accomplish a specified task has to become accountable for its actions. Accountability signifies that the bank must be prepared to answer the public, in particular via its elected representative, concerning the successes, failures, and the remedies in case of failure to meet the agreed-upon objectives. The public must have the capacity to punish incompetent policymakers. Making policymakers subject to punishment makes it indeed more likely that incompetent policymakers will be replaced and creates better incentives for policymakers to do their jobs well (Mishkin, 2002). In order to ensure accountability, policymakers ought to make the independence of the CB (if any) subject to legislative change by allowing the act that creates the CB to be modified by legislation at any time; they can also mandate periodic reporting requirements to the government.<sup>6</sup>

While no voting ratio or voting record of central bank Council meetings is made publicly available, a press communiqué describing the decisions made by the board is released immediately after each meeting. In addition, the governor of Bank Al-Maghrib holds a press conference at the beginning of each year to share with the public its monetary policy

evaluations and directions. Within this context of enhanced transparency, the central bank has committed to publishing annual reports on its supervision activities. The first of these reports was issued at the end of 2005, and Bank Al-Maghrib is conducting preparatory work for the publication of periodic reports on the payments system.

In addition, the Governor of Bank Al-Maghrib can be invited to report on monetary policy at the initiative of permanent parliamentary commissions, and there is a possibility that the governor might address the parliament on his own initiative in the near future, should an amendment to the new central bank Statutes be approved.

### **c. Transparency and communication strategy**

Accountability, however, must be accompanied by the communication of the monetary policy decisions in a clear and regular manner to the financial markets and to the public as well. Consequently, greater transparency is required through the publication of CB forecasts. Transparency should focus on the economic model and the operational objectives of the CB. Increased bank transparency is desirable because it reduces uncertainties in financial markets, the inflation bias, inflation variability, and employment variability (Faust and Svensson, 2001). A transparent monetary policy means that changes in short-term interest rates should not surprise the market. It is important that the CB enhances transparency for the effective operation of an IT framework. Transparency introduces predictability and helps to ensure that expectations are consistent with the objective of price stability; thereby, it permits the lowering of the cost of achieving the inflation target. Nonetheless, a suggested high degree of transparency is not unconditionally desirable. Increased transparency may have the disadvantage of eliminating the CB's strategic advantage. In doing so, it may reduce its ability to stabilize the economy. In the particular case of an economy hit by shocks that require counter-cyclical monetary policy, transparency becomes a straitjacket. In sum, monetary policy should avoid exacerbating fluctuations of output and employment by introducing unnecessary uncertainties.

The Monetary and Financial Committee elaborates its quarterly monetary policy report on the basis of inflation forecasts, which is submitted to the Board and then communicated to the public. The monetary policy report represents an extremely useful tool of communication for the central Bank as it provides explanations that motivate monetary policy decisions and provide economic actors a basis for their expectations.

### **3.2. Economic pre-requisites**

#### **a. Absence of fiscal dominance**

Fiscal dominance may hamper the conduct of an independent monetary policy. Although what is meant by fiscal dominance is the excess of fiscal policy pressures on the monetary policy stance, it is narrowly related to two other factors, namely, a shallow capital market and a fragile banking system. The lack of fiscal dominance signifies that CBs do not have to conduct accommodative policies. The weights of public sector borrowing requirements on the financial system must not be so high and there should not be direct borrowing by the public sector from the CB and heavy reliance on the seigniorage revenues, which is the most common indicator of fiscal dominance. If these conditions are not satisfied, then inflation will have fiscal roots and a fiscally driven inflation process may undermine the effectiveness of monetary policy. Furthermore, fiscal imbalances can also lead to banking and financial crises that will blow out any monetary regime to control inflation.

Experience has shown that large budget deficits may force governments to confiscate assets, particularly those in the banking system<sup>7</sup> (Mishkin and Savastano, 2001). These considerations need to be taken into account, not only in the design of an IT strategy, but also in any monetary strategy.

As far as Morocco is concerned, the separation between monetary and fiscal operations is clearly defined and has been reinforced by the revised Statutes of the BAM. The objective is to prevent Bank Al Maghrib (BAM) from granting any financial assistance to the government or to state-owned enterprises except for cash facilities, which are also regulated. Article 27 of the new Statutes stipulate that these cash facilities are limited to 5 percent of the

previous year's fiscal receipts and can only be used for a maximum of 120 days per year. In addition, the facility is remunerated. The BAM can suspend the use of these cash facilities if the monetary market requires so.

**Table 7:** Moroccan fiscal policy indicators: 2000-2007

	2000	2001	2002	2003	2004	2005	2006	2007	Reference <sup>(2)</sup>
Inflation	1.9	0.6	2.8	1.2	1.5	2.0	3.3	2.1	2.7%
Seigniorage <sup>(4)</sup>	0.69	4.38	0.86	3.82	3.26	2.68	2.4	1.1	<1%
Government balance	-6.4	-5.7	-4.7	-5.3	-4.9	-5.5	-2.3	-1.9	
Budget deficit <sup>(1)</sup>	5.9	5.6	4.5	4.9	4.8	5.9	2.1	3	<3%
Public debt <sup>(1)(3)</sup>	81.5	74.7	71.4	68.5	65.8	69.9	69	68.1	<50%
Fiscal deficit <sup>(1)</sup>	6.4	5.7	4.7	5.3	4.9	5.5	2.1	3.4	<3%

**Notes:** (1) in percent of GDP, excluding grants and privatization receipts. (2) These statistics are average values referring to the three years preceding the adoption of the inflation targeting regime. (3) Gross debt including net central bank credit to government. (4) The monetary seigniorage is defined as the change in the monetary base in percent of nominal GDP. Source: Author's calculations and IM

In Morocco, the seigniorage revenue is not totally absent; it exceeds the one per cent level. Moroccan authorities seem to rely on seigniorage revenues in order to close the transitory gap between its revenue and the expenditure flows even though the government has been meeting its financial needs mainly through the market. The declining deficit is progressively being financed by domestic sources rather than revenue generated from privatization. An ambitious program of public debt management has taken place, and seems to have already produced a sensitive effect on the cost of the public debt as well fiscal deficit by substantially reducing its burden on the economy. It should be stressed that Moroccan fiscal performance has improved considerably since 2005. Indeed, the budget was close to balance in 2007, significantly lower than the deficit of 2 percent of GDP recorded in 2006 and the target of 3.4 percent of GDP set in the 2007 Budget Law. These performances are due mainly to strong growth in tax receipts, which were 3 percentage points of GDP higher than in 2006.

The higher receipts were partly offset by increased expenditure, in particular on subsidies for petroleum products and staple foods, and on investment spending. Outstanding government debt was reduced to 55 percent of GDP, compared with 58 percent in 2006 and 62 percent in 2005. In addition, the Treasury repaid in full the cash advances that BAM had granted it before the 1980s. This improvement in Morocco's public finance is reflective of its efforts to abide by a fiscal consolidation strategy. This greater fiscal prudence has arguably augmented private sector confidence.

## **b. Depth and Development of the financial sector**

To carry out IT, it is important that the country has a well-developed financial markets. Such a requirement constitutes another fundamental condition to pursue an independent monetary policy. A well-developed market and indirect instruments of monetary policy are indeed of overriding importance for the proper operation of transmission mechanisms. Indeed, the lack of indirect monetary instruments will slow the financial market, which in turn will reduce the monetary policy effectiveness, leading to a delay in impacting on inflation. These instruments require effective monetary, capital, and foreign exchange markets. Healthy fiscal and financial systems are fundamental pre-requisites for IT (Masson, Savastano and Sharma, 1997), actually for any other sound monetary strategy.

The above requirements are also important when for financial stability. Indeed, the fear of financial instability is another important constraint that should be taken into consideration when implementing an IT strategy. Traditionally, to prevent financial instability, CBs may act as a lender of last resort by supplying liquidity to the financial system. Such a practice may create moral hazard situations where financial institutions have the incentive to take excessive risk, which may cause financial instability. To prevent this risk, CBs should have easy access to information about the institutions to which it might have to extend loans and effectively supervise these institutions.

The banking sector in Morocco is the main component of the financial system in Morocco. It is made of the Central Bank (Bank Al Maghrib), 22 financing companies, sixteen on shore commercial banks and six off-shore banks. The State's presence in the banking

sector has significantly decreased but remains relatively important. On the basis of the central bank data, public banks control 27.6 percent of the banking sector assets in 2006. However, the role of the public banks is much smaller in term of their contribution to credit extension (19.4%) or collection of deposits (12.4%). In the meantime, a number of international banks have increased their ownership in the Moroccan banks. By the end of 2006, foreign ownership is predominant in five banks that control 21.7 percent of the banking sector assets, collect 25.8 percent of deposits and extent 20.9 percent of credits. The role of foreign capital is even more important when accounting for minority holding in the Moroccan private banks.

*The amount of non-performing loans stood at 35.6 billion DH by the end of 2006 compared to 48.1 in 2004 and 43.6 in 2005. In relative terms, the share of non performing loans in total credits decreased from 19.4 percent in 2004 to 10.9 percent in 2006. The quality of banking loans is even better for private commercial banks where the share of non performing loans is less than 7.4 percent in 2006. There is also a clear trend towards complying with provisioning rules regarding non performing loans. The share of provisions in total NPLs increased from 45.7 percent in 2000 to 71.3 percent in 2006.*

**Table 8:** Non-Performing Loans of Moroccan Banks <sup>(1)</sup>: 2000-2007

	2000	2001	2002	2003	2004	2005	2006	2007
Banking system	17.5	16.8	17.4	18.1	19.4	15.7	10.9	7.9
Specialized banks	36	34.8	37	38.5	43	39	33.2	29
Commercial banks	11.4	10.3	12	13	13.8	9	9	7
Provision <sup>(2)</sup>	47.8	52.9	54.7	54.9	59.3	58.6	71.3	75.2

**Notes:** (1) in percent of Gross assets; (2) in percent of NPLs. Source: IMF.

The upward trend recorded over the period 2002-2004 reflects to a large extent the tightening of classification and provisioning rules introduced in 2002 and for which banks were required to comply with. There is evidence that indicates that a significant part of NPLs in the banking sector in Morocco have been accumulated over the nineties (BAM, 2004), period during which economic growth was low and extremely volatile (Achy and Sekkat, 2007), and credit

risk assessment practices were not rigorous. NPLs were also the legacy of directed credit policies implemented in the eighties and continued provision of credits to unprofitable public enterprises (IMF, 2007).

When compared with the Tunisian banking system, the Moroccan banking system appears to be healthier and more sophisticated. The level of the NPLs is much lower. Nevertheless, specialized public banks are under-capitalized and have insufficient provisions. A sizable portfolio of NPLs is concentrated among large enterprises; these NPLs still weigh heavily on the cost of credit, and consequently penalizes SMEs which are more dependent on banking loans. Table 2 shows that specialized public banks suffer more from the NPLs problem. The significant effort made by stakeholders to clean up the balance sheets of banks—particularly the write-off of a substantial number of NPLs that had been fully provisioned—has already helped to reduce this impact

### **c. Exchange rate regime and exchange rate pass-through**

Inflation-targeting central bankers cannot adequately achieve their accountability and transparency requirements unless the determination of monetary conditions is firmly in domestic hands. This can only be accomplished under flexible exchange rate conditions to ensure that only one nominal anchor of monetary policy is in place.

Morocco has adopted a basket peg regime since 1973. Under that regime, the external value of the dirham has been set on the basis of a basket of currencies that evolved over time to reflect Morocco's foreign trade structure. The objective of the Moroccan authorities was to stabilize nominal and effective exchange rates, and to prevent abrupt variations in the value of the dirham associated with any single currency.

Three main revisions of the basket have occurred over the last 35 years: the first in 1990 through an increase of the weight of European currencies in the basket to reflect Morocco's greater economic partnership with Europe. In 1999, with the launch of the European single currency, the basket structure was again amended: the former national currencies of European countries were replaced by the euro. Finally, the last revision took place in 2001. The composition of the basket was limited to two prominent internal

currencies: the euro and the dollar. The respective weights of each currency are no longer kept secret by the central bank. Recently, the central bank made it public and weights are currently 80 percent of the euro and 20 percent for the US dollar?

### **3.3. Technical pre-requisites**

#### **a. Knowledge of monetary policy transmission mechanism**

One objective of monetary policy is also to smooth output fluctuations and reduce nominal volatility. This should, in turn, reduce uncertainty and, thus, provide a favorable climate for growth. However, the success of monetary policy depends not only on the appropriateness of the decisions taken by the policy making authorities but also on the ability of the remaining economic components of the financial system to process and convey the decision (see Ersel and Kandil, 2000 for further discussions). Hence, more reforms and actions in favor of a better functioning financial system are still needed to help Morocco in dealing with the detrimental effects of volatility.

The monetary authorities should be able to model inflation dynamics in the country and be prepared to forecast inflation under an IT regime and understand how monetary policy affects the key macroeconomic variables (better knowledge about the monetary transmission mechanisms).

The BAM recognizes that more progress is needed with this respect.

#### **b. Technical ability to forecast inflation**

In order for the BAM to act preemptively, it should be able to anticipate future movements in inflation (as well as output gap). BAM is currently considering a mix of models as it looks for an adequate reaction function and tries to produce inflation forecasts as well as their probability distributions. Recently, and thanks to its new law, the BAM has started to use

structural models in order to simulate and predict the impact of its key instruments on the key macroeconomic variables but it does not disclose any information about their outcomes. On another front, it is worth noting that BAM has been indeed endowed since 2005 with a research department<sup>11</sup> in charge, among other things, of forecasting prices and inflation. The BAM continues to strengthen its analytical capacity, and has already fleshed out its analytical toolkit, including its understanding of the monetary policy transmission mechanism. The publication of its monetary policy reports<sup>12</sup>, which present inter alia an assessment of economic developments and an inflation forecast based on a risk-balance approach, demonstrate the progress achieved in modernizing BAM's analytical and forecasting framework. The strengthening of BAM's communication strategy has probably also helped increase the transparency of monetary policy and contributed to better anchoring of inflation expectations. So far, the BAM does not produce does not publish any working paper.

#### ***IV. Concluding remarks and policy recommendations.***

BAM has since 2005 made significant efforts towards meeting the pre-requirement of IT. It is probably the only central bank of the MENA region that has record a significant improvement towards meeting and fulfilling many of the IT preconditions. It has radically changed its chart, developed its technical and forecasting capacity regarding the key macroeconomic variables. It started producing and publishing inflation forecasts. The fiscal deficit as well as the public debt observed in Morocco have been under control during the years 2006- 2007 and consistent with the requirements of IT.

The BAM monetary policies as well as the changes in monetary instruments are announced through regular public information services (annual report, BAM website...). The BAM issues statements to the public on the progress towards meeting monetary policy objectives. The BAM has enhanced significantly its transparency and communication

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<sup>11</sup> See the BAM website.

<sup>12</sup> The BAM has started publishing its monetary policy reports regularly on a quarterly basis since the 2006 in three languages: Arabic, French and English. These reports are downloadable from the bank website.

strategy. It is transparent about its objectives (thanks to the 2005 new statutes) as well as about its technical procedures (the model) it utilizes to reach these goals. BAM started establishing accurate forecasts of inflation and a relatively precise estimate of how inflation is likely to be affected by changes in the monetary policy instrument.

However, studies on monetary transmission mechanism are still lacking implying that BAM knowledge about this issue is incomplete. Indeed, this issue has never been evoked in the BAM's publications (annual reports, brochures...).

Overall, Morocco seems be the candidate most fit for IT in the region and may switch to this regime in the near future.

**A.**

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### III. PREPAREDNESS FOR INFLATION TARGETING IN TUNISIA

Adel Boughrara, Mongi Boughzala<sup>13</sup>

#### ***Introduction***

Recently, the government of Tunisia announced that it is preparing to adopt a monetary policy of inflation targeting (IT) after an indeterminate transition period, and also to move to full liberalisation of capital mobility and full convertibility of the Tunisian Dinar (TND).

Although many financial reforms have been undertaken in Tunisia, many of the preconditions for IT are not yet fulfilled. In particular, the central bank of Tunisia (BCT) lacks independence, and the country lacks a strong and transparent financial system. The banks, which dominate this system, remain fragile, and the severity of their non-performing loans (NPLs) problem undermines their effectiveness in performing their role as the most important channel of financial intermediation and transmission of monetary policy signals. The current situation suggests that Tunisia must undertake major reforms before it adopts a full fledged IT policy. In this paper, we shall describe the needed reforms and the consequences of the failure to implement them.

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<sup>13</sup> This is an updated version of the paper by Boughrara, A., Boughzala, M & H. Moussa “Inflation Targeting and Financial Fragility in Tunisia”, in “Monetary Policy and Central Banking in the Middle East and North Africa” edited by David Cobham and Ghassen Dibeh, Routledge Political Economy of the Middle East and north Africa, 2009.

The rest of this paper is organised in two sections and a conclusion. Section 1 examines the recent history of monetary policy and tries to assess to what extent the Tunisian financial and monetary system is ready for IT. Section 2 presents a simulation of the functioning of IT under financial fragility, which suggests how IT may fail under the current circumstances.

## **1      *The readiness of the Tunisian monetary and financial system for inflation targeting***

There is a consensus among economists and central bankers that in order to successfully implement IT, a country must fulfil a set of quite strong preconditions<sup>i</sup> regarding mainly the efficiency and the role of the central bank and the financial system.

### **1.1. The central bank**

The first fundamental precondition of IT is the independence, accountability and transparency of the central bank. The central bank must be independent above all in order to be able to freely adjust its policy according to its pre-assigned target.

In the case of Tunisia, there is serious doubt about the transparency, accountability and independence of its central bank (Banque Centrale de Tunisie, BCT). The lack of a clear performance indicator, the lack of independence from the executive branch of the government and the composition of its board compromise its independence and its credibility. The governor of the BCT is appointed by government decree and is responsible for the management of all the affairs of the bank. He is assisted by a board whose members are appointed by the government. Six of its ten members, including the governor and the vice governors, are government officers. The other four are chosen according to their professional experience, but also by the government. The composition of the board clearly gives the government a monopoly power over decision making. Given this institutional and governance framework, the BCT has only limited autonomy in terms of goals and instruments. In practice, the BCT is accountable only to the government, primarily to the head of state. The governor of the BCT has behaved as if he were a member of the government. There is only a vague

notion of accountability of the BCT to the public, which emphasises responsible management of its affairs, and there are no explicit benchmarks to measure the BCT's performance in terms of the achievement of its goals.

As for the transparency of the BCT, there are indeed auditors whose role is to check the accounting practices of the central bank. The auditor general is empowered to make propositions to the board. Every year, he writes an annual report on the conduct of the bank's affairs for the minister of finance, but it is a routine auditing procedure unrelated to monetary policy and insufficient to anchor expectations. The Tunisian law 58-90 requires that the board publishes a short statement every month but the amount of information provided to the public concerning monetary policy in this statement has been meagre and limited to some vague comments on financial and monetary aggregates, prices, economic growth and exchange rates. The bank's decision about the interest rate that it will enforce in the money market during the following month is announced at the end of the statement but it rarely changes in response to changes in the economic indicators.

## **1.2. The soundness of the Tunisian financial system**

The ability of the central bank to implement a well defined strategy depends on the degree of development of the country's financial markets and its stability. To prevent financial instability, the BCT has until the recent past tightly controlled interest rates, the amount and distribution of credit, and the banks. Bank lacked the incentive for good management and were pushed to take excessive risks, making the system even more fragile. More recently, measures have been taken to strengthen the enforcement of prudential rules, which has led to some improvement of this system, but it remains fragile and under stress. This means that they are likely to lobby the government for relief through any available channels and this undermines the functioning of monetary policy. For instance, higher short term interest rates intended to reduce inflationary pressures are likely to hurt fragile banks more severely and make them even more fragile. A fragile banking system may also be unable to deal with free capital mobility and exchange rate volatility, given that IT requires exchange rate flexibility.

In Tunisia, the securities market is still small and securities constitute only a small portion of the financial system's assets. Despite a sharp increase in the volume of trading and

capitalisation since the implementation of the 1989 and 1994 reforms, market capitalisation represented only 8.8 per cent of GDP in 2007 while the annual value of trading amounted to only 1 per cent of GDP, which is very small compared to other emerging markets. Moreover, the bond market is dominated by government securities, which represent over 85 per cent of the outstanding bond instruments, and the secondary market is in its infancy. Finally, non-bank financial institutions (insurance companies, pension funds, collective investment institutions and investment companies) play a relatively small role in the Tunisian economy. Their assets represent only 22 per cent of GDP.

The banking system remains the backbone of the financial system. It was composed of 14 commercial banks, 6 development banks and 8 offshore banks in 2006.<sup>ii</sup> The commercial banks dominate with 64 per cent of the total assets of the financial institutions, and the state controlled banks dominate the banking sector (the state controls the three largest banks and more than half of the banking system's assets).

Many reforms have been implemented and laws passed to change and modernize the Tunisian financial system over the last decades. For instance, prior to 1995, the BCT and the ministry of finance in Tunisia controlled on behalf of the government almost every aspect of bank credit and management, and the banks were required to invest various proportions of their deposits in support of economic activity in various sectors that the government designated as priority sectors and to allocate a large portion of their wealth to buy government debt. This has changed quite radically. In July 2001, the Tunisian government has also introduced a new banking law, Law 2001-65, in order to strengthen bank supervision and to help banks deal with the new economic and regulatory environment. The new law removed most of the previous qualitative and quantitative restrictions on bank lending even though the government imposed new restrictions to help it maintain its control of credit and interest rates.

**Table 1: Commercial banks soundness indicators in Tunisia**

	2000	2001	2002	2003	2004	2005	2006 <sup>1/</sup>
Capital adequacy ratio	13.3	10.6	9.8	9.3	11.6	12.4	11.8
Private banks	11.5	10.4	10.0	8.4	12.4	13.5	12.8
Public banks	15.0	11.0	9.4	10.8	10.1	10.0	9.2
NPLs (percent of gross assets)	21.6	19.2	20.9	24.0	23.7	20.9	19.2
Private banks	15.3	16.1	18.1	21.6	20.4	20.0	18.7
Public banks	26.8	22.8	24.3	26.7	27.4	22.1	19.7
Provisions (percent of NPLs)	49.2	47.4	43.9	43.1	45.8	47.4	49.2
Private banks	54.7	47.7	44.9	39.9	43.5	45.9	48.4
Public banks	46.6	47.1	42.9	46.2	47.6	49.1	50.0
Return on assets	1.3	1.1	0.7	0.6	0.4	0.5	0.2
Return on equity	13.7	14.0	8.0	7.6	5.1	6.5	9.1

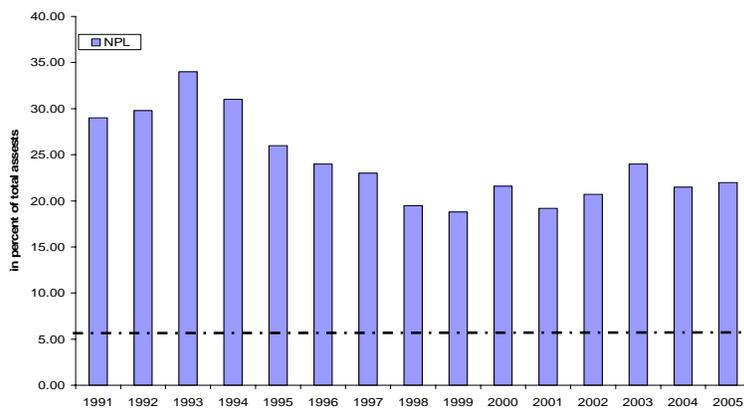
Source : Tunisian authorities and « Pierre-Richard Agénor & ndiamé Diop »

Law 2001-65 requires the management of every bank to maintain the value of its assets after deflating them by appropriate risk factors above the total value of its liabilities, by an amount greater or equal to its minimum paid in capital. Article 21 of the 2001-65 law prohibits a bank from investing more than 10% of own funds to acquire interest in a single non-financial business and from owning directly and/or indirectly more than a 30 per cent share of the capital of a non-financial institution and of engaging in businesses other than banking. However, Article 21 of the 2001-65 law allows a bank to own any share of the capital of another financial institution. Clearly, the goal of these restrictions is to enhance transparency and prudential management, while allowing room for mergers of banks and other financial institutions, and to improve the quality of the banks' management and balance sheets according to the core principles of Basle II. However, not all Basle II principles are yet satisfied. BCT announced that it is implementing a plan over the years 2009 and 2010 in order is to comply with Basle II more fully.

The Tunisian law 2001-65 invests the BCT with the power to obtain any information about any aspect of the financial situation of any credit institution. The BCT can request any credit institution to provide it with information on any of its activities or its financial position, and

can also demand to examine the books of any credit institution on the spot and demand an audit of any bank by an outside auditing firm. One might think that the new law and these powers should have insured that every bank is transparent, endowed with a good risk management system, and thus profitable. Banks would then have a small and sustainable percentage of non-performing loans and adequate provisions to face any likely risk. In fact, based on the statistics on non-performing loans, this is not the case, both for private and public banks, but, not surprisingly, public banks have a higher ratio of non-performing loans (24.3% for public and 18% for private in 2002). Obviously, the central bank is not using all its legal powers and instruments to rigorously implement the existing regulation and avoid such a low performance. .

**Figure 1:** NPLs in Tunisia



**Source:** Banque Centrale de Tunisie

### 1.3. Monetary and fiscal policies

Targeting broad money growth, in addition to pursuing a highly managed exchange rate regime, has long been the core of the BCT's monetary policy. Since the early 1990s Tunisia has followed a constant real effective exchange rate rule in an effort to index its nominal exchange rate to the domestic price level in order to protect the competitiveness of Tunisian producers. The BCT has interpreted this rule with some flexibility in order to smooth movements in the nominal exchange rate. This exchange rate policy has been quite successful. The absence of major terms of trade shocks and the maintenance of strict capital controls for

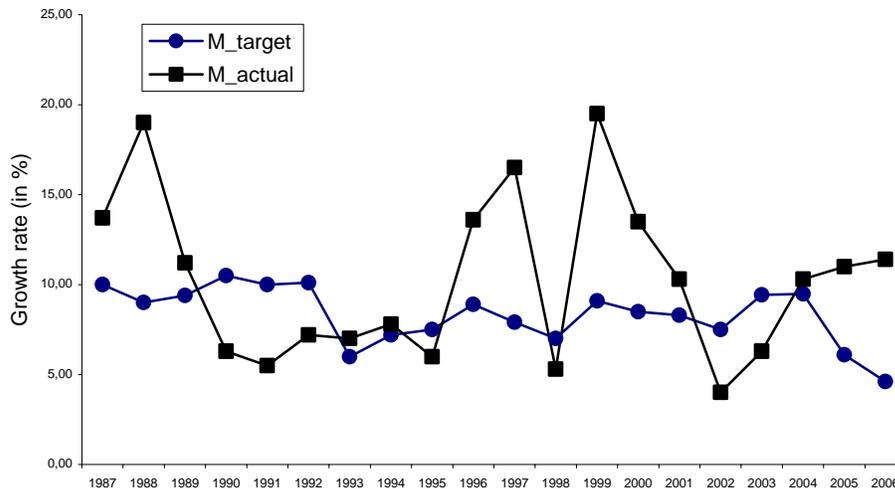
residents and non-residents (except for foreign direct investors) have obviously facilitated the BCT's task.

Targeting money growth remains, in principle, the main feature of the current monetary policy. The banking law provides the central bank with a variety of instruments to reach this target but most of them are in fact intermediate instruments that serve to control the volume and distribution of credit and thus the money supply. The BCT's board is empowered by law to decide about the interest rate (the TAO<sup>iii</sup>) applicable to the BCT's purchase and resale of securities, and to fix the amount of currency the BCT will inject or withdraw from the money market.

The main procedure for money control has been through competitive tenders over credit lines open to all banks for up to three months and renewable no more than twice. The BCT also makes shorter term advances to banks, overnight or up to one week, at a higher interest rate (one full point higher or 100 basis points).

It is remarkable that the procedure for competitive tenders actually followed since the mid 1990s has generally been such that the BCT maintains the previously applied interest rate and asks banks to specify only their demand for liquidity. This amounts to a de facto control of short term interest rates. Given that banks are quite dependent on its resources, the BCT usually satisfies their liquidity requests in order to keep interest rates stable. There are periods when the banks become rather over liquid and become less sensitive to BCT interest changes. The BCT has also managed to exercise a quantitative control on the amount and distribution of total credit in the country. The point is that *in practice* the system has not systematically operated according to the strict rules of monetary targeting, and the targets have often been missed; the gap between the targeted value of M2 (M3 since 2003) and the actual value exceeded the 2% level more than 60% of the time during the period 1987-2002 (see figure 6.2). This gap exceeded 8% during the years 1988, 1996 and 1999, which means that the BCT was not providing accurate guidance to private decision makers on which they could base their expectations (Boughrara, 2006).

**Figure 2:** Actual and targeted monetary growth



Source: IMF financial statistics

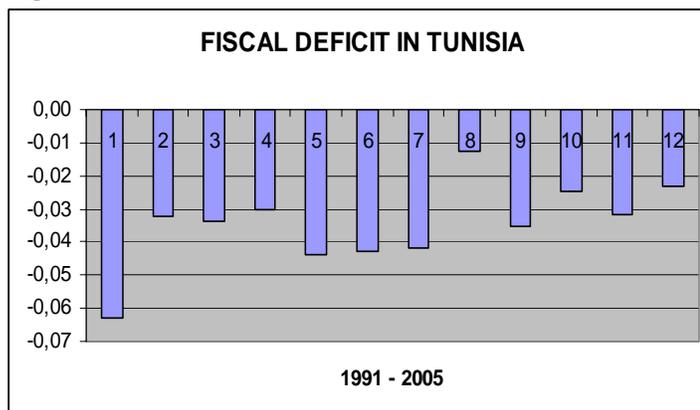
It seems that BCT has in fact been more concerned about the exchange rate than about money targeting. Since it can't use a real exchange rate targeting and a money supply growth rate rule at the same time, the exchange rate targeting have been rather overriding.

BCT's policy seems to be driven also by the fear of financial system instability and by the government's economic development policy and its fiscal deficit than by the rules of its monetary policy. As a result of various contingencies and the government need to meet the financial exigencies of its liabilities, the BCT had to meet requests for liquidity put forward indirectly by the government through the commercial banks, and hence to deviate from its money target. Banks had to supply credits to meet government needs and other demands backed by the government authorities.

IT requires a sound fiscal policy, and fiscal discipline is a main pillar for the credibility of the central bank's independence and the viability of the country's financial institutions. Fiscal dominance means that high pressures may be put on the financial system and the central bank to finance the government budget deficit.

BCT does not supply funds directly to the government. It may be argued that the fiscal reforms implemented during the 1990s established new rules and institutions that have led to more fiscal discipline and contributed to the lowering of the inflation rate. The government has also adopted relatively more transparent and more market-based debt management instruments. The government is now required to issue and sell new bonds on the open market to finance its deficit. These reforms led to the development of the government debt market and improved the incentive for the government to master its deficit and to practice fiscal discipline.

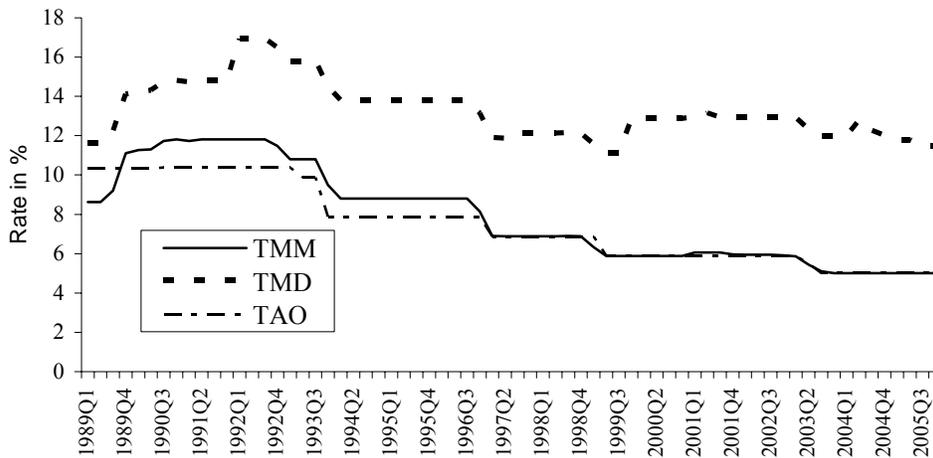
**Figure 3:** Fiscal deficit in Tunisia 1991-2002



However, these improvements do not mean that monetary policy had been completely freed from fiscal dominance and that the government now abided by the rules of fiscal discipline. A closer look at the indirect links between fiscal and monetary policies reveals that monetary policy remains subservient to fiscal policy and continues to accommodate the government's fiscal needs. This accommodation operates through several channels. One such channel is a tacit agreement that prevailed at least since the mid-1980s according to which every time the Ministry of Finance decides to issue and sell additional government bonds, the BCT systematically launches a competitive tender for a corresponding additional injection of

liquidity in the money market. In a growing economy, independence of the monetary authority does not require that it should not increase money supply by purchasing government debt, and the point here is not so much to question the existence of a harmonisation procedure, which is desirable to some extent, but that the additional liquidity is large enough for all the banks to get the liquidity they need to buy the new government bonds with no increase in the money market interest rate as already mentioned. Figure 4 shows how all the major rates are rigidly linked to the TAO, the key BCT rate, including the average money market rate (TMM) and the maximum rate of bank overdraft, TMD. TMD may be taken as a proxy for the loan rate.

**Figure 4:** Main interest rates in Tunisia.



Source: BCT

Direct coordination between fiscal policy and monetary policy is not the only mechanism leading to fiscal dominance. The government has carried important contingent liabilities in the form of arrears, especially during the 1980s and 1990s. The published fiscal deficit being calculated on the cash basis and not on the accrual basis, only completed transactions are accounted for and the arrears do not appear. In some years, these arrears built up and had to be settled through central bank financing. For instance, between 1996 and 1999, BCT had to refinance important government arrears, which led to a fast growth of M2, well beyond its

target. More recently, some measures have been taken to deal with this arrear issue and to avoid off-budget transactions. Significant progress has been achieved but the system does not seem totally immunised against this sort of risk yet.

## **2      *Simulation of the effectiveness of inflation targeting under financial fragility***

We use for this simulation exercise the proportion of non-performing bank loans as an indicator of the financial fragility of the Tunisian economy. Obviously, the default risk of financial institutions is reflected by the banks rate of NPLs, given that the secondary market for government bonds is insignificant and the financial market is small. Our aim in this section is to use a simple macroeconomic model to simulate the impact of adopting IT. More precisely, we simulate under an IT regime the impact of an interest rate shock (increase) on NPLs, the demand for central bank liquidity and inflation. The outcome shows when the banking system depends on the central bank the likelihood of a failure of IT increases.

Even though some of the equations have been deliberately simplified, this model is meant to capture the main features of the Tunisian system. The purpose is not to provide accurate magnitudes for the aggregates to be simulated; it is merely to illustrate the risks presented by an IT monetary policy under financial fragility.

### **2.1. The model**

Let  $y_t$  be the aggregate supply or real GDP,  $y_t^n$  is potential output, and  $y_t^g$  is the output gap.<sup>iv,v</sup> By definition-

$$y_t = y_t^n + y_t^g \quad (1)$$

We compute the output gap by estimating the potential output  $y_t^n$  using the Hodrick-Prescott filter.<sup>vi</sup>

Our main concern is to understand to what extent IT can operate successfully under the current Tunisian financial system and under various scenarios. We assume that the initial objective is to bring inflation down to a certain level. Then we consider different scenarios, some with favourable unexpected shocks and others with significant unexpected negative exogenous shocks. We also assume that these shocks are high enough to induce a significant drop in the rate of growth of real GDP and an increase in the rate of unemployment. In Tunisia, likely exogenous shocks are changes in the terms of trade or rainfall. External shocks are expected to become more likely and more severe in the near future as Tunisia opens up further both its trade and capital flows.

The second component of the model deals with the demand for and supply of loans. First, the interest rate structure is assumed to include two main rates: the central bank's main instrument, the interest rate ( $i_t$ ), and the commercial banks' lending rate ( $R_t^L$ ), the difference being the spread ( $s_t$ ). The demand for bank loans is an increasing function of GDP ( $y_t$ ) and a decreasing function of the interest rate  $R_t^L = (i_t + s_t)$

$$L^d = L(y, R^L) \quad \left( \frac{\partial L^d}{\partial y} \geq 0 \text{ and } \left( \frac{\partial L^d}{\partial i} \right) \leq 0 \right) \quad (2)$$

We assume that the interest rate channel of the monetary transmission mechanism operates through the demand for loans. The credit channel or the loan supply side may be operational too but we have not been able so far to provide a solid empirical proof of this. Above all, our interest is to investigate the dynamics generated when banks are willing to satisfy the demands for credits that have gone through their screening process, knowing that the central bank will support this strategy with more central bank credits when the firms' demand for credit increases, and vice-versa. Thus loan supply ( $L^S$ ) is determined by loan demand, given the loan screening process followed by the banks:

$$L^S = L^d(y_t, i_t + s_t) \quad (3)$$

We are therefore implicitly assuming that the loan market equilibrium is not obtained through changes in  $R_t^L$  as a result of changes in the spread given  $i_t$ ; which means that any change in the central bank rate ( $i_t$ ) is fully (or almost fully) transmitted to the loan rate.

Given the high rate of NPLs, the aggregate loan supply granted to firms will be expressed as the sum of non-performing loans (NPL) and good quality loans (PL):

$$L^S = \text{NPL} + \text{PL} \quad (4)$$

As stressed in the beginning of this section, our emphasis will be on the dynamics of the NPLs as a measure of the performance of the banking sector. Thus, we model the share of non-performing loans in total loans as a function of contemporaneous and lagged macroeconomic variables such as economic growth, inflation, interest rates, the exchange rate, and deposits. A high rate of NPLs is, however, basically the outcome of poor risk management and signifies that not enough has been done to deal with the adverse selection and moral hazard problems linked to loan screening and management.

A fairly simple specification of the NPL dynamics could be expressed as follows:

$$\text{NPL}_t = f\left(y, y_t^g, a_t\right) \quad (5)$$

When output improves borrowers are less likely to default and NPLs should decrease; consequently, the sign of  $\left(\partial \text{NPL} / \partial y_t^g\right)$  is expected to be negative. Higher economic growth is expected to have a positive impact on the banks' asset quality and to lead to financial development. Either  $y$  or  $y^g$  could be used here; which one is omitted will be decided empirically.  $a_t$  stands for the banks' profit rate, which is a measure of their performance and a proxy for good management. So NPLs fall when  $a_t$  increases. When banks are managed better they operate a more efficient loan screening and monitoring process, and hence they allow for less NPLs. Nevertheless, the profit rate is a function of (or is correlated with) a set of variables:

$$a_t = g\left(R_{t-i}^L, \pi_{t-i}, D_{t-i}, \text{CCB}_{t-i}, \text{NEER}_{t-i}\right) \quad (3)$$

$\pi$  is the inflation rate,  $D$  denotes deposits,  $\text{CCB}$  stands for credit obtained by banks from the central bank, and  $\text{NEER}$  is the nominal effective exchange rate. The lag  $i$  will be determined empirically. The profit rate does not necessarily increase when the loan rate increases since an increase of the (real) interest rate may worsen the banks' asset quality, leading to a higher rate of default. Arguably, following Stiglitz and Weiss (1981), this would be the outcome of

imperfect and asymmetric information in the credit market leading banks to follow an adverse selection process. When the loan rate increases banks are led to select a larger share of riskier projects proposed by less ‘honest’ borrowers.

One might expect that the profit rate would decrease when the inflation rate increases because of the depreciation of the banks’ assets; actually this is not certain since the effect of an increase in inflation depends on whether it was anticipated or not, how flexible lending rates are, and whether the increase signals general economic instability. An increase in the nominal exchange rate is also likely to generate losses but this depends on the structure of the banks’ assets and liabilities. Though the NEER variable seems to be an important transmission channel and a determinant of the NPL dynamics, the behavioural equation that describes its dynamics has not been integrated into the model for the sake of simplicity.<sup>vii</sup> We may, however, consider an unexpected exogenous depreciation of the national currency and study its impact using this model. In general, when the currency goes into free fall, the banks may be rendered insolvent through a combination of the following channels: the sudden increase in the value (measured in domestic currency) of their foreign liabilities, the defaults on bank loans by domestic corporations bankrupted by the soaring of their external debts, and the defaults on bank loans by exporters who could not get short-term credit from their foreign suppliers of inputs.

Higher CCB indicates that a bank is under stress and is making fewer profits. Hence, the NPL equation, which describes how NPLs vary over time, becomes:<sup>viii</sup>

$$NPL_t = \Psi \left( y_t, y_t^g, R_{t-i}^L, \pi_{t-i}, D_{t-i}, NEER_{t-i}, CCB_{t-i} \right) \quad (7)$$

From the profit function analysis, we may conclude that the derivative of the NPLs function with respect to the interest rate on loans  $\left( \partial NPL / \partial R^L \right)$  is expected to be positive. A priori, its partial derivative with respect to inflation may be either positive or negative. As for the exchange rate, its effect depends on the composition of outstanding credit (i.e., the size of

unhedged positions and the share of borrowers whose business benefits from a given change in the exchange rate). In the case of Tunisia, we expect it to be negative.

Deposit supply, which appears in equation (7), is a function of output and the interest rate on deposits:

$$D^s = D(y, R^d) \quad (8)$$

With  $R^d = (i_t - s_t^*)$ ,  $(\partial D / \partial y) \geq 0$ , and  $\partial D^d / \partial R^L \geq 0$ . The variable  $s_t^*$  stands for the difference between  $R^d$  and  $i_t$ , and is different from  $s_t$ . As for the deposit demand, it is assumed to be equal to the households' supply (of deposits). The deposits market may reach equilibrium through movements in the deposit interest rate as a result of variations of the spread. Banks compete over deposits.

CCB is the amount of credit requested from the central bank and reflects the dependence of the banking system on the central bank. It is derived from the banks' balance-sheet, on the assumption that NPLs are worthless. The balance sheet links the sum of banks' liabilities (deposits plus loans from the central bank) to their assets (assets in stocks and securities B, reserves P and net loans, i.e. total minus NPLs), and may be written in the following form:

$$CCB + D = B + P + (L - NPL)$$

or equivalently:

$$CCB + D = B + P + L^*$$

with  $L^* = L - NPL$ ,<sup>ix</sup> which gives:

$$CCB = B + (L - NPL) + P - D \quad (9)$$

B stands for the banks' assets in stocks and securities and P denotes the amount of legal reserves. Because of the shallowness of the financial system and the absence of a viable secondary market for government securities, when banks lack liquidity or have excess liquidity they tend to turn to the central bank for relief. This dependency on central bank financing reflects their fragility.

To describe the inflation dynamics, various specifications, often of the Phillips curve type, may be considered: hybrid, forward-looking, backward-looking (Estrella, 2002; Svensson, 2002). The specification we have adopted in this paper is again a simple one:

$$\pi_t = \Pi\left(\pi_{t-i}, i_{t-i}, y_t^g, CCB_{t-i}, h_{t-i}\right) \quad (10)$$

where  $(\partial\Pi/\partial i) \leq 0$ ,  $(\partial\Pi/\partial y_t^g) \geq 0$ ;  $(\partial\Pi/\partial CCB) \geq 0$  and  $(\partial\Pi/\partial h) \geq 0$ .

These assumptions say in particular that inflation might be brought about by the ability of the central bank to resist pressure coming from the banking system, expressed by the CCB level, and to other external pressures pushing it to supply more money,  $h_{t-i}$ . ( $h_{t-i}$ ) is assumed to be a monetary shock generated by a past and persistent fiscal deficit. It is a proxy for fiscal pressure.

## 2.2. Simulations

The macroeconomic model described in the above section is allowed to work through its dynamic path from 1988:Q1 to 2005:Q3 to provide estimates of the endogenous variables in what we call the control or base run. Our main purpose is to simulate the impact of moving to an IT framework, while holding constant all the other exogenous conditions affecting the economy, notably those affecting inflation and NPLs.<sup>x</sup> We then change only the exogenous policy variable, under ceteris paribus conditions, and allow the model to run again through the same temporal path so as to yield a new set of estimates (the policy solution). The difference

between the base run and the policy solution is attributed to the policy under consideration. The main idea behind this is to assess the soundness of the banking system and the efficiency of IT. Will the target be reached or missed? Would this interest rate destabilise the system? In particular, can the system reach its target even when important domestic or external shocks happen along the way? On the supply side, unexpected shocks linked to foreign trade or capital flows are assumed. Our primary focus in the simulation exercise has been put on the inflation and NPL dynamics.

The behavioural equations of the model have been estimated by the seemingly unrelated estimator of Zellner with data described in appendix A and the methodology in appendix C. The result is summarised in table 2.

**Table 2:** Estimates of the behavioral equations.

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$L_t = 0.098 + 0.811 L_{t-1} + 0.18 D_t + 0.013 REER_t - 0.01 i_{t-1}$
(1.447) (17.597) (4.016) (2.741) (-1.795)
$R^2 = 0.998$ DW=1.83
$\pi_t = 1.141 + 0.908 \pi_{t-1} - 0.033 \pi_{t-3} + 4.233 \Delta REER_t + 0.312 y_{t-2}$
(-0.893) (14.864) (-5.239) (4.224) (3.453)
$R^2 = 0.85$ DW=1.61
$NPL_t = -0.225 + 0.043 CCB_{t-1} - 0.035 CCB_{t-2} + 0.703 NPL_{t-1} + 0.312 NPL_{t-2} + 0.011 i_{t-6}$
(-1.248) (3.026) (-2.550) (5.890) (3.20) (1.955)
$R^2 = 0.990$ DW=2.04

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Note: Numbers between parentheses are t-ratios.

It is worth mentioning that some of the explanatory variables turned out to be statistically not significant, and hence have been dropped. The spread  $s_t$  has been proxied by the difference between the maximum rate on bank overdrafts, TMD, and the money market rate  $i$ . The behavioural equation describing the deposit supply dynamics was not reported because data on the spread  $s_t^*$  are not available. Therefore,  $R_t^d = (i_t - s_t^*)$  could not be computed. Deposit dynamics are therefore assumed to be exogenous to the model. Our judgment is that this assumption will not affect substantially the simulation outcomes. Indeed, from the specification tests and the graphics (see appendix B), the equation specification seems to be

satisfactory since the structural model fits the data quite well. The simulated variables exhibit dynamics that are quite close to the actual series.

In the scenarios considered, we assume that the economy has just adopted an IT strategy with an inflation target around 2.5%. We start the simulation exercise with inflation above the target inflation rate as observed at the end of 2001. Then, the central bank decides a large interest rate increase to lower inflation.

We consider an increase of the actual rate by either one or two percentage points decided in 2001:Q4. Formally, the dynamics of the simulated interest rate are as follows:  $R_t^{\text{sim}} = R_t$  if  $t < 2001:Q4$  and  $R_{t+x}$  otherwise, with  $x \in \{1, 2\}$ . The simulation exercise has been run under two different assumptions as regards the output gap, either the base run or a negative output shock occurring unexpectedly right after the interest rate increase. Will the economy and the financial system withstand this monetary decision and the negative supply shock?

The answer is given in table 3 where inflation and NPL dynamics are reported. Inflation is expressed in percentage points while NPLs are in log terms. Hence a change in this NPL measure gives their growth rate; for instance a change in NPLs from 8.4 to 8.5 means a growth rate equal to 0.1 or 10%.

**Table 3:** The dynamics of inflation and NPLs under the two scenarios

	interest rate	NPLs					Inflation				
		Base run	one-zero	one-one	two-zero	two-two	Base run	one-zero	one-one	two-zero	two-two
2000Q4	5.88	8.16					1.65				
2001Q1	6.06	8.21					1.15				
2001Q2	6.06	8.25					1.56				
2001Q3	6.06	8.28	8.39	8.34	8.35	8.32	2.53	3.16	3.22	3.15	3.22
2001Q4	5.96	8.21	8.40	8.36	8.36	8.33	3.70	3.17	3.21	3.15	3.23
2002Q1	5.94	8.27	8.43	8.39	8.38	8.35	3.80	3.33	3.46	3.32	3.48
2002Q2	5.94	8.28	8.45	8.41	8.40	8.37	3.26	2.94	3.14	2.93	3.15
2002Q3	5.95	8.34	8.43	8.40	8.37	8.35	2.04	2.68	2.99	2.66	2.99
2002Q4	5.91	8.28	8.44	8.42	8.38	8.36	2.00	2.63	3.12	2.63	3.12
2003Q1	5	8.28	8.47	8.44	8.40	8.38	1.40	2.05	2.46	2.05	2.46
2003Q2	5.44	8.34	8.47	8.45	8.42	8.40	2.07	2.21	2.60	2.21	2.60
2003Q3	5.1	8.37	8.51	8.49	8.46	8.44	3.43	2.38	2.74	2.39	2.73
2003Q4	5	8.38	8.51	8.49	8.47	8.45	4.50	2.56	2.80	2.56	2.78
2004Q1	5	8.47	8.56	8.54	8.53	8.51	4.74	2.55	2.68	2.54	2.67

Notes: The NPLs series are reported in log-level. The interest rate given is that for the base run.

In table 3 the ‘one-zero’ column reports the results for the 1% interest rate increase scenario without any output shock, the ‘one-one’ column reports the results for the 1% interest rate increase scenario with a one standard deviation negative exogenous output shock (more exactly one standard deviation of the unanticipated component of the output); likewise for the ‘two-zero’ and the ‘two-two’ columns, which report respectively the results for a 2% interest rate increase without and with a two standard deviation negative exogenous output shock. The supply shock happens right after the moment the BCT decides to increase its interest rate. Under the base run, if no action is taken, inflation starts increasing significantly in the third quarter of 2001 and reaches 3.7% in the next quarter while the target is 2.5%, and it would reach 4.5% two years later after some fluctuations. Simultaneously, NPLs would be increasing steadily, at about 8% per year (17% over the two year period).<sup>xi</sup>

It is clear that as a result of the central bank decision to raise the interest rate by one or two percent, if no negative output shock occurs, inflation is basically controlled quite rapidly, since it is brought back to around the 2.5% target in about a year and stabilised. However, NPLs growth increases even more as it reaches about 25% in the same two year period in both cases, which is a very high growth rate. Hence, even though the inflation target is reached the banking system becomes more fragile.

The outcome is more significant in the case where a negative output shock occurs. Here, NPLs grow a little faster than in the previous case, but more importantly the inflation target is missed. Inflation at first falls erratically and then starts to rise again; at the end of 2003, it is 2.8% in the ‘one-one’ case and 2.78% in the ‘two-two’ case. A larger interest rate increase is thus counter productive, so it does not help to use the interest rate lever more intensively.

Consequently, the simulation outcomes throw doubt on the effectiveness of IT under the present situation of the banking system. Because the system is too fragile, a negative supply

shock will limit the effectiveness of IT. A similar failure of the IT policy may be obtained whenever the central bank finds itself under the obligation to create more high powered money or to satisfy any external pressure, for instance as a result of a high fiscal deficit that the government could not manage to finance otherwise.

### **3 Conclusion**

The overall conclusion is that many reforms and actions remain to be undertaken before the final move to an IT framework, especially in terms of financial soundness, fiscal discipline and institutional and governance structure. Independence of the central bank remains a crucial condition. A deep transformation of the financial system is in fact necessary for the success of any sound monetary policy. It is possible to make the banking system stand on its own feet in a reasonable period. The required reforms could be introduced in Tunisia but they are not costless in terms of institutional and political requirements, and they remain a political economy issue. It took Turkey a serious crisis to make the radical decision to switch to IT and to go through the required reforms after years of turbulence and unsound monetary policy. For the moment, the cost of doing so and the uncertainties about the obstacles make this transition rather uncertain in Tunisia. Because the financial system is not yet ready for IT, it would be risky to move to IT soon. However, other countries' experiences (e.g. Turkey, Poland) show that it should not be excluded. IT is in any case not the only option for Tunisia.

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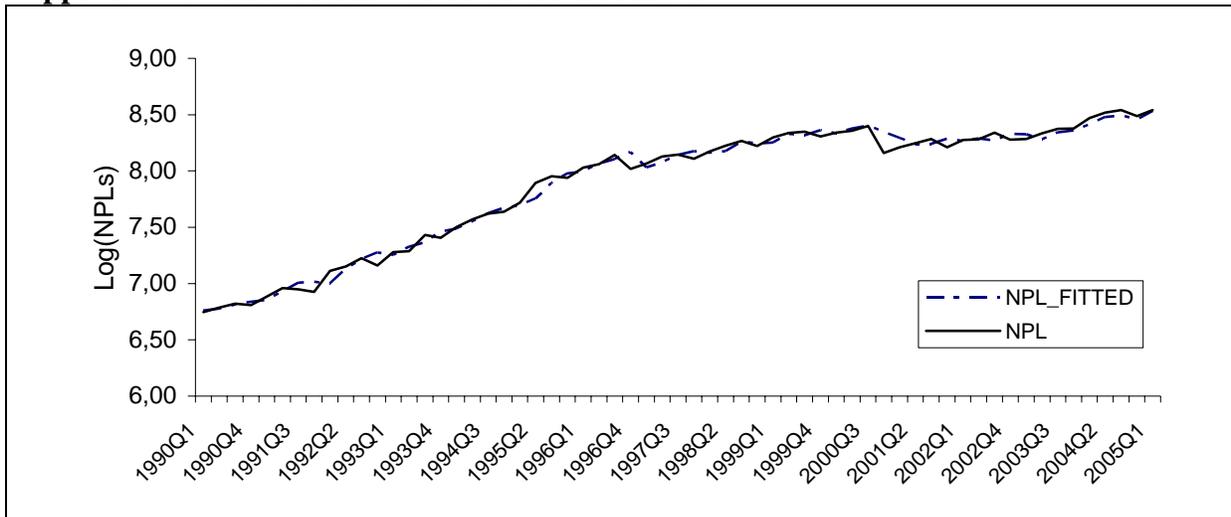
*Experience,* November 14-15, Bank of Mexico.

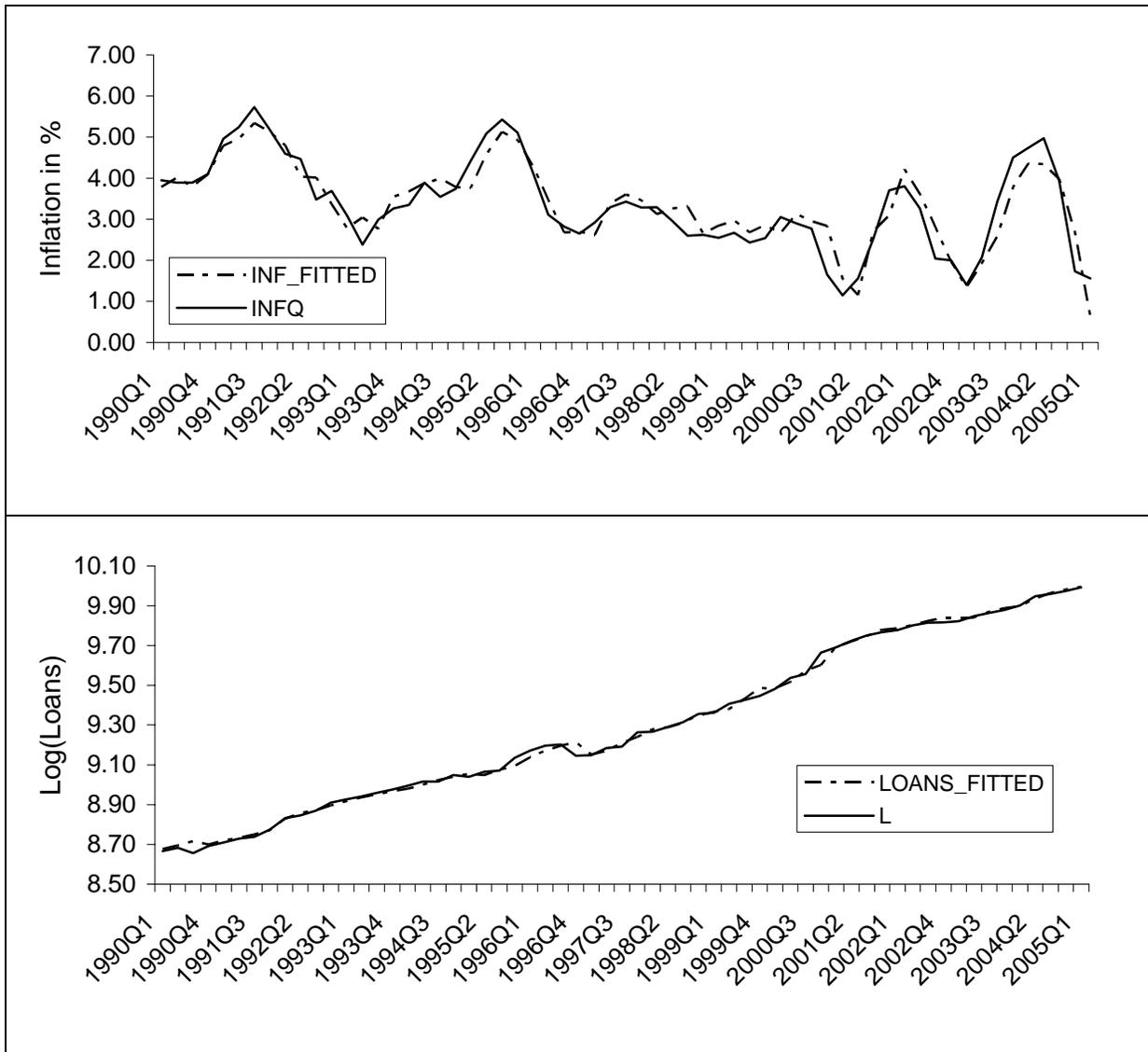
## Appendix A: Data description and sources

Variable	Name	Source
Consumer price index	CPI	IMF, IFS CD-ROM
Nominal effective exchange rate	NEER	IMF, IFS CD-ROM
Bank loans to households and firms	L	IMF, IFS CD-ROM
Real bank loans	BL	Computed as L/CPI
Short-run (nominal) interest rate	TMM	Central bank of Tunisia
Interest rates on Deposits	$R^D$	Central bank of Tunisia
Interest rate on Loans	$R^L$	Proxied by the maximum rate of bank overdraft (TMD)
Bank deposits	D	IMF, IFS CD-ROM
Real GDP	$y_t$	IMF, IFS CD-ROM
Non-performing loans	NPL	Proxied by frozen loans (Central bank of Tunisia)
Capital adequacy ratio	CR	Computed as CR= bank capital/total assets
Inflation rate	INFQ	Computed as $\text{Log}(CPI_t) - \text{log}(CPI_{t-4})$
Real effective exchange rate	REER	IFM, IFS CD-ROM
Credit from Monetary authority	CCB	IMF, IFS CD-ROM
Reserves	RV	Central Bank of Tunisia

Note: All the variables are available on quarterly frequency except the real GDP which is available on an annual frequency. The Chow-Lin procedure has been used to generate quarterly figures. The basic idea here is to find some GDP-related quarterly series (notably the industrial production index) and come up with a predictive equation by running a regression of annual GDP on annual related series. Then, the quarterly figures of the related series are used to predict the quarterly GDP figures, and adjusted to match the annual aggregates. This disaggregation procedure has been widely used in other works (see for instance, Abeyasinghe and Ajaguru 2004; Frain, 2004; Bloem et al. 2001).

## Appendix B: Actual versus filtered variables: base run





### Appendix C: Econometric estimation

The behavioural equations of the model have been estimated by the seemingly unrelated estimator of Zellner with data described in appendix A. Each of the behavioural equations (equations Eq.(3), Eq.(7) and Eq.(10)) could be written in the following form:

$$Y_i = X_i\beta_i + u_i \quad (C1)$$

$Y_i$  is a  $T \times 1$  vector of observations on the  $i^{\text{th}}$  dependent variable,  $X_i$  is a  $T \times k_i$  matrix with rank  $k_i$ , of observations on  $k_i$  independent variables,  $\beta$  is a  $k_i \times 1$  vector of regressions coefficients and  $u_i$  is a  $T \times 1$  vector of random error terms, each with mean zero. The system of behavioural equations could be written as:

$$\begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \end{bmatrix} = \begin{bmatrix} X_1 & 0 & 0 \\ 0 & X_2 & 0 \\ 0 & 0 & X_3 \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \end{bmatrix} + \begin{bmatrix} u_1 \\ u_2 \\ u_3 \end{bmatrix} \quad (\text{C2})$$

Or more compactly, as:

$$Y = X\beta + U \quad (\text{C3})$$

Where  $Y = [Y_1', Y_2', Y_3']'$ ,  $\beta = [\beta_1', \beta_2', \beta_3']'$ ,  $U = [u_1', u_2', u_3']'$  and  $X$  stand for the block diagonal matrix on the right hand side of equation (C2). The  $T \times 1$  vector  $U$  in equation (C3) is assumed to have the following variance-covariance matrix:

$$\Omega = \begin{bmatrix} \sigma_{11} & \sigma_{12} & \sigma_{13} \\ \sigma_{21} & \sigma_{22} & \sigma_{23} \\ \sigma_{31} & \sigma_{32} & \sigma_{33} \end{bmatrix} \otimes I_T = \Sigma \otimes I_T \quad (\text{C4})$$

Where  $I_T$  is a unit matrix of order  $T \times T$  and  $\sigma_{ij} = E(u_{it}u_{jt})$  for  $t=1,2,\dots,T$  and  $i,j=1,2,\dots,3$ . Having at hand the set of the above regression equations, the regression coefficients are therefore estimated simultaneously by applying Aitken's generalised least-squares to the whole system of equations. The best linear unbiased estimator by this method takes the form:

$$\hat{\beta} = \left( W' (\Sigma^{-1} \otimes I_T)^{-1} W' \right)^{-1} \left( W' (\Sigma^{-1} \otimes I_T)^{-1} Y \right) \quad (C5)$$

While the variance-covariance matrix of the estimator is given by:

$$\text{Var}(\hat{\beta}) = \left( W' (\Sigma^{-1} \otimes I_T)^{-1} W' \right)^{-1}$$

This estimation procedure yields coefficient estimators at least asymptotically more efficient than single equation least-squares estimators.

**FORMAL INFLATION TARGETING EXPERIENCE  
of TURKEY: 2006-2007**

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## INTRODUCTION

In mid-May 2001, just three months after the February crisis, Turkey started to implement a new economic program. One major integral part of the program was to overhaul the failing banking system. The restructuring program for the banking sector, inevitably, increased public debt-to-GDP ratio sharply. Therefore, other targets of the program, i.e. macroeconomic discipline and the ambitious agenda for structural reforms had to be achieved under severe fiscal dominance.

At the beginning of 2002 the Central Bank of Turkey (CBT) announced that it started to implement 'implicit inflation targeting'<sup>14</sup> and added that when the conditions were favorable it would switch to formal inflation targeting. The reason behind this choice can be explained as follows: The CBT faced the dilemma of not being able to re-launch one of the monetary policy strategies that more or less failed in the past, and, on the other hand, lacking the necessary environmental conditions to switch to inflation targeting regime. In the latter context the CBT was facing the following constraints: First and the most important issue was fiscal dominance: public debt was almost 105 percent of GDP causing to debt sustainability concerns which reflect themselves as high spreads and real interest rates. Second, both the financial sector and non-financial corporations were severely affected from the crisis. The resulting balance sheet problems were putting serious constraints on the efficient implementation of formal inflation targeting. There were other challenges as well: high pass-through and backward looking pricing.

The implicit inflation targeting regime was rather successful: The actual consumer inflation always remained under but close to the target and declined to 7.7 percent by the end of 2005. There was no output sacrifice during the same period: the average growth rate was 7.4 percent –almost twice of the historical growth rate. This outcome and the continuing remarkable fiscal discipline encouraged economic policymakers to switch to formal inflation targeting at the beginning of 2006. The public debt-to-GDP ratio was at 69 percent as of the end of 2005 - 35 percentage points lower than that attained at the end of 2001. Public sector borrowing requirement-to-GDP ratio declined to zero percent from a record high level of 16 percent of 2001.<sup>15</sup>

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<sup>14</sup> The core of formal inflation targeting was included in this framework. That is, firstly, given that the main aim of the CBT is to achieve price stability short-term interest rates had been changed based purely on the inflation outlook. Secondly, whenever a decision was taken on interest rates, the rationale behind that decision was explained to the public in press releases. However, up to the beginning of 2005, some elements of formal inflation targeting were missing: for example, the public did not know the meeting dates of the monetary policy committee, there was not any voting in the monetary policy committee and final decision on the policy rates was taken by a small group.

<sup>15</sup> The fiscal discipline that Turkey exhibited during 2001-2006 period was both unexpected and, indeed, impressive. It was unexpected, because in the recent history of Turkey, fiscal discipline was either missing or, even when it was attempted, short lived. In 2001, however, Turkey launched a detailed and strong medium term program to deal with the economic crisis and to reduce the public sector debt and institutionalizing fiscal discipline. However the coalition government that launched the program lost November 2002 elections and the Justice and Development Party became to the power. The new government that was formed after the elections, to its credit, decided to continue with the existing economic program and implemented it - almost- fully until 2006. The policy of creating considerable primary surplus plus using the proceeds of privatization to reduce public debt, enhanced the credibility of the economic policy while leading to visible improvements in the public sector

There were other factors reinforcing this decision: the record low level of default spreads (EMBI spreads) was registered in 2005, which fluctuated around a band of 215-310 basis points and remained around 220 basis points in the second half of the same year. The Turkish government declared that Turkey would sign a new stand-by agreement with the IMF covering the period 2005-2007. Fiscal and monetary discipline was again at the core of the program. Three important structural reforms were planned: social security reform (second phase), tax reform and financial services reform. So, it was clear that there would be the necessary powerful anchor for a successful implementation of full fledged inflation targeting. The second anchor would be the EU accession process. While the role of the EU accession was going to be more visible in the medium to long term, it would nevertheless reinforce the positive impact of the new program.

The inflation target was set as a point target. The inflation rate measured by the headline consumer price index was used to define the target. The end-year targets for 2006, 2007 and 2008 were set as 5%, 4% and 4%, respectively. However, during the formal targeting period the external conditions were rather unfavorable: There were international financial stress build-up both in 2006 and 2007 causing temporary decline in risk appetite of foreign investors. Global warming increased food prices, whereas crude oil prices registered record high levels. There were domestically originated negative factors as well: political tension increased during the 2007 presidential election which immediately followed by a general election on July 2007. Some moves of economic policymakers caused concerns about the viability of fiscal discipline that was at the core of the success so far and increased question marks regarding whether the essence of structural reforms was well-understood by the politicians. As a result, actual inflation rate remained well above the targets: 8.6 percent in 2006 and 8.5 percent in 2007 leading to credibility losses. The aim of this paper is to evaluate the two-year Turkish experience of formal inflation targeting and draw some lessons from it.

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performance. It must, however, be admitted that the rather favorable world environment had helped the government in implementing a program which is really binding due its rather high primary surplus creation condition. Government's, in a sense unexpectedly, strong and sincere move towards the EU membership, coupled with the privatization attracted foreign capital far beyond country's previous experience and reduced the cost of borrowing for both public and private sectors.

The government faced almost no political difficulty in implementing such a program, because during this period the rate of growth of the economy also increased. Although part of this acceleration can be attributed to the exceptionally supportive world economic environment, there is strong evidence that such well programmed fiscal contractions, through enhancing the credibility of the economic policies, may lead to a reduction in the risks perceived by the economic decision making units. Such a development, in turn, may induce investments and promote economic activity. For the validity of this thesis for Turkey as well as the references to the literature see Özatay (2007).

## II. INITIAL CONDITIONS

There are some conditions to be met before passing to an inflation targeting regime. Most important of these are the independence of the central bank, a statement in its law regarding price stability as its main aim, absence of fiscal dominance, a strong financial sector, low exchange rate pass-through, and absence of backward looking pricing. In this section we analyze the Turkish economy in the period preceding formal inflation targeting from these perspectives.

### II.1 Central Bank Independence and its Mandate

The CBT law was amended on April 25, 2001. Since that date it has had instrument independence according to article 4: "The primary objective of the Bank shall be to achieve and maintain price stability. The Bank shall determine at its own discretion the monetary policy that it shall implement and the monetary policy instruments that it is going to use in order to achieve and maintain price stability." There were other amendments as well. From the independence perspective the most important of them are the dismissal and appointment procedures of the governor and vice governors and the prohibition of credit extension to the Treasury. Hence, from legal perspective the CBT has been ready to implement formal inflation targeting since May 2001.

### II.2 Fiscal Dominance

After the February 2001 crisis the public-debt-to-GDP ratio jumped to 104 percent from 54 percent of 2000. As pointed out by Sargent and Wallace (1981), when public debt is high and the real rate of return on government securities is in excess of the economy's growth rate, tightening the monetary policy by reducing the growth rate of money can result in higher, rather than lower inflation. Under these conditions, a contractionary monetary policy will initially lower seigniorage revenue and require that additional debt be issued; an increase in the deficit and the following rise in the stock of debt will eventually require an increase in seigniorage. This situation has been dubbed as "fiscal dominance of monetary policy".

Why should an inflation targeting central bank be afraid of high public debt? The logic behind such a fear is as follows: An inflation targeting central bank should respond to an increase in the probability of an upsurge in future inflation by raising its policy rate. If, in a highly indebted economy the pass-through effect is significant, developments that increase concerns about debt sustainability, would not only increase interest rates, but also weaken the domestic currency. An increase in the probability of debt repudiation, on the one hand, would cause new subscribers to ask for higher rates to compensate for an increase in default risk. On the other hand, demand for foreign currency denominated assets would increase; hence the weakening of the domestic currency would occur. Consequently, a central bank that raises its policy rate in response to a potential rise in inflation due to weakening of the currency faces two related problems in these conditions. First, a rise in its overnight rate could signal to the markets that "things are not going in the right direction", which could obviously increase the perceived default risk and hence, the real interest rate and exchange rate. Second, both indirectly with the first effect and directly by raising the cost of borrowing, such a response in policy would increase the debt burden of the treasury and jeopardize debt sustainability. The domestic currency would depreciate in these circumstances, which is inflationary if the pass-through effect is significant. This means the plan to increase the short-term interest rate to cope with inflationary pressures would backfire.<sup>16</sup>

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<sup>16</sup> The model presented in Blanchard (2005) shows in what conditions and how inflation targeting can have adverse effects. Blanchard further argues that Brazil found itself in such a situation in 2002 and 2003. Studying the recent experience of Brazil, Favero and Giavazzi (2005) show how the effectiveness of monetary policy depended on the fiscal policy regime, in the same period.

Based on these considerations the CBT refrained from implementing formal inflation targeting in the period 2002-2005. However, thanks to strong fiscal performance, fiscal dominance had gradually lost its importance throughout the stabilization period. As of the beginning of 2006 public debt-to-GDP ratio was at 68.9 percent -35 percent lower than its 2001 level. Moreover, fiscal discipline was continuing. Table 1 shows various indicators of fiscal policy. The figures in the first two columns are cyclically adjusted. The third column reports structural balance using potential GDP as defined in Ortiz et al. (2007).<sup>17</sup>

Table 1: Fiscal policy indicators (% of GDP)

	A	B	C	Public debt
	Cyclically adjusted primary balance	Cyclically adjusted operational balance	Structural balance	
1997	0.0	-4.1	-9.6	42.0
1998	0.5	-1.8	-13.7	41.4
1999	-1.8	-6.3	-17.8	52.6
2000	10.7	-5.0	-9.3	54.4
2001	6.2	-7.9	-15.0	104.3
2002	4.5	-8.4	-13.7	90.7
2003	5.1	-7.9	-10.6	80.6
2004	5.7	-5.9	-7.6	74.9
2005	7.3	-1.0	-2.6	68.9
2006	6.0	-0.1	-2.4	63.0

Source: Özatay (2008)

### II.3 Strength of the Financial Sector

A major concern of a central bank that attempts to implement an inflation targeting program is whether the country's banking system can properly and safely react to policy signals given by the central bank. If banks fail to react properly, they may curb the effectiveness of the monetary policy.<sup>18</sup> On the other hand, if their reaction endangers the safety of the banking system, then the central bank will find itself in the

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Aktaş *et al.* (2005) derived a "model-based" default risk series for Turkey during the 1999-2003 period by introducing an unobserved components model with time varying parameters. They found that the arguments of Blanchard (2005) and Favero and Giavazzi (2005) are valid for Turkey also.

<sup>17</sup> For further details see Özatay (2007).

<sup>18</sup> One may imagine that banks may not be able to understand the signals given by the central bank. Such a situation was highly unlikely in the case of Turkey. The Central Bank had a long experience of communicating with the banking community. Therefore, despite the existence of problems of the sufficiency of the information thus revealed, "central bank language" was not alien to banking community. On the other hand, as was demonstrated in Ersel (2002), banks were capable of taking macroeconomic information into account in forming their major managerial decisions.

position of placing financial stability ahead of price stability. Recent experience of the developing countries, as well as Turkey's own, indicate that a liberalized financial system, unless supervised carefully and forcefully may be quite vulnerable to crises. Banks, in general tend to assume high risks, without increasing their capital base. Growth and employment concerns of the governments induce them to overlook such tendencies and/or undermine their dangers. Under such circumstances, central banks, inevitably, refrain from taking those decisions that may be effective in controlling inflation but may endanger financial stability. Obviously the solution of this problem lies in strengthening the supervisory environment to enforce an effective risk management constraint on banking system and increase bank capital.

The negative balance sheet effect of the 2001 crisis was detrimental not only for banks but also for non-financial corporations. On May 15, 2001 Turkey launched the Banking Sector Restructuring Program (BSRP), to deal with the situation. The program was, in fact, a component of the rather comprehensive restructuring program of Turkish economy. It therefore shared the philosophy of the general approach of inducing a change in the private sector by launching reforms in the public sector to change its mode of operation. The final aim of the BSRP is, therefore, to create a sound competitive environment for banking. Reforming the state owned banks drew considerable attention due to its high cost as well as its impact on the domestic politics of the country. However, this pillar of the BSRP is merely an intermediary step stone towards achieving its final aim, i.e. changing the mode of operations of private banks.

The program was based on three main pillars. The first pillar was reforming state owned banks. The program aimed at solving the problem of the accumulated debt of the Treasury and restructuring these banks. The second pillar was strengthening private banks. The third pillar was establishing the conditions for a sound functioning banking system by securing the autonomy of the supervisory authority, enhancing its technical capabilities and adopting the international (notably European Union) standards in banking legislation.

Table 2: Indicators of financial depth

	% of GDP					% of TA			
	TA	CR <sub>co</sub>	CR <sub>hh</sub>	CR <sub>p</sub>	CR <sub>g</sub>	CR <sub>co</sub>	CR <sub>hh</sub>	CR <sub>p</sub>	CR <sub>g</sub>
1997	47.6	16.9	1.7	18.6	9.0	35.5	3.6	39.0	19.0
1998	54.6	17.3	2.2	19.4	13.3	31.6	4.0	35.6	24.3
1999	69.1	17.0	2.4	19.4	21.6	24.6	3.5	28.1	31.3
2000	73.7	15.6	3.5	19.1	25.3	21.1	4.8	26.0	34.3
2001	80.0	16.0	3.8	19.7	28.7	20.0	4.7	24.7	35.9
2002	70.4	12.4	2.1	14.5	27.1	17.6	3.0	20.6	38.4
2003	65.9	11.5	2.8	14.3	26.8	17.5	4.2	21.7	40.7
2004	62.6	12.3	4.5	16.9	25.6	19.7	7.2	26.9	40.9
2005	69.6	15.9	7.4	23.3	26.0	22.9	10.6	33.5	37.4
2006	74.7	19.1	10.0	29.0	24.7	25.5	13.4	38.9	33.1
2007.9	79.2	21.3	12.3	33.6	24.3	26.9	15.6	42.4	30.7

Notes: TA: total assets; CR<sub>co</sub>: credit to the corporate sector; CR<sub>hh</sub>: credit to households; CR<sub>p</sub>=CR<sub>co</sub>+CR<sub>hh</sub>. CR<sub>g</sub>: claims on the government. Financial variables are adjusted for the effects of inflation using the methodology of Financial Structure Dataset, World Bank. See Özatay (2008) for the details.

Both the declining importance of fiscal dominance due to fiscal prudence and the banking restructuring program created a potential for banks to increase their credit lines to the corporate sector and households. The same economic environment simultaneously increased demand for credit. Table 2 provides information regarding the financial depth and credit growth in the period 1997-2007. There has been a sharp increase in credit to private sector-to-GDP ratio since 2002.

Note also the increasing importance of the credit volume and the decreasing share of the claims on the central government in the balance sheets of the banking sector after 2002. In the same period consumer credit volume expanded significantly as well. As a ratio to GDP the consumer credit volume was almost negligible throughout the 90's, putting an important constraint on consumers. There has been a radical change in this story since 2003.

Table 3: Profitability of the Banking Sector (%)

	2001	2002	2003	2004	2005
Net interest income / total assets	11.2	6.0	4.5	5.8	4.6
Profit / total assets	-5.7	1.1	2.2	2.1	1.4
Profit / equity	-58.4	9.2	15.8	14.0	10.6

Source: Banks Association of Turkey

Despite the positive developments in the Turkish banking system after its major restructuring in early 2000s, financial stability is still a concern for the CBT. First of all, the recovery of the economy brought in not only an opportunity to grow for the banking system but also a fierce competition. On the one hand, domestic banks found themselves competing for those customers who seemed eligible after the introduction of new risk management rules. It became clear that the number of such commercial customers that need financing is a binding constraint for banks to expand their activities and increase their profitability. A glance at Turkey's balance of payments statistics reveals that, as economy enters growth phase of the cycle, such companies' ability to borrow from abroad dramatically increases and therefore their reliance on domestic financial institutions declines.<sup>19,20</sup> Such an increase in both domestic and external competition in banking exerted considerable downward pressure on bank profitability. Net interest income to total assets ratio exhibited a declining trend during the years of economic recovery, and profitability declined (Table 3).

#### II.4 Exchange Rate Pass-Through and Backward Looking Pricing

Exchange rate pass-through is the effect of exchange rate changes on inflation. It has two dimensions: magnitude and pace. By high exchange rate pass-through it is generally meant that one of the most important determinants of future path of inflation is the rate of change of the exchange rate. This occurs firstly through the impact of import prices on costs, secondly through shaping inflationary expectations and thirdly via various indexation mechanisms.<sup>21</sup> In a small open emerging economy, a significant change in the direction of capital flows not stemming from policies followed by that country, has the potential to affect the exchange rate and hence the inflation rate. Provided that such a shock persists for some time, inflation targets can be missed.

Kara and Ögünç (2005) shows that after the crisis with the implementation of the floating exchange rate regime, the exchange rate pass-through decreased in Turkey: First, while most of the pass-through is completed within five months in the period preceding the floating exchange rate regime, this duration is increased to twelve months under float. Second, the total pass-through

<sup>19</sup> We examine this effect in Section 4. See Table 4 and the discussion there.

<sup>20</sup> See Stiglitz and Greenwald (2003, Chapter 8) for a discussion of the banking system related factors that influences that efficiency of the monetary policy.

<sup>21</sup> It should also be pointed out that Turkey can be considered as an endogenously dollarized economy, a property that feeds the pass-through indirectly.

dropped to 30 percent during the float from a level of 60 percent of the pre-float period.<sup>22</sup> Findings of Kara et al. (2007) point to a reduced pass-through as well. Note that despite sharp decline in the magnitude of pass-through and the delayed response of inflation to changes in exchange rates after 2001, its level is still high. Başçı et al. (2007) points to the large share of the import component in total value added as the most important culprit for high pass-through.

Like high pass-through the practice of indexation of nominal contracts to past inflation is one of the most important obstacles to the success of a monetary policy. The simple reason is that, under such schemes one observes an important amount of inertia in the behavior of inflation. Even in the absence of such formal indexation mechanisms, if economic agents consider past inflation data in taking economic decisions (if they are backward looking) a similar inertia in inflation can arise. Kara *et al.* (2007) show that the impact of such implicit indexation mechanisms on the evolution of the inflation rate in Turkey in the periods preceding the 2001 crisis was considerable. However, their findings show that with the introduction of the floating exchange rate regime the indexation behavior weakened.

## II.5 What is the Right Time?

The discussion so far shows that just before passing to formal inflation targeting only some of the initial conditions of an ideal inflation targeting were met. While fiscal dominance was not strong as in the initial phase of the implicit inflation targeting regime, by the end of 2005 still public debt-to-GDP ratio was high. Similarly, despite the fact that the implicit inflation targeting regime period witnessed strengthening of the financial sector and rapid credit growth to the private sector, still there were concerns about the risks and profitability of the banking sector as of the beginning of 2006. One can make parallel arguments for the exchange rate pass-through and backward looking behavior.

All these show that determining the 'right' time to put in place formal inflation targeting is not an easy job. One should bear in mind that being too much perfectionist in this regards will be counterproductive, since there is never a 'right time'. There will be always some elements missing, but one should seek for a balance between these missing elements and the elements ready to use.

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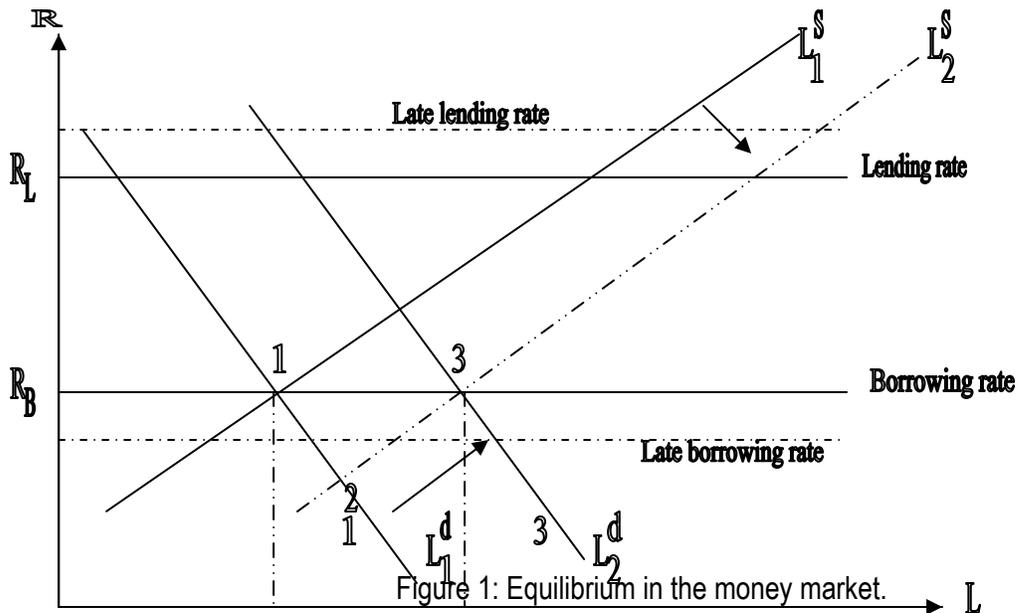
<sup>22</sup> Kara & Ögünç (2008) approached exchange rate pass through both from the traditional cost channel (use of imported inputs) and the indexation channel. In order to detect the possible changes in the exchange rate pass-through in such a setting, they used, first, a time varying parameter model and secondly the seemingly unrelated regression model. Their findings indicate that there is a marked decline in the exchange rate pass-through after the adoption of the floating exchange rate regime with an implicit inflation targeting framework, thanks to weakening of indexation behavior. In other words, the exchange rate began to lose its function as a nominal anchor in the pricing behavior of economic agents. However, the authors also warn that the impact of exchange rate on inflation, especially in the tradable sectors, is still sizable in the long run and movements in the nominal exchange rates have a significant impact on the relative prices.

### III. EFFECTIVENESS of the MAIN POLICY TOOL of the CBT

#### III.1 Main Policy Tool and the Operation Procedure

Since the February 2001 crisis the CBT has always remained net borrower at the money market. There are two underlying reasons. First, the restructuring operation of the banking sector which became one of the main victims of the February 2001 crisis created an important amount of excess liquidity in the market. Second, as of mid December 2007, the net foreign exchange purchases of the CBT amounted to almost 54 billion US dollars. The CBT withdrew the excess liquidity in the market mainly via New Turkish Lira deposit operations in the Interbank market within the CBT and repo transactions in the repo and reverse repo market of the Istanbul Stock Exchange, on an overnight basis. Accordingly, overnight interest rates were constantly realized around the borrowing rate of the CBT. Hence, the borrowing rate of the CBT has continued to be an indicator for money markets.

The operation procedure is as follows: the CBT announces overnight borrowing and lending interest rates between 10:00-12:00 and 13:00-16:00 in the interbank money market. In case of a liquidity shortage during the day, banks can borrow at the CBT's lending rate against collateral within their limits. In the event of a fall in interest rates due to increasing liquidity, banks are able to lend New Turkish Lira to the CBT at the CBT's announced borrowing rate. The CBT has another liquidity facility: late liquidity window facility in the interbank money market. Between 16:00-16:30 banks can borrow from or lend to the CBT against collateral without any limit.



As stated above, there has been almost always excess liquidity for the last six years. The CBT's operation procedure, therefore, was based on its borrowing rate and can be explained as follows: In Figure 1 in the horizontal axis the overnight liquidity in the money market is measured. The vertical axis shows the overnight interest rate. The upward sloping curve is the liquidity supply, whereas demand for liquidity is shown by the downward sloping curve. Both the supply and demand quantities are the sum of commercial banks' and the CBT's supplies and demands. In the initial equilibrium (point 1) the interest rate is at where the CBT wants it to be ( $R_B$ ). Let, due to some reason –for example foreign exchange purchase of the CBT the supply curve shifts to  $L_2^s$  and the

new equilibrium is at point 2. However, now the money market rate is below  $R_B$ . The CBT has to intervene in the money market to increase the interest rate to  $R_B$  again. To do so it purchases liquidity from the banks and hence the demand curve shifts to  $L^d_2$ . The new equilibrium is established at point 3.

Notice that the equilibrium interest rate will always remain between the lending rate and the borrowing rate. If instead of excess liquidity, there is excess demand for overnight funds, this time the equilibrium interest rate will settle somewhere close to  $R_L$ . In this case, the benchmark short-term interest rate will be the lending rate. The CBT will then set the lending rate consistent with its inflation target and adjust other money market rates ( $R_B$ , late lending and late borrowing rates) with reference to  $R_L$ .<sup>23</sup>

While this system has been working well since the beginning of 2002, obviously it is not sufficient for the success of the inflation targeting regime. The changes in the overnight rate have to cause parallel changes in the short to medium end of the yield curve.

### III.2 Interest Rate Pass-through

How do lending and deposit rates respond to changes in monetary policy rate? This is an important question for an inflation targeting central bank. In order its policy changes to be effective on the aggregate demand, the interest rates that affect aggregate demand must follow these decisions in the first place. Second, such changes in the lending and deposit rates should have significant impact on the decisions of economic agents. That is, at least some of the transmission channels should work.

Using bank-level data, Aydın (2007) investigates the degree and the speed of adjustment of retail bank lending rates to the central bank policy rate for the period June 2001-September 2005. In his panel there are four types of loans (automobile, housing, cash, and corporate loans) and 25 banks. He estimates both long-run and short-run equations. He finds that all types of loan rates are co-integrated with the policy rate. That is, they move together. Long-run pass through for corporate loans is around 70 percent, whereas especially in the second half of the period they cover automobile and cash loans adjust almost one-to-one to the policy rate. Evidence for short-run pass through is inconclusive.

What do these results tell for the effectiveness of inflation targeting? Results of Aydın (2007) can be interpreted as showing the importance of the monetary policy for determining general trend of loan rates. However, for day-to-day fluctuations other factors are at play.

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<sup>23</sup> During stressful times there can be temporary or permanent liquidity shortages. The CBT has another facility to supply enough liquidity to the market: one-week repo auctions. For the details of the liquidity management of the CBT, see its annual 'monetary and foreign exchange policy' announcements.

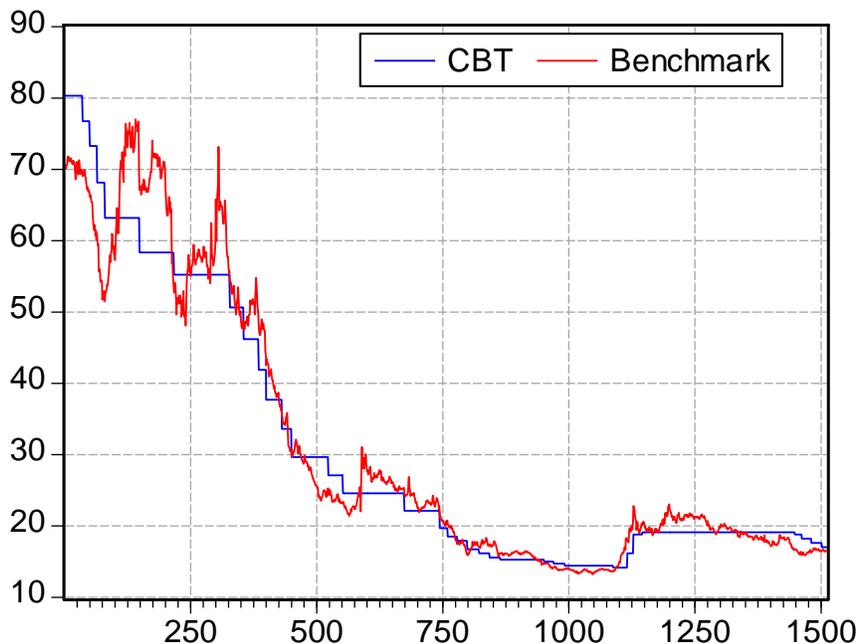


Figure 2: Central Bank policy rate (CBT) and the secondary market benchmark bond rate (Benchmark): 2 January 2002 – 31 December 2007 (%).

What about other interest rates? One important interest rate is the secondary-market rate of the benchmark Treasury-bond. Using daily data, and controlling for domestic macroeconomic surprises and political news effects, Çulha et al. (2007) show that for the period 2001-2004 there is a positive association between the CBT policy rate and the benchmark secondary market rate. Estimating a co-integrating relationship for a longer time span between the CBT rate and the benchmark rate tells a similar story. Figure 2 shows how these variables share a common trend. In fact, using daily data of the post-crisis period (2 January 2002 – 31 December 2007), a formal test indicates that these two variables are co-integrated.<sup>24</sup>

#### IV. WHICH TRANSMISSION CHANNELS ARE EFFECTIVE?

##### IV.1 Credit channel

The Turkish financial system is thin compared to the financial system of the developed countries. For example, in 2006, the credit to private sector-to-GDP ratio was %94 in France, %109 in Germany, %85 in Greece, %91 in Italy, %95 in South Korea, %149 in Portugal, %151 in Spain and %163.9 in UK, whereas it was %29 in Turkey.<sup>25</sup> Comparison of household liabilities to the financial

<sup>24</sup> The co-integration vector is:  $\text{Log}(\text{benchmark rate}) = 0.012 + 1.000 * \text{Log}(\text{CBT rate})$ . The ADF test-statistics for the stationarity of the residual of this equation is -4.22. Hence, the two variables are co-integrated.

<sup>25</sup> Figures are from the “Financial Structure Dataset” of the World Bank.

sector tells the same story. While the household liabilities-to-GDP ratio was %12.4 in Turkey, the EU average was %63.2 in 2006.<sup>26</sup>

Note that this comparison is for a point in time. As emphasized above, in the last years there has been a significant credit expansion. Especially consumers enjoyed rapid consumer credit growth. Results of Özatay (2007) indicate that the credit volume is an important determinant of private demand. He shows that in the period 1994-2006, once controlled for the disposable income fluctuations, there was a significant influence of consumer credit growth for the Turkish consumption growth. Similarly, along with business confidence and real income, real credit to the corporate sector was an important determinant of private investment decisions.

These are good news for an inflation targeting central bank. However, this is not the end of story. Private sector can increase its liabilities to the rest of the world, conditions of which are mainly determined by international risk factors. This dependence can undermine the efficiency of the credit channel. As emphasized in section II, as economy enters growth phase of the cycle, companies' ability to borrow from abroad dramatically increases and therefore their reliance on domestic financial institutions declines.

Table 4: Net claims of non-residents on the non-banking private sector (% of GDP)

	Long-term			Short-term	Total net
	Disbursement	Repayment	Net		
1997	3.2	-1.4	1.8	0.3	2.1
1998	3.5	-1.4	2.0	0.2	2.2
1999	4.0	-2.7	1.3	0.0	1.2
2000	6.4	-3.9	2.5	0.1	2.5
2001	6.2	-6.0	0.2	0.1	0.3
2002	5.4	-4.8	0.6	-0.4	0.2
2003	4.5	-4.2	0.3	0.1	0.4
2004	4.8	-3.3	1.6	0.2	1.7
2005	5.8	-3.1	2.7	0.1	2.8
2006	8.2	-3.5	4.7	0.1	4.8
2007	9.9	-4.3	5.6	0.0	5.6

Source: Central Bank of Turkey

In Table 4 we report the evolution of the liabilities of the non-banking corporate sector to the rest of the world. The long-term new disbursements-to-GDP ratio increased to almost 10 percent in 2007. Note also that average new long-term credit line in the formal inflation targeting period (2006-07) reached almost two times the average of the period 1997-2005. While this is not a development that helps to the Central Bank, note that conditions of consumer credits are still dictated by the Central Bank.

<sup>26</sup> See Table 1.8 at page 17 of the Financial Stability Report, No. 5, 2007, Central Bank of Turkey.

In sum, despite the hampering effect of globalization, we can conclude that the formal inflation targeting period witnessed a deepening in the credit market, which increased the power of the credit channel relative to that in the past.

#### IV.2 Exchange Rate Channel

Since the beginning of 2002 up to the beginning of formal inflation targeting (January 2006), the CBT had rarely intervened in the foreign exchange market. All of the interventions were in the form of foreign exchange purchases, except one -an extremely low foreign exchange sale at the end of the Iraq war. Despite this fact, lira had appreciated in real terms in the same time period.

What was the role of the appreciation in the post-crisis growth performance? The most obvious consequence of appreciation is its negative impact on demand for domestically produced goods. However, in highly dollarized countries it can also affect output through an entirely different mechanism. Kesriyeli *et al.* (2005) show that liability dollarization of the Turkish corporate sector firms is extremely high. They use the share of debt denominated in foreign currency in total debt of the commercial sector as a proxy for liability dollarization. This ratio after reaching a record high level in 2000 with almost 80 percent slightly declined to 72 percent at the end of 2003.<sup>27</sup> Based on various unbalanced panel estimation results, they show that budget deficit to GDP ratio and real sector confidence index are among the important determinants of the corporate sector liability dollarization. As fiscal irresponsibility increases and business confidence decreases liability dollarization increases. Another important finding is that the high level of exposure to exchange risk in low-export sectors dominates the partial hedge in higher exporting sectors. Put differently, they argue that, in the period analyzed, real exchange rate appreciations are expansionary in terms of investments and profitability.

Findings of Kara *et al.* (2007) support this conclusion. Using the extended Kalman filter method they estimate the time-varying impact of the real exchange on output gap. They show that appreciation increases gap between the output and potential output, leading to expansion in economic activity. Furthermore, Başçı *et al.* (2007) argue that appreciation phases coincide with solid expansion phases, at least through two channels: first, by increasing net worth of firms with foreign currency denominated debts. Second, through the cost channel, by decreasing production costs of the firms and hence reducing prices and stimulating domestic demand.<sup>28</sup>

Hence, one should note that in highly dollarized economies impact on exchange rate developments on the real economy can be significantly different than what the traditional text-book channels envisage. One should take the balance sheet effects into consideration.

#### IV.3 Expectations and Communication Channel

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<sup>27</sup> They use the sector level data compiled by the Central Bank of Turkey, which are based on the annual financial accounts of approximately 8500 firms covering the period 1992-2003.

<sup>28</sup> In Karadaş *et al.* (2006) it is shown that the average share of imported raw materials in total costs of firms in the manufacturing industry is 36.1 percent, whereas domestic raw materials and labor constitute 32.6 percent and 11.6 percent of total expenses respectively.

Management of expectations is an integral part of inflation targeting. In order this channel to be effective, first, the underlying macroeconomic framework should be strong. Second, monetary authorities should be able to convince the markets regarding their decisions. In this context, successful communication methods should be sought. If in the past there had been lax fiscal policies and the monetary policy was accommodative, it is very difficult to manage expectations so that they are in line with the inflation target. To gain credibility, inflation targeters of such countries should give clear messages to the markets, if and when necessary publicly criticize the government, publish press releases to explain what they intend to do, take no decision which they did not promise to and refrain from taking controversial decisions if the markets are not going to be receptive. Monetary authorities should understand that they can gain credibility only gradually.

To show their degree of their credibility to the markets they need a metric as well. Measuring inflation expectations frequently would help in this respect. Well aware of this fact, the CBT before implementing implicit inflation targeting, started to conduct a bi-weekly expectations survey in August 2001. It is focused and compact survey the questions of which has been sent and answered through e-mails. Its results find broad coverage in the media and central bank watchers pay a special interest to it. The CBT announced publicly that it is measuring its 'credibility gap' by the difference between the expected inflation and the targeted inflation. Expected end-year inflation rates as of the beginning of the year and realizations are given in Table 4.

Table 4: Consumer inflation (%)

	Target	Expected end-year inflation as of the first month of the year	Credibility gap (percentage points)
2002	35.0	48.3	13.3
2003	20.0	24.9	4.9
2004	12.0	13.1	1.1
2005	8.0	8.4	0.4
2006	5.0	5.7	0.7
2007	4.0	7.0	3.0

Source: Central Bank of Turkey.

For managing expectations, a transparent decision making process is essential. The rule that the central bank follows in decision making process should clearly be understood by the public. By 'the rule', we mean a decision process in which an explicit model of the economy plays a central role as stressed, for example, by Woodford (2003, pp:15-18). The first essential part is explaining the rational behind the decisions that have already been taken. The most important means to communicate with the market regarding the decisions taken is publishing 'Inflation Reports'. But, Inflation Reports are more than this. Besides, explaining the past decisions, these reports should be forward-looking in the sense that they should provide forecasts regarding future path of inflation and either signal future path that is going to be followed by the policy-rate or explicitly provide this. This is the second essential part.

CBT has been publishing such reports in quarterly basis since the beginning of 2006. The report is basically the analysis of the current and possible future developments in the economy and in international markets from the perspective of their impact on the future paths of inflation and the CBT's overnight rate. An important feature of the CBT's and other inflation targeting central banks' Inflation Reports is that they are mainly forward-looking.

In their recent paper Başkaya et. al (2008), using survey data, found support to the view that economic agents (i.e. survey respondents) take the inflation targets as well as Central Bank's forecasts into account in forming their expectations. It is also reported that, the sensitivity of inflation expectations to exchange rates and risk started to increase in recent years. A second major finding of the paper is the differences between financial and real sector in forming their expectations. Decision makers in the real sector are more backward looking, whereas those in the financial sector quite sensitive to short term variations in the financial data. Finally, the authors point out that, the May-June 2006 financial market turbulence, had a significant impact on the way agents form their expectations; the degree of backward looking behavior increased since then.

## V. EXCHANGE RATE REGIME and POLICY

The pre-announced fixed rate of increase of exchange rate system, which had been implemented since January 2000 collapsed in February 2001. One of the most important elements of the program that has been implemented after the crisis is the floating exchange rate system. Both the monetary and exchange rate policies of CBT were made more explicit at the beginning of 2002. At that time, CBT once more emphasized the importance of floating exchange rate system. Main principle since then has been that market conditions would determine exchange rates. That is, CBT stressed that it would not interfere to the level or trend of exchange rate. It also announced that it could intervene in case of excess volatility. Based on the main principle, however, CBT has also pledged to keep the number of such volatility interventions strictly limited.

In addition, at the beginning of 2002, CBT explicitly told to the markets that;

- i. Conditional on strict implementation of the program and in the absence of large external shocks, dollarization process would lose its importance, starting eventually a reverse dollarization process.
- ii. It was most likely to observe favorable balance of payments conditions.
- iii. Although the exchange rate regime was a float -“almost pure float”- the level of foreign exchange reserves was important at least due to three reasons. First, Turkey had debt repayments forthcoming to the IMF. Second, international investors gave a special emphasize to the level of reserves. Third, CBT wanted to clear its balance sheet from some types of foreign exchange liabilities like deposits of workers abroad.
- iv. Given the importance of the level of reserves (in this case regardless of the exchange rate system), provided that at least one of the conditions stated in the first two paragraphs materialize, it was going to build-up reserves through rule based, transparent, and pre-announce purchase auctions. The important point to note is that these auctions unlike volatility interventions were not discretionary. They were rule-based, which were known by the public. Provided that aforementioned conditions were satisfied, at the beginning of each month, CBT announced how much and via which mechanism it was going to buy foreign exchange in these daily auctions. In later stages the auction mechanism was revised: A yearly program was announced to bring distortionary effects -of possible changes in daily purchase amounts at the beginning of each month- on the operation of the foreign exchange market to a minimum. It was made explicit that CBT was not going

to change the program unless extraordinary changes are observed in terms of foreign exchange liquidity.

We must emphasize that without the floating exchange rate regime, it would be almost impossible to implement both the implicit and formal inflation targeting regimes of the 2002-2007 period. This gave the chance to CBT to concentrate only on one objective. However, note also that during the same period, due both to confidence build-up as a result of prudent policies and –generally- favorable international liquidity conditions, the lira appreciated significantly in real terms, which will be discussed below.

## VI. DEVELOPMENTS IN THE FORMAL INFLATION TARGETING PERIOD: 2006-2007.

Two major problems marked the formal inflation targeting period. First, despite a slowdown in inflation, it remained well above the targeted rates and world average. That led to erosion in CBT's credibility. One should note that during the formal targeting period the external conditions were rather unfavorable: there were international financial stress build-up both in 2006 and 2007 causing temporary decline in risk appetite of foreign investors. Various factors (such as increased food demand, reallocation of agricultural land in favor of bio-fuel production and global warming) contributed to sharp increases in food prices, whereas crude oil prices registered record high levels. There were domestically originated negative factors as well: political tension increased during the 2007 presidential election which immediately followed by a general election on July 2007. Some moves of economic policymakers caused concerns about the viability of fiscal discipline that was at the core of the success so far and increased question marks regarding whether the essence of structural reforms was well-understood by the politicians.

The second problem was the continuation of the appreciation of the lira. Although the actual appreciation rate is not as extreme as people think, in time its negative effects on the industry became more visible. Notice that these two developments, when coupled with the relatively high real interests, create a rather complex set of conditions for the industry. Appreciation of the lira, reduces the imported input costs of the industry (including oil), which encourages imports. On the other hand, the high inflation, increases domestic input costs including the wages. Notice that, during this period, advantages due to declining unit labor cost started to lose its importance.

In response to these developments, the CBT, sent a letter to the government on June 3, 2008 and suggested a major revision in inflation targets. The existing inflation target of 4% for 2008 was clearly unreachable after the aforementioned supply side shocks. The CBT made it clear that, it is aware of the fact that the social cost of attempting to bring down inflation to the targeted level under new economic conditions, will be unacceptably high. The CBT's new proposal did not have a target for 2008. Instead, the CBT suggested its 2008 forecast 9,3% to be considered as a guide. CBT's new proposal aimed at bringing down inflation at a much more moderate manner than before. It's inflation targets are 7,5 % for 2009, 6,5% for 2010 and 5,5% for 2011. The government, almost immediately, agreed with the proposal and the recently announced medium term program of the government, utilizes these targets. This move of the CBT, was considered as realistic and the immediate affirmative reaction by the government as reassuring by the economic decision makers. Therefore, in contrast the initial expectations, changing inflation targets did not hurt the credibility of the CBT. In fact, it may even helped to regain some of its credibility loss due to its transmission of confusing signals in the first quarter of 2008. The CBT's recent move of raising its borrowing rate by

50 basis points on July 17, 2008, therefore, was in line with the expectations of the market and mostly welcomed.

The CBT faced a rather disappointing development at the political level. The new government that came to power after the 2007 elections failed to give the much required effective support to CBT's anti-inflationary policies. Although the government, apparently, never abandoned the rhetoric of supporting the CBT in its efforts in fighting inflation, various ministers frequently find excuses to openly complain against the CBT's policies (notably in the contexts of high interest rates and appreciation of the currency) or even made careless announcements in launching some policy measures, that sounded to be in conflict with the main objective of the monetary policy. However, it should also be indicated since the end of second quarter of 2008, the government seems to be more careful in publicizing its commitment to economic stability and fiscal discipline. Recently announced rather encouraging budget performance for the first half of the 2008, can be considered as an important step towards government's intention of reestablishing the fiscal discipline.

## VII. CONCLUSION

The formal inflation targeting experience of Turkey seems to be performing in line with the expectations. However, the apparent failure in achieving the targeted inflation levels, to a considerable degree, disappointed economic decision makers. The disillusioned business circles, therefore, started to exert pressure on the government and CBT, to switch to policies that they hope to benefit in the short run at the expense of higher inflation (reduction in interest rates, higher public expenditure -as witnessed before 2007 elections).

Therefore the importance of credibility should be stressed. It should also be added that, credibility, apart from pedagogical reasons, can not be taken solely as a function of the difference between the targeted and actual inflation. For example the respect of the government to central bank actions (as we observe in the USA and the EU but not in Turkey) should be taken into account.

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## PART II

### **MONETARY TRANSMISSION MECHANISMS AND THE EFFECTIVENESS OF THE MONETARY POLICY IN EGYPT, MOROCCO AND TUNISIA**

Understanding and measuring the time lag between a monetary policy measure is what the analysis of MTMs is all about. How does a change in the policy interest rate decided by the central bank affect key macroeconomic variables, including the exchange rate, the volume of loans and above all the inflation and output? The purpose is not only to identify these impacts but also to measure their intensity. This is of course essential for successfully conducting monetary policy in general, and more so in the case of inflation targeting. With this respect, a lot remains to be done in the region; at this stage, we still wonder which channels and mechanisms are really operating and which channel is the most important? And then, what makes this channel more prevailing?

The policy rate may be more or less effective in bringing about changes in the market lending rates in the desired direction. The effectiveness of the policy rate may also vary over time especially when it comes to countries undertaking reforms and to underdeveloped financial markets. Several factors may determine the extent to which the policy rate pass-through to lending rates and to other variables. These factors range from structural variables reflecting the financial system structure to more changing economic variables.

Two main approaches are possible for identifying and analyzing MTMs. The first approach adopted by Boughzala relies on micro data mainly on banks and when possible on firms and other investors, and adopts a panel data set up. The second approach, adopted by Boughrara, relies on macro time series data and applies various types of VAR models; the latter is the most widely used.

The first, entitled “MTM and the Imperfection of the Banking System” has a wider geographical coverage but its field of investigation is more limited. It tries only to explore how and to what extent changes in the short-term nominal interest rate decided by a central bank leads to changes in the banks lending interest rate and consequently in the volume of loans they effectively provide to investors (firms and households). The second paper, entitled “Monetary Transmission Mechanism Analysis in Egypt, Morocco and Tunisia” is more comprehensive.

## MONETARY TRANSMISSION MECHANISMS AND THE IMPERFECTION OF THE BANKING SYSTEM

Mongi BOUGHZALA <sup>29</sup>

Monetary policy effectiveness depends on which monetary transmission mechanisms (MTM) are operational and on how efficient they are. Operational MTMs vary across countries; in particular, they are not the same and are not equally efficient in all the European Union (EU) countries, and arguably not in the countries of the MENA region. Within the EU, for instance, the Index of MTM speed varies from 0.22 in Spain to 0.86 in The Netherlands (*Mojon 2000*). Monetary policy would be more or less successful, depending on this speed.

MTMs operate mainly through the banking system, be it for the interest rate channel or the credit channel. What makes these channels more efficient in some countries, and what to do in order to improve their effectiveness through the improvement of the performance of the banking system? How fast do banks reflect changes in the interest rate decided by the central bank (CB) in their lending activities and/or their own rates (mainly their loan rates)? And what determines the speed of their response? This is the main concern of this paper. Our interest will indeed be limited to cases where the monetary instrument used by the CB is the interest rate and where the monetary policy objective is to reach an inflation target and/or a real output and employment target (assuming that output and employment are strongly linked) and relies on the traditional interest channels and the credit channel. Hence, by exploring the reaction of the banking system to the central bank policy actions we are indirectly assessing the impact of monetary policy on inflation and real economic variables.

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<sup>29</sup> In collaboration with Dhafer Saidane.

In this paper we try to test to what extent the banks' response depends on the banking market structure and the type of competition (imperfection), on the risks banks accept and on the imperfections characterizing the information they hold. Banks' response depends on the structure and quality of their assets (that is the quality of their loans and how much and which type of securities they hold...) and on their liquidity (Ehrmann M., Gambacorta L., Martinez-Pagés J., Sevestre P., Worms A., 2001). Indeed, banks that can obtain liquidity at the inter-bank market or by easily selling assets on the financial market would be less dependent on the CB financing and might respond more slowly to monetary policy shocks, especially in the case of an interest rate increase, and, so they would continue to supply loans. The final outcome also depends on the existence of substitutes to bank financing and on the enterprise structure. It is widely admitted that banks that lend mostly to large firms do not face the same risks as banks that diversify more or banks that target mostly SMEs. Banks that have the opportunity to diversify their assets and invest in the financial market would be less sensitive to short term interest variations.

Through this investigation, our aim will also be to compare countries from the MENA region (Egypt, Morocco, Jordan, Lebanon, and Tunisia) to some OECD countries (France, Germany and the UK) whose financial market and banking systems are highly developed.

Most of the selected MENA countries are undergoing important financial and monetary reforms and for them the effectiveness of the interest and credit channels matters perhaps more than elsewhere in the region.

In what follows we try in a first section to give an overview of some of the recent research closely linked to the same issue and to give some hints about the challenges to be addressed. In the second section we briefly present the theoretical model underlying our empirical investigations. In the last section, the empirical finding will be presented and analyzed.

## **Section 1: Monetary policy transmission and inter-banks competition**

Not so much work has been devoted (to our knowledge) directly to the link between the information and competition structure of the banking market and the effectiveness of MTM in transmitting monetary policy decisions to the economy (Angeloni I., Kashyap A., Mojon B., Terlizzese D., 2002; Chatelain J.-B., Erhmann M., Generale A., Martinez-Pagés J., Vermeulen Ph., Worms A., 2003). However, a growing literature studying MTMs in various regions, including the EU and to a lesser extent to the MENA region is available (Chatelain J.-B., Erhmann M., Generale A., Martinez-Pagés J., Vermeulen Ph., Worms A., 2003; van Eels P., Locarno A., Mojon B., Morgan J., 2003, Boughrara 2006...). More contributions on the link between competition and the impact of monetary policy on real variables through aggregate demand variation (Beaudy, P and M.B. Devereux 1995; Blanchard, O.J. and N.Kiyotaki 1987) are also available, some of them being particularly inspiring and relevant. In particular, Blanchard and Kiyotaki show that, as a result of an aggregate demand variation, imperfect competition is not sufficient to generate real effects (output and employment) but imperfect information combined with some sort of price stickiness will induce real effects. The monopolistic competition framework they propose for firms may be transposed to banks.

The standard view of monetary policy transmission relies on the impact of policy rates variations, but it is still an incomplete way to account for the consequences of monetary policy (see Bean et al., 2002). This standard view notably assumes a relatively high degree of substitutability between bonds and loans, and a relatively passive behavior of the banking system, as monetary policy only impacts on loans' rates.

A complementary view arises from the literature on the credit channel, according to which an imperfect loan market has to be included into the analysis. The credit channel view looks at the impact of monetary policy on both the supply and demand for loans. Intermediated finance thus lies at the heart of this view, embedding micro-funded

behavior for both firms and households. In such a framework, banks will not all react in the same way to policy rates variations, the ones with a higher capital ratio being able to access to market loans, whose cost is reduced after the policy shock. Inversely, or in parallel, more liquid banks can use their cash to counteract the policy shock. Hence, a variation in the policy rate will have redistributive effects in terms of loan availability.

The European context has given birth to another wave of studies, with a focus on similarities and differences among the members of the Euro-area. The literature on monetary policy transmission channel in the EU countries has been growing rapidly, especially since the launching of the euro. However, the "black box" to which Bernanke and Gertler (1995) referred to is still a valid image. Without being able to pretend to be exhaustive, it seems to us that several results now appear remarkable and convergent among these studies:

- Monetary policy in the Euro-area is less efficient than in the United States<sup>30</sup>;
- There has, however, been an improvement since the Euro-birth;
- Banks have a relatively weak role in monetary policy transmission in Europe.

Chatelain J.-B., Erhmann M., Generale A., Martinez-Pagés J., Vermeulen Ph., Worms A., 2003 show that altogether the interest rate channel is operational in the Euro zone countries

\*\*\*Ehrmann M., Gambacorta L., Martinez-Pagés J., Sevestre P., Worms A., 2001) offer a comprehensive comparison of the structure of banking and financial markets in the euro area and they find that monetary policy does alter bank loan supply, with the effects most dependent on the liquidity of individual banks.

Some empirical findings show that European countries are converging in terms of banking soundness, though some heterogeneity remains. European countries continue to exhibit different reaction coefficients with, for example, a ratio going from 1 to 3 in terms of investment reactions (see van Eels et al., 2003, and Angeloni et al., 2002, table 7). What is more remarkable is that the variables that can be linked to such

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<sup>30</sup> See however de Grauwe et Costa-Storti (2005) for a dissenting view.

heterogeneity (see Chatelain and al., 2003, for example, for a synthesis) are not fully understood, as none of the expected variables related to size, capitalisation, cash-flow proved to be systematically significant. And even the degree of competition on the money market is not sufficiently accounted for when trying to understand the inter-countries differences (see Ehrmann et al., 2001). What could then explain the differences between monetary policy transmission degrees inside the Euro-area and between the Euro-area and other regions, particularly the MENA region?

### **Speed of adjustment to monetary policy impulses (1992– 1998)**

Belgium	0,55
Spain	0,22
France	0,42
Germany	0,54
Italy	0,58
Netherlands	0,86
<b>Standard deviation</b>	<b>0,21</b>

Source : Mojon (2000, Table 2b) and authors calculations.

Evidently, the MENA region countries are less studied (boughrara 2006, Neaime, S., 2008,...) and are arguably more heterogeneous as they have not gone through any harmonization process. Nevertheless many of the countries of the region face similar policy challenges, and may learn from their neighbour European countries.

## **Section 2: the model**

We assume that the banking market for a given country is of the monopolistic competition type and is constituted of  $n$  banks, that banks are not equally large, as larger banks are less risk averse, and that some banks operate in riskier areas than others,

depending on the size and type of investors and sectors they deal with (housing, mining, manufacturing, food and agriculture...). Our main concern is with demand and supply for loans derived from a general equilibrium model that describes banks and investors behavior.

Banks provide loans to  $m$  investors. Bank  $i$  deals with  $m_i$  of them ( $\sum m_i = 1$ ), a homogeneous subset whose total demand for loans ( $L_i$ ) is of the general form:

$$L_i = L_i(r_L, r_e, \rho, X_i) \quad (1)$$

Where  $r_L$  denotes bank  $i$  loan rate,  $r_e$  the market average rate and  $X_i$  the main characteristics of these investors, indicating namely their average size, the quality of their assets and their riskiness and their access to alternative financial resources (financial market). Indeed, most recent studies (...) show that these are important features and have a significant impact on demand for loans.

Bank  $i$ 's cost function ( $C_i$ ) depends on its own characteristics  $Y_i$  and on the money market interest rate, that is, we assume, narrowly correlated with the central bank rate ( $r$ ):

$$C_i = C_i(r, Y_i)$$

$Y_i$  reflects mainly the bank's operational costs, output (size), liquidity and capitalization, which (according to...) are significant determinants of banks decisions.

Bank  $i$ 's objective is to reach an adequate balance between higher profits and less risky situations:

$$\text{Max}[r_L L_i(r_L, r_e, X_i) - C_i(r, Y_i)] - \lambda \sigma_i^2 \quad (2)$$

Where  $\sigma_i^2$  is a risk indicator for investors of type  $i$ , which may be measured by the size and variation of the bank's NPLs.

This behavior leads to bank  $i$  loan supply function:

$$L_i^s = L_i^s(r, r_{Li}, X_i, Y_i, \sigma_i^2)$$

Or alternatively the reaction banks reaction function in terms of loan rates:

$$r_{Li} = R_i(r, L_i^s, X_i, Y_i, \sigma_i^2)$$

### **Section 3 Data and estimation results**

The model is tested using data on some EU countries (Germany, UK, and France) and MENA countries (Egypt, Morocco, Jordan, Lebanon, and Tunisia) mainly from the Bankscope data base which contains an impressive set of micro information on banks all over the world. However, it is not at all about firms or investors in general; the few variables it provides to reflect the investors characteristics is their deposits and the NPL rate, which of course depends on the bank's strategy too. This data base is quite rich regarding information on bank size, assets, incomes and profits, capital, liquidity, specialization ...

But it does not provide a sufficient number of observations for all variables; in our case the rate of non performing loans, which is a good measure of the risk level faced by each bank, is offered only for about ten percent of the sample and turned out to be non significant for the remaining 660 observation. As our sample contains in total more than 5000 observations distributed over seven years (2000 -2006).

Because of the quality of the data on loan rates, the estimations based on the impact of the central bank rate on the loan rates were not acceptable and most of the coefficient calculated was not significant. Thus, we concentrate on the loan equation.

Nevertheless we can report enough interesting and significant results and we could compare the performance of MENA countries with those of the EU countries. It turned out that the EU countries banking system reacts more significantly.

Different specifications were tested. The simplest is a regression of loans on the central bank rate (CB rate) and the loan rate, the volume of deposits, the bank's total assets, non interest income for the bank, which reflects its non lending activities in the financial market, and a country dummy, which lumps together EU countries opposed to the MENA (non EU) countries. Given the endogeneity of the loan rate a one period lagged rate is introduced instead, but this variable does not seem significant after all!

It is clear that the country dummy has a positive and significant sign showing the superior performance of the EU countries, and that all the other signs are as expected.

When a two stage estimation method or a GMM method is used, basically the same results are confirmed.

Durbin-Watson stat 0.281985  
 Dependent Variable: LOANS  
 Method: Two-Stage Least Squares  
 Included observations: 4863  
 Excluded observations: 207 after adjusting endpoints  
 White Heteroskedasticity-Consistent Standard Errors & Covariance  
 Instrument list: DP(-1) TASTS(-1) LLOANS OYCOM(-1) LIQ(-1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LLR	-5792215.	3020851.	-1.917412	0.0552
CBR	-10019532	2829346.	-3.541290	0.0004
COUNTRY	48251104	13479063	3.579708	0.0003
TASTS	0.747867	0.073935	10.11519	0.0000
OYCOM	-0.836965	0.101767	-8.224326	0.0000
LIQ	0.005723	0.001620	3.532204	0.0004
R-squared	-2.813913	Mean dependent var	3049499	.

Dependent Variable: LOANS

Method: Least Squares

Included observations: 4874

Excluded observations: 196 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LLR	-66332.75	22291.33	-2.975720	0.0029
CBR	-46208.74	13932.03	-3.316727	0.0009
COUNTRY	199868.6	71755.33	2.785419	0.0054
TASTS	0.861060	0.004294	200.5321	0.0000
OYCOM	-0.989789	0.006808	-145.3828	0.0000
LIQ	0.003571	9.82E-05	36.37470	0.0000
R-squared	0.970075	Mean dependent var	3047904.	

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## Annex

**Table 1. European banking structures : size in 2006**

	Number of credit institutions		Number of local units (branches)		Number of employees		Total assets (EUR millions)	
		Shares in % of the total		Shares in % of the total		Shares in % of the total		Shares in % of the total
Germany	2050	32,4%	40283	22,0%	692500	30,8%	7122777	27,7%
France	829	13,1%	40013	21,9%	435413	19,4%	5728127	22,3%
Austria	809	12,8%	4258	2,3%	76323	3,4%	789770	3,1%
Italy	807	12,7%	32337	17,7%	339878	15,1%	2793244	10,9%
Finland	361	5,7%	1598	0,9%	23947	1,1%	255055	1,0%
Spain	352	5,6%	43691	23,9%	261890	11,7%	2515527	9,8%
Netherlands	345	5,4%	3456	1,9%	116500	5,2%	1873129	7,3%
Sweden	204	3,2%	2004	1,1%	47069	2,1%	773708	3,0%
Portugal	178	2,8%	5618	3,1%	58213	2,6%	397123	1,5%
Luxembourg	154	2,4%	234	0,1%	24752	1,1%	839564	3,3%
Belgium	105	1,7%	4574	2,5%	67987	3,0%	1121905	4,4%
Ireland	78	1,2%	935	0,5%	39154	1,7%	1186228	4,6%
Greece	62	1,0%	3699	2,0%	62171	2,8%	315081	1,2%
<b>TOTAL</b>	<b>6334</b>	<b>100,0%</b>	<b>182700</b>	<b>100,0%</b>	<b>2245797</b>	<b>100,0%</b>	<b>25711238</b>	<b>100,0%</b>

Source : *EU banking structures*, October 2007.

# **MONETARY TRANSMISSION MECHANISM IN EGYPT, MOROCCO AND TUNISIA**

**Adel Boughrara**

## **A. INTRODUCTION**

Good knowledge of the monetary transmission mechanisms (MTM) is crucial for implementing any efficient and effective monetary policy, and this knowledge is rather

lacking in most of the countries of the Middle East and North Africa (MENA) region, in particular in Egypt, Morocco and Tunisia, the three countries covered by this paper. These three countries also have in common the fact that they announced their choice to gradually move to a monetary policy systematically geared towards inflation control, and that they are preparing to switch to inflation targeting (IT) for which having a good knowledge of the MTMs and good forecasting tools constitutes an important requirement for success. So far the number of studies in the MENA region devoted to MTMs and forecasting models is limited, and no comprehensive view of the main mechanisms is available. Some studies dealing with this theme are nevertheless worth mentioning (Boughrara 2006, Neaime, S., 2008,...). In particular, comparative studies are needed for learning from relevant experiences when conducting monetary policies. Such studies can also, among other things, enlighten MENA policymakers on the possibility of a future policy coordination and eventually monetary union.

Considering that we live in a changing world and considering that all the countries we are investigating are witnessing a lot of financial and monetary reforms, which are likely to enhance their trade and capital account liberalization and therefore to expose them to more external shocks (supply, demand, changes in terms of trade,...), it is quite obvious that the choice of an appropriate monetary strategy or policy is essential to avoid difficult situations, and that a good understanding of the MTM should help these countries in terms of policy conduct and in terms of strategy and policy choice.

The research field of monetary transmission mechanisms is constrained by at least two important factors. The first is the lack of data in terms of length and frequency of time series and of quality and reliability. The second is constant institutional changes in the studied countries which renders the different models and techniques structurally unstable and the results generally volatile. In spite of these constraints, we try in this paper to investigate the four major conventional transmission channels, namely the exchange rate channel, the interest rate channel, the lending channel, and the stock market channel. Far from describing all the transmission mechanisms, these channels are more likely to be operating in the panel countries considered. To what extent these transmission channels (e.g. interest rates, exchange rates, credit aggregates, stock market indexes...) matter will be first tested using Granger causality tests. A more formal analysis will be based on SVAR models. Firm-level data instead of aggregate level studies are not considered here as they will be the theme of a separate paper.

Before undertaking these empirical tests, we will in the next section (section II) provide a brief presentation of the main MTM channels and in section 3 the main features of the monetary policies followed in the three countries. Section 4 is the main section; it is where the methodology is laid down and MTMs are investigated empirically. In subsection 4.1, the focus is put on the interest rate pass-through; while in subsection 4.2 a more encompassing model is used for MTMs analysis covering several key variables: the exchange rate, inflation and the level of activity...The main findings will be discussed in this same section. The last section concludes and gives some policy implications.

## **B. MTMs AND CHANNELS: A BRIEF DESCRIPTION**

There are multiple theories on the role of monetary policy in the economy. The standard neoclassical model considers money to be neutral, which means that changes to the money stock and to interest rates will only have an effect on nominal variables, but will never affect real variables such as real GDP. More recent neo-Keynesian theories on the functioning of financial markets suggest that there are channels through which interest rates can affect the real economy. In particular, changes in interest rates may affect the return on equity relative to the return on bonds, which leads to changes in the financial wealth of individual firms and banks and would affect output through balance sheet effects. Interest rates can also affect credit to the private sector, and thus activity, by making higher/lower liquidity available to banks, which would affect their lending.

### ***II.1. Interest Rate Channel***

The interest rate channel is the standard Keynesian channel of monetary transmission. A fall in real interest rates lowers the cost of capital, causing a rise in investment spending, thereby leading to an increase in aggregate demand and a rise in output (Cotarelli, 1994). It is the real rather than nominal interest rate that affects consumer and business decisions. In addition, it is often the real long-term interest rate and not the short-term interest rate that is viewed as having the largest impact on spending. It is therefore important to explore how changes in the short-term nominal interest rate induced by a central bank result in a corresponding change in the real interest rate on both short- and long-term bonds. Economists argue that expansionary monetary policy, which lowers the short-term nominal interest rate, also lowers the short-term and long term real interest rate, even in a world with rational expectations (Mishkin, 1996). These lower real interest rates then lead to rises in business fixed investment, residential housing investment, consumer durable expenditure and inventory investment, all of which produce a rise in aggregate output<sup>31</sup>.

### ***II.2. Credit Channel***

There are two basic channels of monetary transmission that arise as a result of information problems in credit markets: the bank lending channel and the balance sheet channel (Kashyao, 2000). The bank lending channel is applicable when expansionary monetary policy, which increases banks' reserves and deposits, increases the quantity of bank loans available. Given banks' special role as lenders to classes of bank borrowers, this increase in loans will cause investment (and possibly consumer) spending to rise. An important implication of the credit view is that monetary policy will have a greater effect on expenditures of smaller firms that are more dependent on bank loans than on large firms that can access the stock and bond markets directly.

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<sup>31</sup> Taylor (1995) surveys research on interest rate channels and concludes that there is strong empirical evidence for substantial interest rate effects on consumer and investment spending, making the interest-rate monetary transmission mechanism a strong one.

The balance sheet channel arises from the presence of asymmetric information in credit markets, particularly with respect to adverse selection and moral hazard. The lower the net worth of business firms, the more severe the adverse selection and moral hazard problems are from lending to these firms. Lower net worth reduces the collateral for loans, and so losses from adverse selection are higher. A decline in net worth, which raises the adverse selection problem, thus leads to decreased lending and investment.

Expansionary monetary policy, which causes a rise in equity prices as described earlier, raises the net worth of firms and so leads to higher investment spending and aggregate demand because of the decrease in adverse selection and moral hazard problems. Expansionary monetary policy which lowers nominal interest rates also causes an improvement in firms' balance sheets because it raises cash flow, thereby reducing adverse selection and moral hazard problems. An important feature is that it is the nominal interest rate that tends to affect firms' cash flow the most, because long-term debt is typically fixed and thus has little impact on firms' cash flow<sup>32</sup>.

The existence of the bank lending channel relies on two basic conditions. On the one hand, the monetary authorities should be able to affect the supply of bank loans through open market operations or other monetary instruments. On the other hand, there should be no perfect substitutes to bank loans for, at least, some types of borrowers. Obviously, these conditions clearly depend on the structure of the financial system and its regulation. The key point here is that the real effects of higher interest rates may be amplified through the lending channel beyond what would be predicted where policy transmitted solely through the traditional interest rate (cost of capital) channel. As market interest rates rise subsequent to monetary tightening, business investments fall not only because the cost of capital is higher, but also because the supply of bank loans, mostly to small and medium sized firms, is reduced. Firms in Tunisia have relied heavily on bank lending. The bias towards bank debt financing not only makes firms more dependent on bank lending, but also increases the sensitivity of firms' balance sheets to interest rate movements.

Many economists, using aggregate time series data, have attempted to identify the credit channel by studying the behavior of the credit aggregate following a monetary tightening (Bernanke & Blinder, 1992; Kashyap & Stein, 1994; Ramey, 1993; Romer & Romer, 1990). They found, using the VAR methodology, that an unanticipated hike in the interest rate (the measure of stance of the monetary policy) is followed by a decline in loans. Does this signify that the credit channel is operative?

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<sup>32</sup> As Cecchetti (1995) and Hubbard (1995) point out, the different interpretation of the observable decline in bank loans after a monetary contraction reflects a serious identification problem (the so called demand-supply puzzle identification). While the credit channel emphasizes a shift in loan supply, the interest rate channel postulates a shift in loan demand, which stems from a drop in real activity due to higher interest rates. Distinguishing between these predictions is a difficult task: *"It is not possible using reduced-form estimates based on aggregate data alone, to identify whether bank balance sheet contractions are caused by shifts in loan supply or loan demand"* (Cecchetti, 1995).

The answer to the above question is far from being easy. At first glance, the decline in bank loans seems to be consistent with the credit view. From the credit proponents' view, a restrictive policy shifts the bank curve supply left pushing down the quantity of loans supplied by banks. As surprisingly as it may appear, the same result would occur (loans will decline) even though the credit channel is not operative: a restrictive monetary policy could leftward bank curve demand causing the decline of bank loans; this process is fully consistent with the interest rate channel (the money view). In fact, subsequent to a monetary tightening, money demand declines, and bank loans contract because of the high correlation between monetary and credit aggregations. As soon as bank loans contract, deposits are also likely to contract. Therefore, different schedules movements give rise to the same phenomenon, namely loans contraction; this is a supply-demand puzzle, which implies that bank loans contraction is consistent with both lending and interest rate channels.

How to identify each of them? To check whether the lending channel is operative or not, one may attempt to identify whether bank loans contraction corresponds to a leftward supply curve or rather to a leftward demand curve. If the lending channel is operative, a monetary tightening will shift the supply schedule of bank loans. It is worth noting that such monetary policy could trigger a parallel move in supply as well demand curves; such a situation would reflect the coexistence of both lending channel (lending view) and interest rate channel (money view). It goes without saying that bank loans contraction, of itself, is not necessarily a consequence of a leftward shift in the supply schedule. Another solution would consist in studying and testing the long-run implication of the model describing the lending channel.<sup>33</sup>

### ***II.3. Equity Price Channel***

There are two channels involving equity prices that are important to the monetary transmission mechanism; these involve Tobin's Q theory of investment and wealth effects on consumption.<sup>34</sup> Tobin's Q theory provides a mechanism by means of which monetary policy affects the economy through its effects on the valuation of equities.  $q$  is defined as the market value of firms divided by the replacement cost of capital. If  $q$  is high, the market price of firms is high relative to the replacement cost of capital, and new plant and equipment capital is cheap relative to the market value of business firms. Companies can then issue equity and get a high price for it relative to the cost of the plant and equipment they are buying. Thus, investment spending will rise because firms can buy a lot of new investment goods with only

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<sup>33</sup> Several studies have explored the timing patterns of financial and real aggregates following a monetary tightening. Using VAR analysis, Bernanke and Blinder (1992) and that bank loans and real output decline by degrees roughly contemporaneously after a monetary policy shock. This finding is consistent with the credit channel, as banks appear to decrease their loan activities in response to a monetary tightening, and when bank lending drops this curtails real activity. Romer and Romer (1990) report a similar result, but relate it to the interest rate channel, because of the sluggish decline in bank loans that coincides with the decline in real output. King (1986) and Ramey (1993) observe that bank loans perform badly in predicting real activity, which prompts the conclusion that bank lending has an inferior impact on spending; whereas, Morgan (1998) shows that the sluggish adjustment of bank loans can be explained by loan commitments, which suggests that the loan level may not drop immediately when monetary policy tightens.

<sup>34</sup> See Cashin (1995) and Chen (2001).

a small issue of equity. The reverse applies when  $q$  is low, and consequently, investment spending will be low. When the central bank reduces interest rates, the discounted value of future profits of companies rises and fixed income instruments become relatively less attractive. Thus, the demand for equities increases as does their price. To the extent that firms compare the market value of capital to its replacement cost in making investment decisions, this stimulates investment expenditures, and hence output.

It goes without saying that the asset price channel works through many markets including real state market and securities market. However, in emerging countries, empirical analysis usually emphasize the stock market channel because of lack of data on other markets. Egypt, Morocco and Tunisia are not exceptions since data are only available on their stock markets. An alternative channel for monetary transmission through equity prices occurs through wealth effects on consumption. According to Modigliani's life-cycle model, consumption spending is determined by lifetime resources of consumers, which are made up of human capital, real capital, and financial wealth. A major component of financial wealth is common stocks. When stock prices rise, the value of financial wealth increases, thus increasing the lifetime resources of consumers, and consumption should rise.

#### ***II.4. Exchange rate channel***

Another important channel for transmitting monetary policy is through its effects on the exchange rate of the local currency. If interest rates on domestic securities, e.g. T-bills, are higher than on other foreign ones, they become more attractive, other things being equal. By increasing the interest rate spread between domestic and foreign assets, the Central Bank can encourage a capital inflow or reduce an outflow, i.e., spur demand for the local currency. Under normal conditions a rise in interest rates prompts an exchange rate appreciation (or less depreciation than otherwise), contributing towards lower import prices which, all things being equal, has a direct effect towards reducing inflation. Since changes in the exchange rate alter the relative prices of domestic and foreign goods and services, and thereby the competitive position of domestic companies vis-à-vis foreign ones, they exert an effect on external trade and domestic demand. An appreciation makes imported goods and services relatively cheaper, channelling demand out of the domestic economy. Demand for domestic production reduces, thereby leading to lower inflation (all things being equal).

### **C. MONETARY POLICIES IN EGYPT, MOROCCO AND TUNISIA**

#### ***III.1. Egypt***

Until the end of the 1990s, the Egyptian monetary authority chose to target the exchange rate as the nominal anchor as most Middle Eastern countries. During the 1990s, Egypt has witnessed a severe macroeconomic crisis; by 1990–91 inflation was running at 24 percent, the budget deficit was 18 percent of GDP, the CBE only had enough foreign exchange reserves to cover three weeks of imports, foreign debt had risen to 151 percent of

GDP, and the GDP grew only at 3.6 percent. This situation prompted policymakers to embark on a series of monetary and financial reforms. The most striking feature of these reforms is that the Central Bank of Egypt (CBE) was attempting to achieve multiple objectives simultaneously (boosting economic growth, reducing inflation, preserving a stable exchange rate) in a context characterized by an increase capital mobility and instable political environment. By the end of 1999, Egyptian monetary authority was prompted to shut down the peg regime and to adopt a crawling peg regime in order to resolve the inconsistency emanating from a combination of exchange rate rigidity, reluctance to use international reserves to support the peg of the dollar and an attempt to reduce the interest rate to boost economic growth. The Central Bank of Egypt (CBE) has also started to pursue tight monetary policy aiming at stabilizing the economy and reducing inflation rates. The monetary authority occasionally intervenes in the market to maintain the exchange rate within the bands specified in the policy. Until the set up of the corridor system in 2005, the CBE used excess reserves of banks as its operational instrument, and M2 as its intermediate target given its strong linkage with inflation. The CBE used also various instruments, quantitative as qualitative, to achieve its multiple objectives at different points in time; these instruments are reserve requirement, government securities, repo et reverse repo operations as well as the CBE discount rate.

By 2003 and thanks to new banking law exchange rate stability has been replaced by price stability, and inflation has become the bank's primary target. As off 2008, Egypt still has not explicitly stated a nominal anchor, it rather monitors various indicators in conducting monetary policy. The CBE intends to put in place a formal inflation targeting framework to anchor monetary policy once the fundamental prerequisites are met. During the transition period, the CBE intends to meet its inflation objectives by steering short-term interest rates, keeping in view the developments in credit and money supply, as well as a host of other factors which may influence the underlying rate of inflation. In order to regulate the money supply and control price rises, the CBE introduced corridor rates for overnight deposit and lending since June 2005. Recently, The Egyptian monetary authority has established an inter bank market for foreign exchange that is a prerequisite for the Egypt's transition to a unified flexible exchange rate system.

### ***III.2. Morocco***

Since the beginning of the 1990s, the role of Moroccan monetary policy has been reshaped. Credit restrictions have been relaxed and the new monetary policy has been based on indirect control instrument. The primary objective of the Moroccan monetary policy, as defined in the new 2005 Bank Al-Maghrib (BAM) statutes, is the maintenance of price stability. It includes the intermediate targets as well as the rules and the procedures. The monetary policy, sought to ensure that the rate of growth in means of payments, was in line with ensuring that the productive sector enjoyed adequate funding. Moroccan monetary authority has firstly started to carry out a monetary targeting strategy with announced growth rates of M3 (and recently of M1) as the main operational targets. The current practice of monetary policy implementation requires the existence of rather strict capital account restrictions. Moroccan monetary authority has adopted officially a fixed exchange rate regime in the early 1990s. Despite their official target, which consists in preserving the stability of

the currency, price stability also represents one of the main policy-making elements. Until the first two quarters of 2008, the Moroccan monetary policy framework is still an informal quantitative framework. Since the beginning of the 1990s, Moroccan monetary authority has decided to pursue an exchange rate policy of pegging the local currency (Dirham) to an undisclosed basket of currencies. On the other hand, restrictions on capital movements are maintained. These restrictions, which are applied to residents, concern more capital outflows rather than inflows. The capital account restrictions have allowed the authorities to maintain the pegged exchange rate in combination with an independent monetary policy.

### ***III.3. Tunisia***

The chief de jure objectives of the Tunisian monetary policy include preserving the value of the currency as well as supporting the economic policies of the government. To do this, at the end of 1980s, the monetary authority has decided to carry out a stability-oriented monetary strategy. The monetary policy formulation has focused on the determination of the proper growth of an intermediary aggregate according to the quantity equation of money. The target for the growth in the intermediary monetary target is derived by inserting forecasts for the rates of change in prices and output as well as in the velocity of the intermediary target expected to occur. Commitment to this target is intended to make credible the commitment to price stability.

Targeting the broad money growth (M2 since 1988 and M3 since January 2003), in addition to pursuing a highly managed exchange rate regime, has represented until recently the core of the monetary framework. The Central Bank of Tunisia (BCT) derives, from the growth target for broad money, the ancillary target for the monetary base by assuming stable multiplier. Considering the projected path of the broad money on the one hand, and having at its disposal an estimate of the required increases in net domestic credit on the other hand, the BCT derives the credit expansion to the public sector that is deemed to be consistent with these projections. The amount of credit expansion is estimated given a separate assessment of the private sector credit needs. Finally, the BCT determines the amounts of liquidity to be distributed through the refinancing facilities by taking into account in particular the projected net international reserves as well as the credit requirement of the agricultural sector. These amounts need to be fine-tuned on a weekly basis in the light of the supposed financing needs of the commercial banks. Tunisia still maintains relatively strict control on capital account transactions. However, in 2007, Tunisia has announced that it the main objective of its monetary policy is going to be inflation control and the central bank key interest rate will be its main instruments. It has also been announced that it will be gradually preparing and moving to an IT framework, but no deadline is fixed as to when the preconditions should be fulfilled.

## **D. MONETARY TRANSMISSION CHANNELS**

When studying channels of monetary transmission it is first important to assess how the central bank main rate (policy rate) affects other retail interest rates, in particular the lending rates banks and other financial intermediaries charge to businesses and consumers. These

rates end up impacting on inflation and real variables, usually with some lag, as households and firms take them into consideration in their consumption and investment decisions.

#### ***IV.1 Interest rate pass-through***

##### ***IV.1.1. Methodology***

Assessing the strength as well as the speed with which central bank main rate changes affect lending rates is thus a preliminary step in the monetary transmission analysis.

In textbooks, the interest rate charged by commercial banks is usually assumed to be a function of the marginal cost of funds to the lenders. The cost to a bank of borrowing from other banks or the cost of using the central bank short-term lending facility can be useful proxies of the opportunity cost of funds for banks. Then changes in these rates can be expected to be passed through to market lending rates. The expression “pass-through” is used to refer the metric that measures the strength of connection between the policy rate and a detailed rate. A high pass-through heightens this connection while a low one lowers the connection. Pass-through is complete when a movement in the policy rate leads to a one for one change in lending rates.

Several factors may determine the extent to which the policy rate pass-through to lending rates. These factors range from structural issues in the financial industry to changing economic conditions. The policy rate may be more or less effective in bringing about changes in the market lending rates in the desired direction. Still, the effectiveness of the policy rate itself may vary over time especially when it comes to countries undertaking reforms or with underdeveloped financial markets. Indeed, Tieman (2004) argued that low degree of monetization, underdeveloped financial markets, and the existence of capital controls may undermine and limit the effectiveness of central banks policy rate changes. Bredin et al. (2001) argued when banking industry lacks competition (because of regulation, collusion by banks of fixed costs of entering the market) the spread between the policy rate and the lending rates becomes high and the adjustment of the latter to the former becomes slow. One of the reasons that may explain the slowness of the adjustment of bank lending rates is the difficulty of deciphering whether changes in policy rates are permanent or temporary and whether changes in policy rates are expected or unexpected.

The speed of adjustment is also likely to depend on the liquidity of the banking sector. An excess liquidity in the banking sector as is currently (2007-2008) the case in Morocco, Egypt and Tunisia could render any policy rate ineffective. Excess liquidity could bring about an asymmetric in behavior of banks, which may respond differently to cost increases than to revenue decreases (Sarno and Thornton, 2000). Finally, the balance sheet problems (non-performing loans) in the banking and corporate sectors are also frequently mentioned as a cause of policy rate ineffectiveness.

The long-term relationship between the administered rates and the market rate could be formulated according the following ARDL (m,n) model:

$$y_t = \alpha_0 + \sum_{i=1}^m \alpha_i y_{t-i} + \beta_0 x_t + \sum_{i=1}^n \beta_i x_{t-i} + u_t$$

Where  $y_t$  represents the lending rate rates;  $x_t$  denotes the policy rate (which is assumed to be exogenous);  $u_t$  is the disturbance term;  $m$  and  $n$  indicate the optimal lag lengths. The long-run equilibrium associated with Eq.(1') could be expressed as:

$$y^* = \theta_0 + \theta_1 x^* + u^*$$

Where  $\theta_1$  stands for the long-term multiplier, which has to be calculated as:

$$\theta_1 = \frac{\beta_0 + \sum_{i=1}^n \beta_i}{1 - \sum_{i=1}^m \alpha_i}$$

A full pass-through in the long run is reflected by  $\theta_1=1$ . An imperfect pass-through ( $\theta_1<1$ ) could be caused by a less than perfect elasticity of demand for banking products, the existence of market power, lack of market contestability, switching costs, or information asymmetries. If the long-term pass-through is found to be overshooting ( $\theta_1>1$ ) in lending markets which is less likely in case of Egypt, Morocco and Tunisia, this can be interpreted as a situation where banks increase lending rates to compensate for higher risks instead of rationing credit.

#### IV.1.2 Empirical Findings

The results reported on Table 1 clearly corroborate our preliminary conclusion regarding the degree of the interest rate pass-through in all countries. Overall, they indicate that the pass-through is incomplete to all retail rates (deposit and lending rates). It is worth noting however that the magnitudes of pass-through coefficients associated to deposit rates are weaker than those associated to deposits rates. For instance, the long-run pass-through effect in case of Egypt is around 0.31 for lending rate and 0.11 for deposit rate. This implies that 31 per cent of any money market rate change is passed through to the lending rate in the long – run, and only 11 per cent of the policy rate is passed through the deposit rate. The pass-through in Morocco is slightly superior to that in Egypt. Approximately 40 per cent of the change in the Moroccan policy rate is passed through the lending rate whereas 33 per cent is passed through deposit rate. Likewise, the pass-through degree in Tunisia is not significantly different from that recorded in Morocco.

**Table 1:** Interest Rate Pass-through

	Egypt	Morocco	Tunisia
Lending Rate	0.31	0.4	0.39
Deposit Rate	0.11	0.33	0.27

Source: Author's calculation

Stickiness of retail rates in the case of Egypt, Morocco and Tunisia is due to the presence of adjustment costs associated with changing retail rates to customers and this may lead to the smoothing of retail interest rate changes with respect to changes in the policy rate (which could play the role of the marginal cost of funds). It is also caused by to the lack of competitiveness among banks. Indeed, the lesser the degree of competition, the higher this spread is likely to be. In the panel countries considered in this paper, the lack of competition is due, to a great extent, to regulation (case of Egypt), to collusion on the part of financial

institutions or fixed costs of entering the market (Tunisia and Morocco), and to the ‘gentleman’s agreement’ (Tunisia). Besides, the monopolistic or oligopolistic structure of countries’ banking systems explains the small pass-through degree because in such banking, retail rates won’t move significantly and quickly in response to changes in money market rates.

Finally, the finding of a weak interest rate pass-through could be explained in all the Egypt, Morocco and Tunisia by the fact that the monetary institution lacks credibility; in such case, economic agents may misperceive temporary policy rate shocks as being permanent. Having said that

Overall empirical results on long-run interest rate pass-through seem to indicate that the central banks policy rates do not seem to rapidly determine the market lending and deposits rates. Yet, we would expect interest rate pass-through to have improved in recent years given the improvement in the specific features of the monetary framework, banking sector and economic conditions as described in the previous section.

## **IV.2. Monetary Transmission Analysis**

The next and main step in analyzing MTMs is to examine the impact of policy measures on the key economic variables, primarily inflation and the activity level. A natural extension of the analysis of interest rate pass-through presented in the previous part lies in analyzing the complete interest rate channel of monetary policy, from policy rate changes to movements in the consumer price index and changes in the level of economic activity.

### ***IV.2.1 Methodological issues***

The issue, addressed in the context of Egypt, Morocco and Tunisia, is part of a broader issue of effectiveness of interest rate policy in controlling inflation by affecting aggregate demand and through other channels; which requires a better insight into the transmission channels of monetary policy.

The purpose of this analysis involves many objectives. First, it is to separate the policy impacts into anticipated and unanticipated components. The unanticipated component reflects how policy has deviated from the usual path (Cochrane, 1995). The separation between these two components may be obtained using a structural VAR model of the type popularized by Sims (1980). Such a dynamic system of equations describing the interrelationships between economic variables requires imposing minimal assumptions about the underlying structure of the economy, which adds to the lack of consensus about MTM in Morocco and Tunisia.

VAR models aim at determining the impact of unanticipated changes in monetary policy. However, these changes cannot be directly detected. Reduced-form innovations of VAR models cannot be interpreted as structural or deep shocks (Green, 2005). Thus, the challenge is also to

identify and separate policy shocks (structural shocks) and endogenous effects. The challenge of distinguish policy changes from endogenous changes is indeed a fundamental monetary issue<sup>35</sup>.

The identification of the structural auto-regressive (SVAR) model is achieved through a set of restrictions. In the structural VAR literature these restrictions are usually taken from economic theory and are intended to represent some meaningful short-run or long-run relationship between the variables and the structural shocks. That is, the reduced form model with correlated innovations has to be transformed into a structural form with uncorrelated, economically interpretable shocks. Much of the discussion in the literature that examines the impact of monetary policy deals with the issue of how to best identify monetary policy shocks. Indeed, investigating monetary transmission mechanisms supposes that the economist has enough knowledge about the policy variables as well the target variables.

The form of the structural vector auto-regression (SVAR) used in this paper project (the different papers) reflects the fact that the countries we are considering are small and open.

In our case, we start with a lower triangular VAR model and adopt the Choleski factorization approach. This implies that the first variable responds only to its own shock, the second variable responds to the first variable plus to a shock to the second variable, and so on. Finally, the last variable in the system reacts without delay to all shocks, but disturbances to this variable have no contemporaneous effect on the other variables. This recursive scheme entails that the ordering of the variables matters for the identification of the shocks. The ordering we are assuming is based on the speed with which the variables respond to shocks. The output is assumed to be the least responsive (that is the most exogenous), followed respectively by the prices, then by the transmission variables; at the end, we put the interest rate variable. By putting the interest rate in the last position, we implicitly suppose that the monetary authorities respond to all other variables contemporaneously. The central bank reaction function includes all the contemporaneously variables. In contrast, the interest rate has no immediate impact on the other variables. Its impact is perceptible with a time lag. In other words, if Y stands real activity (output), P for prices, T for a potential transmission variable, and R for the central bank main policy rate, the order chosen is: Y→P→T→R, and the model has the following form:

$$\begin{aligned}
 Y_t &= E_{t-1}(Y_t) + \varepsilon_t^Y \\
 P_t &= E_{t-1}(P_t) + \rho \varepsilon_t^Y + \varepsilon_t^P \\
 T_t &= E_{t-1}(T_t) + \lambda_1 \varepsilon_t^Y + \lambda_2 \varepsilon_t^P + \varepsilon_t^T \\
 R_t &= E_{t-1}(R_t) + \gamma_1 \varepsilon_t^Y + \gamma_2 \varepsilon_t^P + \gamma_3 \varepsilon_t^T + \varepsilon_t^R
 \end{aligned}$$

Where the  $\{\varepsilon_{j,t}; j=Y,P,T,R\}$  are the structural shocks;  $E_{t-1}(\cdot)$  is the expectation of a variable based on the information set at the end of period t-1; and the T variable stands for a transmission variable, which could be an exchange rate variable, a credit variable or an indicator of the asset market such in the cases at hand stock market prices. According to this picture, the monetary policy does not

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<sup>35</sup> This issue has been discussed more widely and formally by other authors (Sims, 1988; Bermanke and Blinder, 1992; Christiano and Eichenbaum, 1992), we only provide informal information.

have any contemporaneous effect, which may be rationalized by assuming the existence of time dependent rules, convex adjustment costs, menu costs or building and delivery lags.

Finally, it is worth noting that due to the contemporaneous nature of our restrictions, the lags of the effects are left unrestricted. We use ML estimation together with numerical optimization methods in the form of a scoring algorithm (Breitung et al., 2004; Amisano and Giannini, 1997).

Inference and testing in VAR models depend tightly on the correct specification of the lag length. Many approaches have been used in the economic literature. The most widely used techniques are information criteria and likelihood ratio (LR) test. The LR test consists in the comparison between two different lags according to the following hypotheses:

$$\begin{cases} H_0 : p = p_0 \\ H_1 : p = p_1 \quad (p_1 > p_0) \end{cases} \quad (10)$$

The parameter  $p$  stands for the VAR lag length. This test will be conducted using the following test statistics:

$$LR = 2(\hat{L}_1 - \hat{L}_0) \equiv T(\log|\hat{\Omega}_0| - \log|\hat{\Omega}_1|) \quad (11)$$

Where  $\hat{L}_0$  and  $\hat{L}_1$  are the estimated log-likelihoods obtained after estimation of VAR( $p_0$ ) , and VAR( $p_1$ ), respectively.  $|\hat{\Omega}|$  stands for the determinant of the appropriate covariance matrix. On the other hand and from the same estimations, the estimated matrices of variance-covariance of residuals are also calculated as follows:

$$\hat{\Omega}_i = \frac{1}{T} \sum_{t=1}^T \hat{u}_t(p_i) \hat{u}_t'(p_i) \quad \text{for } i=1,2 \quad (12)$$

The LR statistic has the chi-squared distribution with  $q = n^2(p_1 - p_0)$  degrees of freedom which are equal to the number of restrictions in the system under the null hypothesis.  $n$  is the number of endogenous variables.<sup>36</sup> An alternative approach to select the appropriate lag length is based on information theory which proposes a battery of information criteria. Many studies have analyzed the behavior of these criteria in finite sample as well as asymptotically (Lütkepohl, 1985). It turned out that there is no specific criterion that could be considered as preferable in all situations. It has been shown for instance that when it comes to VAR models with a relatively moderate sample size, and when data frequency is monthly, the criterion of Akaike (AIC) is recommended (Ivanov and Kilian, 2005). It is determined by the following statistic:<sup>37</sup>

$$AIC = T \log|\hat{\Omega}| + 2n \quad (13)$$

<sup>36</sup> When the estimation of a VAR model is conducted over a sample with a low size, Sims (1980) suggests a slight correction replacing  $T$  in Equation (10) by  $T - n(1 + p_1)$  where  $(1 + p_1)$  is the number of estimated parameters in each equation of the VAR model specification (Equation (2)).

<sup>37</sup> See Lütkepohl (1993), Chap.4.

Besides, in order to assure a relevance of the lag length choice, we run Ljung-Box test (henceforth, LB) for residual serial correlation up to 16 lags (Hosking, 1980; Lütkepohl, 1993). If  $p$  is the dimension of the VAR and  $k$  its lag order, then it has been demonstrated (Lütkepohl, 1993, p.151) that the overall significance of the residual autocorrelation up to lag  $h$  has an approximate asymptotic chi-squared distribution with  $p^2(h - k)$  degrees of freedom. The reduced form covariance matrix, subject to restrictions imposed in the structural form, is next used to obtain estimates for the contemporaneous impact matrix.

#### ***IV.2.2. Empirical Findings***

##### **Case of Egypt:**

##### ***Data description:***

The quantitative assessment of the effects of the monetary policy decisions on the main macroeconomic key variables requires, among other things, the identification of an appropriate measure of the monetary policy stance. As far as Egypt is concerned, this task is far from being easy given that the CBE did not consistently control an interest rate-based indicator of the monetary policy stance. Two solutions can therefore be put forward: either to generate a new indicator or to select one interest rate among the 3-month Treasury bill rate and the discount rate. The first solution has been carried out by Al-Mashat and Billmeier (2007). Such solution has at least two caveats; the first one is that the quality of the indicator depends on the quality of the data used to generate it. In case of Egypt, there is no warranty that the data used are sufficiently informative. The second and the most serious caveat is that the indicator one may generate is different from the traditional interest rates. An increase in this indicator corresponds to an ease in monetary policy. Thus, all the VAR analysis one may obtain are confined to the case of an ease in monetary policy. However, policymaker and central banker are more interested in the effects of a restrictive monetary policy. In other words, the results will be relevant if and only if the effects of monetary policy are symmetric, which in general is not true. Hence, we adopt the second solution. We do not use the discount rate for the same reasons put forward by Mashat and Billmeier (2007), namely because it exhibited a downward trend without any cyclical behavior. Instead, we use the 3-month Treasury bill rate (hereafter, TB\_Rate) as the CBE's policy rate.

The other data we used in the case of Egypt are a measure of real activity, proxied by GDP deflated by the whole sale price index (RGDP); prices proxied by the whole sale prices (WPI); a nominal exchange rate, proxied by bilateral U.S. dollar (ER), and a stock market index proxied by the Cairo and Alexandra Stock exchange index (CASE).

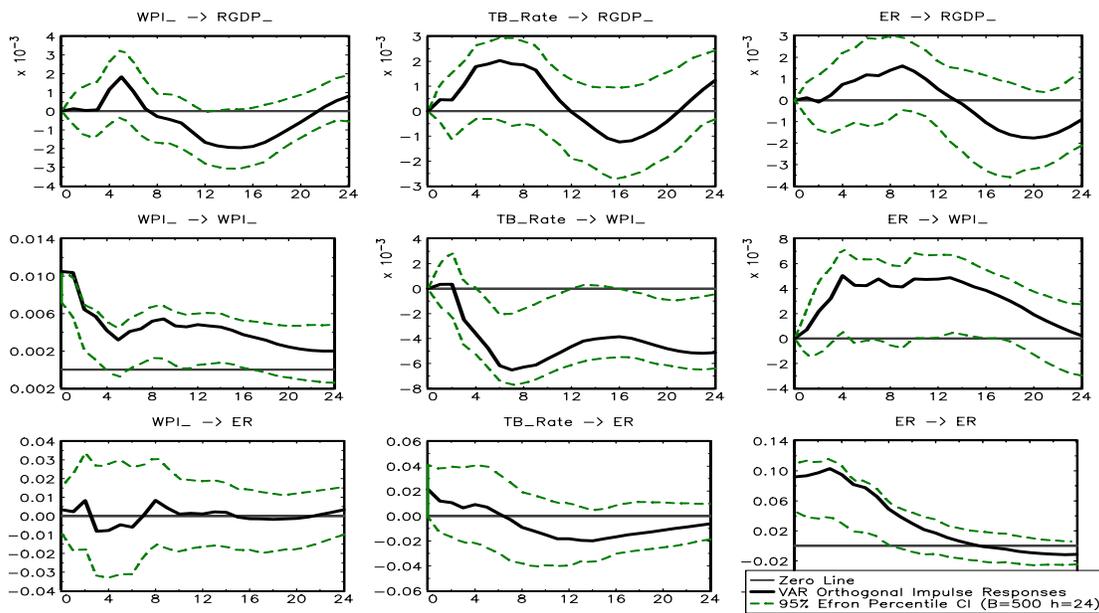
##### ***A.1. The baseline model:***

In line with the above explanation, we start the empirical analysis of the MTM in Egypt by considering the baseline model which comprises the four following endogenous variables  $Y_t = [RGDP_t, WPI_t, TB\_rate_t, ER_t]$ . We also include in the VAR the oil price and the US federal funds rate in order to avoid well-known empirical anomalies such price puzzle. All the variables are considered in level and in log except for rates. All the data used are from

IMF International financial statistics CD ROM (July 2008). Date are monthly and covers the period 1997:01-2007:12.

The response of prices to an increase in the monetary policy measure (the Treasury bill rate) is also significant and quick- prices start to decrease after about one quarter or so; the monetary policy seems effective in bringing down prices. The strong deflationary impact of a tightening on the WPI is intuitive and consistent with earlier findings (Rabanal, 2005 and Al-Mashat and Billmeier, 2007). As for the response of real activity, it stands out from the IRFs pattern that the policy rate fails to impact on real activity. While the reaction of the real activity to an exchange rate hike is not significant, it appears to be consistent with prior expectations especially after one year or so; the activity start to decline just after one year. Overall, these findings are consistent with the theory and free from any puzzle.

**Figure 1:** Selected IRFs responses of the baseline VAR (Egypt)



To get a clear picture about the share of the fluctuations in a given variable that are brought about by other variables' shocks, we reported on Table 2 variance decompositions for each variable at forecast horizons of 1, 6, 12, 18 and 24 months. The number reported on the columns stand for the percentage of variance due to each shock, with each row adding up to 100 per cent. For instance, after 24 months, interest rate shocks account for around 5 per cent of the reactivity fluctuations which quite small when compared to other emerging countries. However when it comes to exchange rate, its contribution in real activity is much more pronounced than that of the interest rate: the exchange rate shocks account for around 24 per cent of the real activity variations. The variance decomposition for the baseline VAR indicates that most variables fluctuations are explained by their own innovations even after two years. The exception is the WPI, whose variation after barely one year is mainly explained by the exchange rate; shocks to exchange rate account for slightly more than 30 per

cent of the fluctuation in WPI (see Table 2). This finding is consistent with a strong exchange rate pass-through to the WPI. These results are also consistent with previous findings on Egypt (See Mashat and Billmeier, 2007), and they speak about the importance of the exchange rate channel.

**Table 2:** Variance Decomposition (percent of total variance)

Variance Decomposition of Output (RGDP)				
Months	RGDP_	WPI_	TB_Rate	ER
1	100	0	0	0
6	93	0	3	4
12	72	4	5	19
18	72	5	5	19
24	67	4	4	24

Variance Decomposition of Prices (WPI)				
Months	RGDP_	WPI_	TB_Rate	ER
1	13	87	0	0
6	10	70	5	15
12	6	49	17	28
18	11	38	16	35
24	17	33	18	32

Variance Decomposition of policy Rate (TB_Rate)				
Months	RGDP_	WPI_	TB_Rate	ER
1	0	0	1	0
6	3	1	77	19
12	5	1	72	20
18	7	1	72	19
24	8	2	69	21

Variance Decomposition of Exchange Rate (ER)				
Months	RGDP_	WPI_	TB_Rate	ER
1	0	0	6	94
6	2	0	6	91
12	5	0	4	90
18	16	0	5	79
24	16	1	5	77

Source: Author's calculation

In order to check for the robustness of these baseline results, we re-run the model while using a monetary aggregate (reserve money) to signal the monetary stance; besides, the endogenous variable ordering has been also inversed, exchanging the exchange rate and the monetary stance measure variable. While the former check is driven by the attempt to employ a quantity measure of the monetary stance (as opposed to artificial or price-based), the latter check is motivated by the fact that the exchange rate may be considered, at least occasionally, a policy target, and hence exogenous to the monetary stance in the short run.

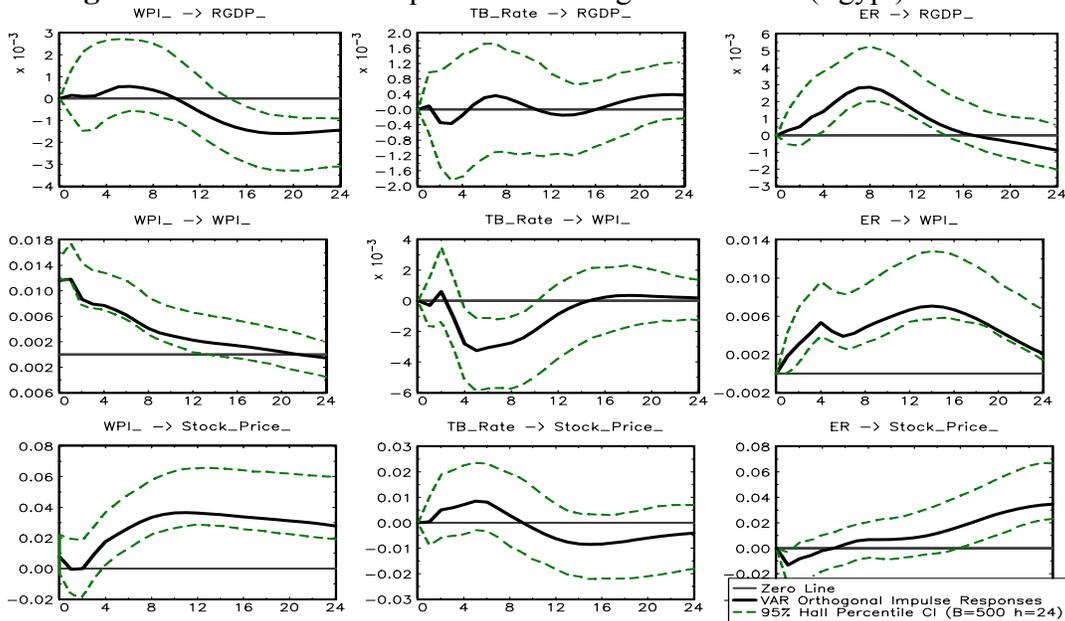
The inversion of the exchange rate variable and the monetary stance variable has no substantial effect on the results, indicating that the baseline specification is rather robust.

### ***A.2. The exchange rate and asset price channels***

The most striking finding that should be highlighted when including the stock price variable in the baseline VAR model is that of the exchange rate variable. The exchange rate became more effective in impact on real activity, whole sale prices and stock prices. That

could indicate that exchange rate channel is operative in Egypt and its effects are much preannounced as it stands from the IRFs patterns reported on figure 4. The introduction of the ‘stock prices’ variable in the baseline VAR model highlights the significant role of price on the main variables. Not only the responses of real activity, stock prices to an increase in prices are consistent with the theory but also they are quick and statistically significant. This finding signifies that the asset channel amplifies and reinforces the effects of the traditional interest rate channel. The introduction of the stock price variable indicates that the asset channel plays a significant in role in propagating the monetary policy effects. Indeed, the monetary policy contraction would trigger a householders and businessmen’s feeling that their profit will lower (expectations effects), which would put pressure on stock markets quotations and thereby strengthening the wealth effect. That is how the asset price channel comes in play in Egypt. Figure 2 exhibits the different responses to monetary contraction. But, the effects of monetary policy changes on real activity are still far from statistically significant.

**Figure 2:** Selected IRFs responses of the augmented VAR (Egypt)



### A.3. The bank lending channel in Egypt

In this subsection we provide an alternative approach to resolve the supply-versus-demand puzzle. An important assumption is that an observable quantity of bank loans is the equilibrium value given by the intersection of the demand and supply curves in the bank loan market. In principle, a change in the quantity may be associated with a shift of the demand curve, a shift of the supply curve, or both. A decline in the quantity, for example, is not necessarily caused by a leftward shift of the supply curve. It could be also brought about by a shift of the demand curve. Having an eye on the price will make it easier to identify the shifts of the supply and demand curves behind the change in the quantity. The approach can be well understood using a simple demand-supply model. Following an exogenous shock, the supply curve and/or the demand curve will shift, so that the price (P) and/or the quantity (Q) will

move. Four cases could be envisaged: Case A:  $Q$  decreases, while  $P$  does not rise. Case B:  $Q$  increases, while  $P$  does not fall. Case C:  $P$  rises, while  $Q$  does not increase. Case D:  $P$  falls, while  $Q$  does not decrease. In the context of testing the lending channel, case A needs to be focused on. If it is found statistically significant in the loan market following a monetary tightening, then the lending view is supported. If however case B is found to be significant, then the lending view could be rejected. In the remaining two cases, nothing can be inferred about the position of the supply curve. If the lending channel of monetary policy is dominant, a leftward shift of the supply schedule must be clearly observed following a monetary tightening. A rise of the loan price detects a leftward shift of the supply schedule of bank loans unless the quantity of bank loans increases. For the study of the lending channel to be meaningful, it might be also worthwhile to test the effectiveness of monetary policy. Thus, the lending view will be accepted if:

- H1: the quantity of bank loans ( $LQ$ ) does not increase,
- H2: the price of bank loans ( $LP$ ) rises, and
- H3: real output ( $RGDP$ ) decreases, following a monetary contraction.

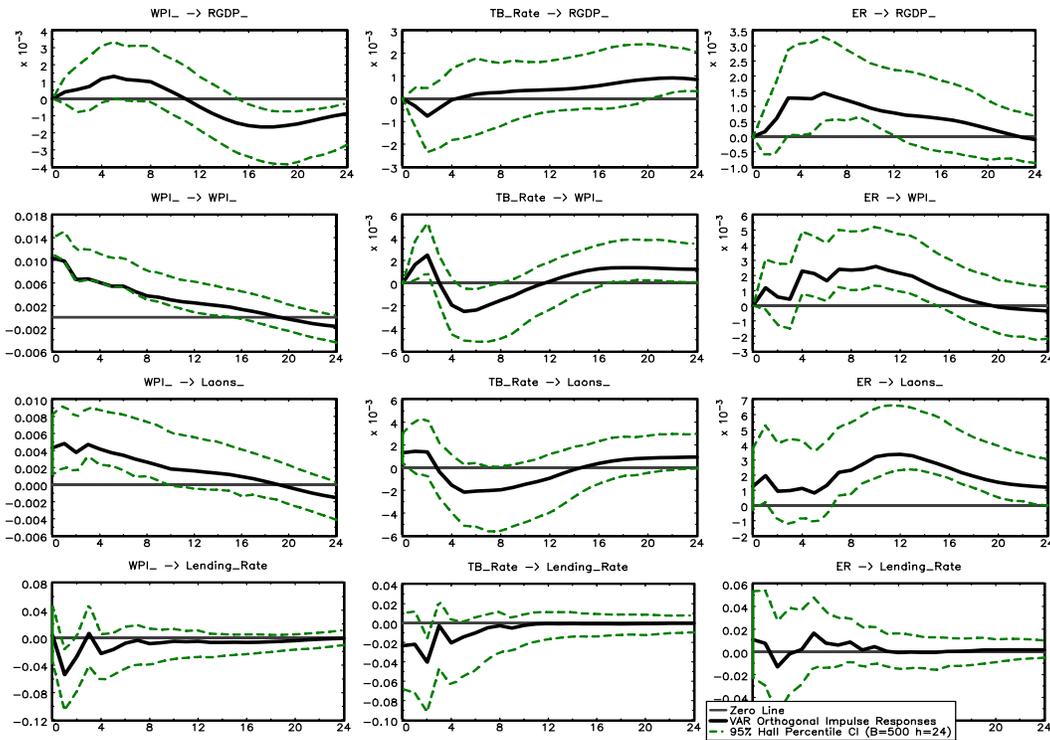
To shed light on the existence of the lending channel in Egypt, we include into the baseline model loans quantity (Loans) and loans price (proxied by lending-rate). The ordering of the variables is chosen on the basis of the speed with which the variables respond to shocks like in the case of the channel considered above.

It worth noting that the main point we focus on in this section is the identification puzzle (the supply-versus-demand puzzle). A contraction of bank loans for itself is not necessarily a consequence of leftward shift of the supply schedule. Thus, testing the lending view requires identifying the supply and demand schedule of bank loans. If the lending channel of monetary policy is dominant, a leftward shift of the supply schedule must be clearly observed following a monetary tightening. For the study of the lending channel to be meaningful, it might be also worthwhile to test the effectiveness of monetary policy. Thus, the lending view will be accepted if and only if:

- H1: the quantity of bank loans  $LQ$  does not increase
- H2: the price of bank loans  $LP$  rises, and
- H3: real output  $Y$  decreases following a monetary tightening.

For the purpose of testing H1 to H3 statistically, the VAR is estimated to stimulate impacts of monetary policy on the economy. Simulating the dynamic responses of macroeconomic variables to monetary policy shocks is equivalent to calculating the impulse response functions (IRFs) of those variables to an innovation to the measure of the stance of the monetary policy.

**Figure 3:** Selected IRFs responses of the augmented VAR (Egypt)



To examine the role of bank loans in the MTMs, we append the basic VAR model with additional variables, namely loans quantity variable (Laons) and loans price (Lending\_Rate). Concretely, the vector of the endogenous variable is  $Y_t = [REGP_t, WPI_t, Laons_t, Lending\_Rate_t, TB\_Rate_t, ER_t]$ . The IRFs we got from the estimates are reported on figure. What should focus on are the response of the following variables: Loans, Lending\_Rate and RGDP.

It stands out from figure 3 that the IRFs that the empirical evidence on the existence of the lending channel in Egypt is very weak. While hypothesis H1 (loans do not decrease) can be supported by data, hypothesis H2 (loans price as measured by the Lending\_Rate variable increases) cannot. In addition, the real activity does not seem to depress as suggested by the theory leading thereby to rejecting hypothesis H3. Worse still, the response of real activity does seem to be amplified significantly when accounting for the lending channel. Hence, the lending channel in Egypt can hardly be supported by data. Bank loans do not seem to react subsequent to an interest rate hike. Some of the reasons that could explain such a finding are the high volume of non-performing loans, and the under-developed state the financial market.

### Case of Morocco: Data description

The endogenous variables are respectively real activity measured by nominal GDP deflated by consumer price index, consumer price index (CPI), and money interbank rate (INT\_Rate). For the need of running the augmented VAR model, we used also the following variables: Loans

quantity proxied by loans to domestic sector (LOANS), the loans price proxied by the lending rate (ExtRate)<sup>38</sup>, the exchange rate measured by the nominal effective exchange rate (NEER) and finally the stock price index proxied by the MASI index (MASI)

### ***B.1. The baseline model***

In the case of Morocco, the baseline model includes only three endogenous variables  $Y_t=[RGDP_t, CPI_t, IN\_Rate_t]$ . As for the exogenous variables we tried to include as in the case of Egypt two variables namely oil price to account for supply shocks and US Fed rate to reflect development in world interest rate. The latter variable did not seem to play a significant role; it was therefore decided to drop it and the VAR was run with only one exogenous variable as well as a constant and seasonal dummy variables. All the estimations in case of Morocco were done using monthly data over the period 1990:01-2007:14. For the basic (baseline) model, the lag length was set at 5 lags based on Akaike and Schwartz information criteria. However, results are similar with 4 and 6 lags.

The ordering of the endogenous variables reflects an implicit assumption about the dynamic structure of the economy and is guided by the fact that policy rate dynamics tend to lead changes in activity. Changing output and prices is a time consuming-process while monetary authority set policy with at least some indication about contemporaneous development in output and prices. Thus, it is sensible to assume that RGDP is not affected by contemporaneously shocks to other variables in the system while the interest rate (Int\_Rate) responds to innovation in RGDP and prices, as measured by CPI, within the same period. This reflects the assumption about the speed with which the variables respond to shocks with output being the least responsive, followed by prices, and finally interest rate.

The inspection of the IRFs from the baseline model, which are reported on figure 4 shows that an unexpected contractionary monetary policy –corresponding approximately to 1 per cent rise in the policy rate- brings about a quick decline in real activity and this decline lasts for about one quarter; the monetary policy effects dies out after approximately four months. It is worth nothing that real activity decline, while being statistically, is quite small. Prices (CPI) start to decline until about 16 months. Contrary to real activity, the fall of prices seems to be quite important and persistent (around 2 per cent below the baseline). Finally, the interest rate shock last for more than one year.

**Figure 4:** IRFs responses of the augmented VAR (Morocco)

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<sup>38</sup> As for the loans price (LP), it is measured by the maximum rate on export credit (MaxExpo) for Morocco, and by the maximum rate of banking uncovered balance (TMD) for Tunisia.

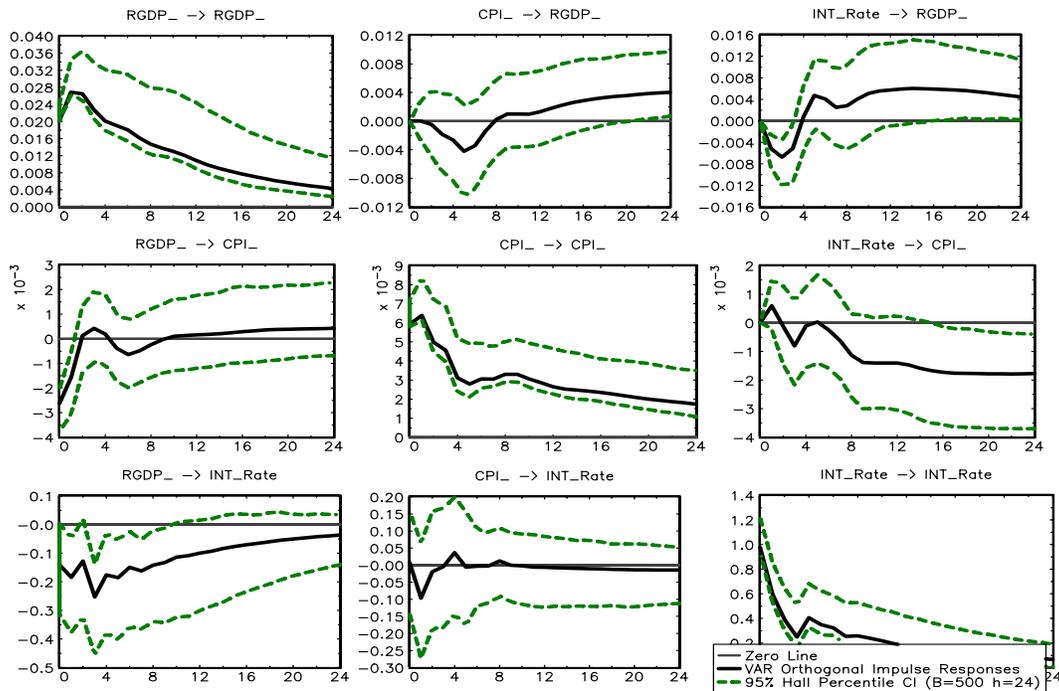


Table 3 gives a clear picture about the contribution of each variable's innovations in the target fluctuations variable. What should be highlighted when inspecting Table 3 is that most variables are highly idiosyncratic; the fluctuation in each one is mainly explained by its own innovations.

**Table 3:** Variance Decomposition (percent of total variance)

Variance Decomposition of Output (RGDP)			
Month	RGDP	CPI	INT_Rate
1	100	0	0
6	97	0	3
12	95	1	4
18	92	1	7
24	89	2	9

Variance Decomposition of Prices (CPI)			
Month	RGDP	CPI	INT_Rate
1	17	83	0
6	8	91	2
12	6	90	4
18	5	88	7
24	4	86	9

Variance Decomposition of policy Rate (Int_Rate)			
Month	RGDP	CPI	INT_Rate
1	2	0	98
6	6	0	93
12	8	1	92
18	8	1	91
24	9	1	90

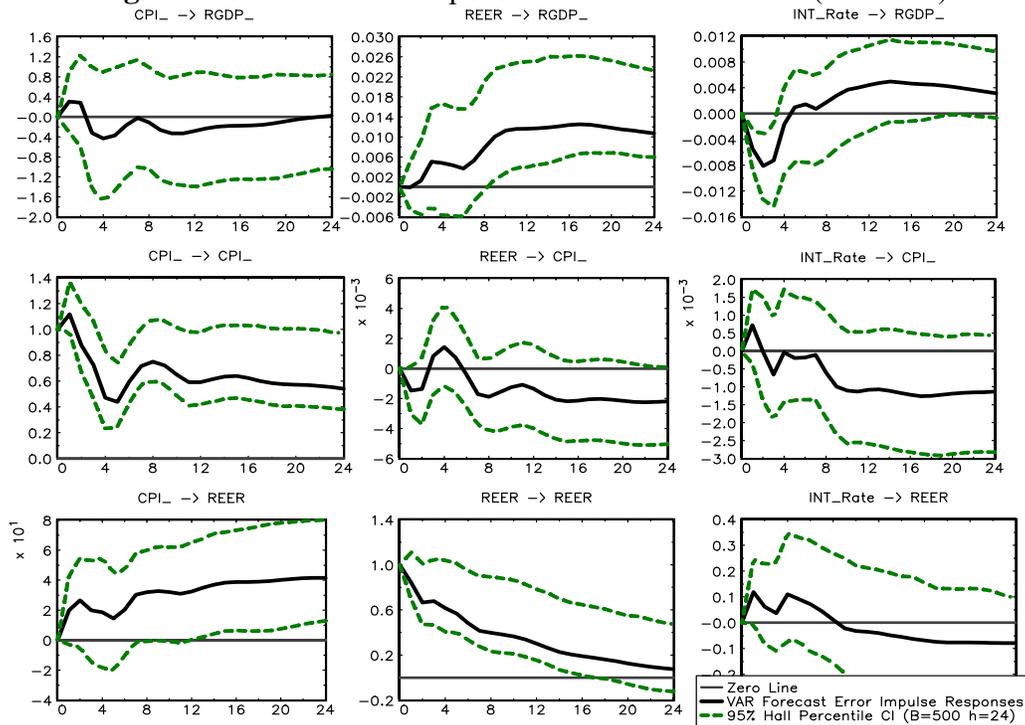
Source: Author's calculation

## B.2. The Exchange Rate Channel

The Moroccan monetary authorities have pegged the Dirham to basket currencies where the (nominal) exchange rate fluctuates within a narrow margin around a central rate. Although one suspect that under the exchange rate regimes followed by Morocco, the strength of the exchange channel would be negligible if not absent, it is nonetheless sensible to verify this intuition. To this end, the basic VAR model was added the nominal effective exchange rate, NEER, as a potential transmission variable. The baseline VAR model has been augmented by including the nominal exchange rate as a potential transmission variable; thus, the vector  $Y_t = [RGDP, CPI, NEER, INT\_Rate]$ .

The IRFs results of the VAR simulations related to the exchange rate channel (see figure x) indicate that a restrictive monetary policy (as measured by one standard deviation hike) is insufficient to impact significantly on the effective nominal exchange rate (see **figures 1.a and 1.b**). On the other hand, the depreciation of the currency seems to have significant effects on real activity in Morocco. The depreciation of the currency depresses real output. The IRFs analysis indicates that the depreciation has an asymmetric impact on prices. Still, the reaction of output does not seem to vary when including the NEER variable in the baseline model. This would indicate that the exchange rate channel is not operative. Overall, these findings corroborate to some extent the a priori belief we have about the strength of the exchange channel in Morocco. At best, the contribution of the exchange channel in propagating the impulses of the monetary policy in Morocco negligible. Again, the FEVD analysis (not reported) indicates that the exchange channel does not function either in Morocco.

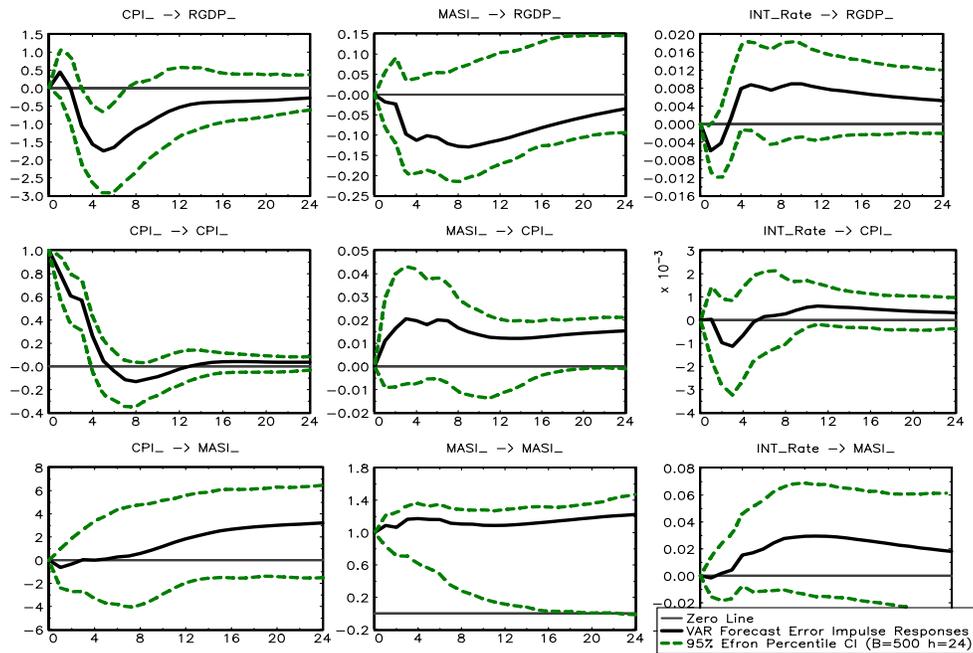
**Figure 5:** Selected IRFs responses of the baseline VAR (Morocco)



### **B.3. The Asset Price Channel**

To assess the importance of asset price in propagating the impulses of monetary policy in Morocco, we add the MASI index to the baseline VAR model. As it stands out from the IRFs profiles, a monetary tightening appears to have no significant impact on equity prices in Morocco. The absence of role of asset prices in transmitting monetary shocks is not surprising given that share ownership is far from being pervasive, and that firms' reliance on equity financing has not been very significant if not negligible compared to bank credit. The role of asset prices in the propagating the effects of the monetary policy might increase in the future in line with the continued developments in capital markets that both increases investment opportunities for households, as well as financing options for firms.

**Figure 6:** Selected IRFs responses of the augmented VAR (Morocco)

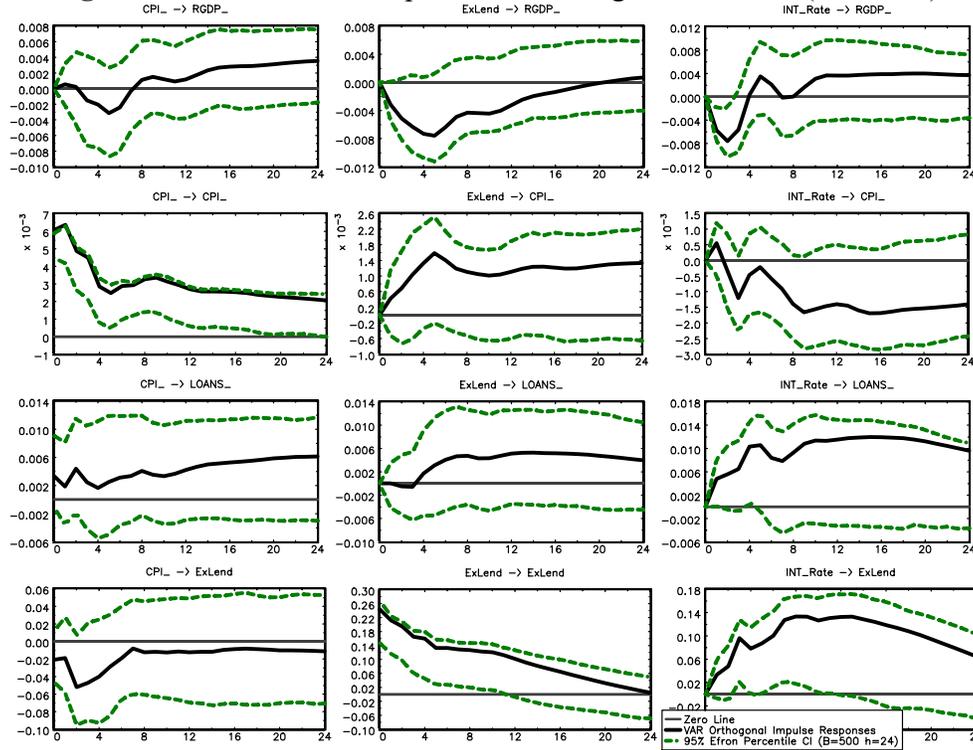


### **B.4. The Lending channel**

As for testing the lending view, we include in the baseline model loans quantity and loans price. Therefore the model we consider for the estimation is  $Y_t = [REGP_t, WPI_t, Laons_t, Lending\_Rate_t, Int\_Rate_t]$ . Figure 4 provide the response of the main variables to change in monetary policy stance. First of all, we notice that quantity loans

The response of price loans depicts a clear tendency to increase subsequent to a tight monetary policy. This reaction is immediate and statistically significant at 5 per cent level. In other words, the response of price loan is such that  $\partial E(LP_{t+i}|\Lambda_t)/\partial u_t^R > 0$  for  $i=1,2,\dots,16$  implying that H2 cannot be rejected. Furthermore, bank loans IRFs show that loans quantity does not increase. Rather, it exhibits a clear downward tendency, which thought non statistically significant for the eight first quarters becomes significant at the latest:  $\partial E(LQ_{t+i}|\Lambda_t)/\partial u_t^R = 0$  for  $i=1,2,\dots,8$  and  $\partial E(LQ_{t+i}|\Lambda_t)/\partial u_t^R < 0$  for  $i=9,10,\dots,16$ . Therefore, H3 cannot be rejected. Seeing that the hypotheses H1, H2 and H3 cannot be rejected, one may conclude that the lending channel is operative in Tunisia. Better still, when considered together the patterns of price loan and bank loans IRFs indicate implies that the supply schedule for bank loans shifts left following a monetary tightening. Thus, data do support the lending view in the case of Tunisia. It is worth nothing that this finding does not imply the rejection of the money view. All that we can state is that the lending channel is not only operative but also dominant.

**Figure 7: Selected IRFs responses of the augmented VAR (Morocco)**



### Case of Tunisia:

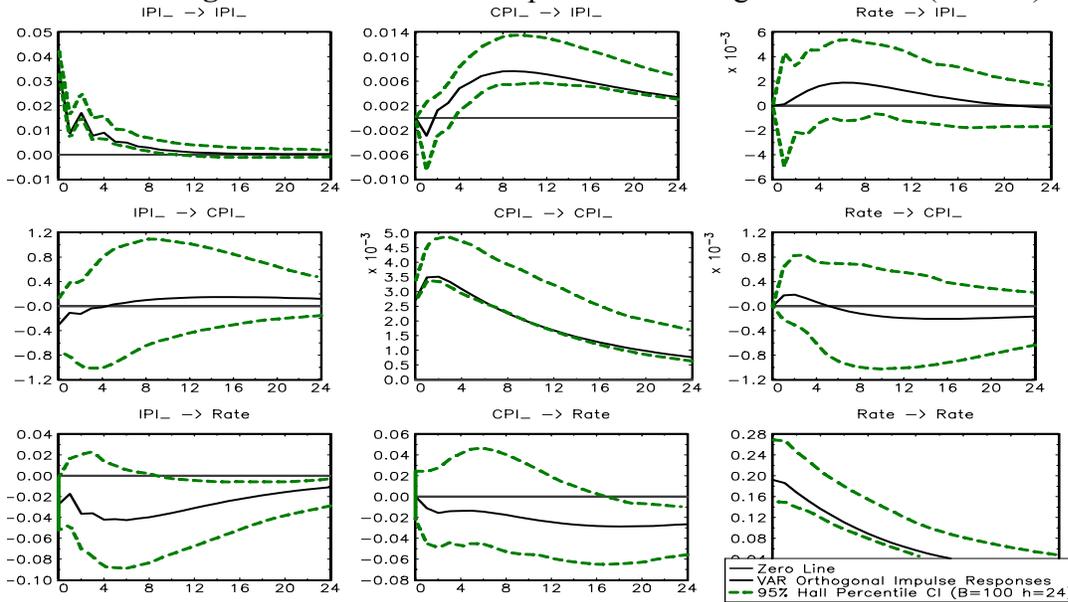
The endogenous variables are respectively real activity measured by the industrial production index, consumer price index (CPI), and money market rate (Rate). For the need of running the augmented VAR model, we used also the following variables: Loans quantity proxied by loans to domestic sector (LOANS), the loans price proxied by the maximum rate of banking uncovered balance (TMD), the exchange rate measured by the nominal effective exchange rate (NEER) and finally the stock price index proxied by the Tunis stock market index (BVMT). In addition to these endogenous variables, all the VAR estimations include two additional exogenous variables, namely oil price to account for supply shocks and US Fed rate to reflect development in world interest rate. Also, the models include a constant and seasonal dummy variables. Data are monthly and covers the period 1993:01-2008:01.

#### C.1. The baseline model

The baseline model includes only three endogenous variables  $Y_t = [IPI_t, CPI_t, IN\_Rate_t]$ . All the estimations in case of Morocco were done using monthly data over the period 1993:01-2008:01. For the basic (baseline) model, the lag length was set at 2 lags based on Akaike and Schwartz information criteria. However, results are similar with 3 and 4 lags.

The ordering of the endogenous variables reflects an implicit assumption about the dynamic structure of the economy and is guided by the fact that policy rate dynamics tend to lead changes in activity. Changing output and prices is a time consuming-process while monetary authority set policy with at least some indication about contemporaneous development in output and prices. Thus, it is sensible to assume that IPI is not affected by contemporaneously shocks to other variables in the system while the interest rate (Rate) responds to innovation in IPI and prices, as measured by CPI, within the same period. This reflects the assumption about the speed with which the variables respond to shocks with output being the least responsive, followed by prices, and finally interest rate.

**Figure 8:** Selected IRFs responses of the augmented VAR (Tunisia)



The inspection of the IRFs from the baseline model, which are reported on figure 8 shows that an unexpected contractionary monetary policy brings about a non significant variation in real activity. The IRFs results show also that a contraction monetary policy triggers a significant and persistent decline in prices. Contrary to real activity, the fall of prices seems to be quite important and persistent. Finally, the interest rate shock last for slightly more than one year.

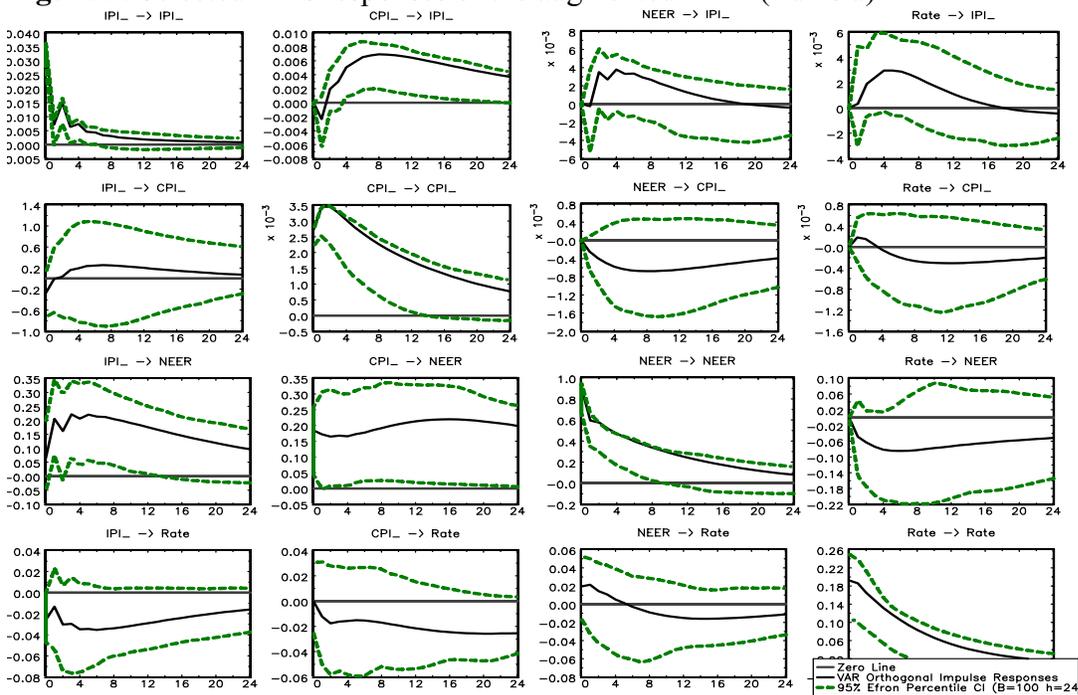
### *C.2. The exchange rate channel*

As explained before, the importance of the exchange rate channel depends, among other things, on the exchange regime. When the exchange regime is of the fixed type, the exchange rate channel cannot be operative. On the other hand, when the exchange rate is fully flexible, the transmission of interest rate movements to exchange rate and to activity in the tradable goods sector is highest. The short-run behaviour of the exchange rate is the result of the asset market equilibrium. When domestic real interest rates rise subsequent to a monetary contraction, deposits in domestic currency and credit in foreign currency become more attractive, inducing an appreciation of the exchange rate, reducing net exports, and lowering domestic output. The exchange regime in Tunisia is neither fully flexible nor fixed. The

monetary authorities have followed a constant real effective exchange rate rule, which resembles to a crawling peg regime.

Although one suspects that under such regime the strength of the exchange channel would be negligible, it is sensible to verify this intuition. To this end, the basic VAR model was added the nominal effective exchange rate, NEER, as a potential transmission variable. The VAR model comprises therefore the following variables  $Y=[IPI, CPI, NEER, Rate]$ . The IRFs results of the VAR simulations related to the exchange rate channel (see figure 9) indicate that the nominal exchange rate does not seem to be influenced significantly by the one-standard deviation shock in the policy rate. It is worth mentioning that even if nominal exchange rate is substituted by the real effective exchange rate, the same outcome is obtained. On the other hand, the appreciation of the currency exhibits a significant effect on real output. The effects of exchange rate shocks are also visible on prices; subsequent to the exchange rate shock, prices decrease significantly after 8 months; in addition prices path do not exhibit any tendency to go back to the baseline, which would signify that this decline is lasting.

**Figure 9:** Selected IRFs responses of the augmented VAR (Tunisia)

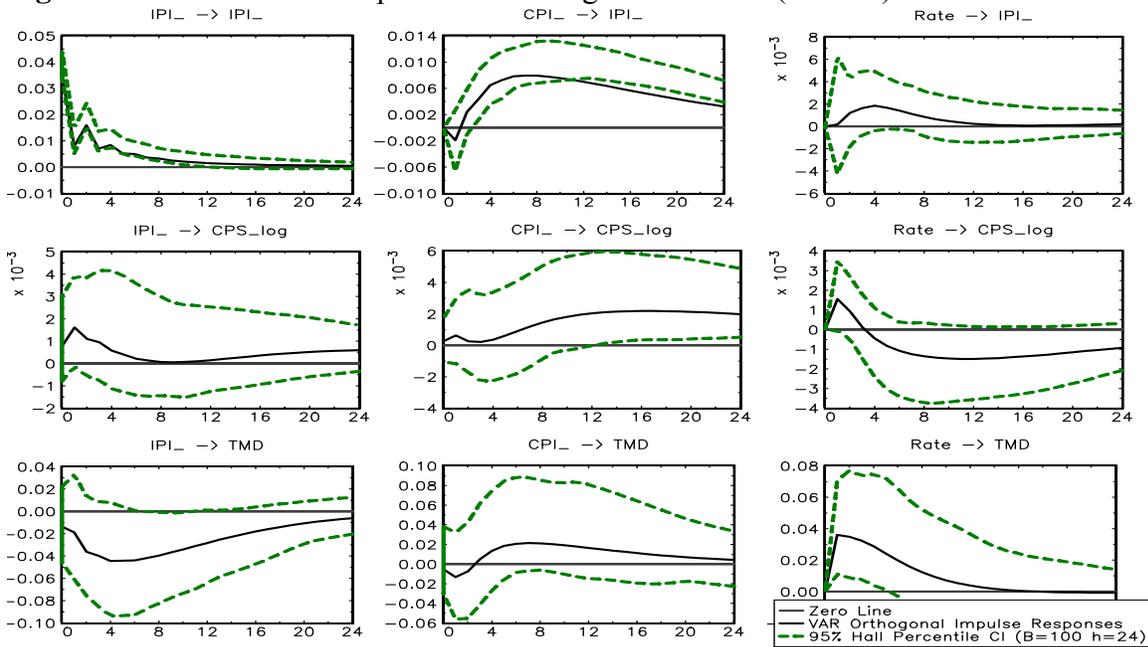


The exchange rate channel inaction is mainly due to the lack of impact of the monetary policy on the nominal exchange rate as well as to the negligible effects of nominal rate on output. This latter finding might be explained by the relative stability of the rate during the estimation period. It was deemed unnecessary to depict the FEVD scheme in the case of the exchange rate channel because of the following reasons. On the one hand, the simulations that have been done pointed out that the exchange rate variance is mainly driven by its own innovations. On the other hand, the output variance revealed to be explained only by the monetary policy innovations (17.62%). In short, from this analysis one can conclude that the exchange rate channel could not be operative.

### C3. The lending channel

As for testing the lending view, we include in the baseline model loans quantity and loans price. Therefore the model we consider for the estimation is  $Y_t = [IPI_t, CPI_t, LAONS_t, TMD_t, Rate_t]$ . Figure 10 provide the response of the main variables to change in monetary policy stance. First of all, we notice that quantity loans

**Figure 10:** Selected IRFs responses of the augmented VAR (Tunisia)



The response of price loans depicts a clear tendency to increase subsequent to a tight monetary policy. This reaction is immediate and statistically significant at 5 per cent level. In other words, the response of price loan is such that  $\partial E(LP_{t+i}|\Lambda_t)/\partial u_t^R > 0$  for  $i=1,2,\dots,16$  implying that H2 cannot be rejected. Furthermore, bank loans IRFs show that loans quantity does not increase. Rather, it exhibits a clear downward tendency, which thought non statistically significant for the eight first quarters becomes significant at the latest:  $\partial E(LQ_{t+i}|\Lambda_t)/\partial u_t^R = 0$  for  $i=1,2,\dots,8$  and  $\partial E(LQ_{t+i}|\Lambda_t)/\partial u_t^R < 0$  for  $i=9,10,\dots,16$ . Therefore, H3 cannot be rejected. Seeing that the hypotheses H1, H2 and H3 cannot be rejected, one may conclude that the lending channel is operative in Tunisia. Better still, when considered together the patterns of price loan and bank loans IRFs indicate implies that the supply schedule for bank loans shifts left following a monetary tightening. Thus, data do support the lending view in the case of Tunisia. It is worth nothing that this finding does not imply the rejection of the money view. All that we can state is that the lending channel is not only operative but also dominant.

#### *C4. The asset price channel*

Our estimations tend to indicate clearly that the the asset market channel I not operative in Tunisia. The real activity does not show any significant reaction to the policy rate. In short, the asset price (the stock market price) channel does not have a significant role in propagating the impulses of monetary policy in Tunisia. As it stands out from the IRFs profiles, a monetary tightening appears to have no significant impact on equity prices in Tunisia. The role of asset prices in the propagating the effects of the monetary policy might increase in the future in line with the continued developments in capital markets that both increases investment opportunities for households, as well as financing options for firms.

### **Concluding remarks and Policy implications**

**1.** The empirical analysis has shown that the central bank's means to influence economic activity and inflation are still limited. **The CBE has come a long way in developing its set of monetary instruments, but these instruments still lack effectiveness as the diverse channels of monetary transmission are not operating effectively and properly.** Improving the performance of these channels will be paramount for a successful transition to a full-fledged inflation targeting monetary policy framework in Egypt.

It is also important to note that transmission channels of monetary policy may change over time. A variety of factors including changes in the monetary regime, structural reforms in banking, financial markets and other areas as well as changes in the overall credibility of economic policies could cause dynamic relationships to shift over time. Leiderman et al. (2006) note that the way an economy responds to monetary policy is also regime-dependent. A regime shift toward IT may gradually induce changes in the way economic agents react to policy signals, thus improving the efficacy of the new monetary policy regime.

**2.** For Egypt, the transmission mechanism is typically less straightforward as the impact of interest rate changes is found to be weak if not insignificant. Besides, the bank lending channel, as well as the asset prices channel, is not functioning as one would expect. The role of the asset price channel is generally subdued, but explicit modeling of this channel does not seem to intensify the response of prices to exchange rate shocks. The impact of interest rate changes on credit has been found to be weak, likely owing to highly inelastic lending policies of banks burdened by non-performing loans, undeveloped financial markets, large holdings of government debt and volatile capital inflows. The lack of maturity and depth of the financial system has been shown to impede the smooth transition of monetary policy

impulses (Cottarelli and Kourelis, 1994). **Further uncertainty in the channels of interest rate policy may be caused by a strong and fast-working exchange rate channel.** Indeed, the exchange rate channel continues to play an important role in the transmission of the monetary stance, as it magnifies the impact of policy shocks drastically. There may be a real exchange rate effect on aggregate demand via the relative prices of foreign and domestic goods. As well, the impact of the exchange rate on the price of domestically produced goods, through the price of imported intermediate inputs could be significant. In addition, a more open economy will be affected to a greater extent by possible wealth effects through the exchange rate as an asset price and foreign shocks. Changes in the exchange rate may cause balance sheet effects in the presence of currency mismatches.

The overall results pertaining to MTMs speak of weak impact of monetary policy changes on the main real variables; thus these findings are not satisfactory, particularly in light of the planned move toward inflation targeting..

**3. In the case of Morocco, the monetary policy appears to be relatively more effective in impacting on real activity when compared with case of Egypt.** Two channels are operative, namely the traditional interest rate channel and the bank lending channel. These two channels co-exist. However it remains to be seen which of them is the most dominant. This research issue is left for future research. **The finding relative to the existence of the bank lending channel in Morocco does not surprise seeing that Moroccan system is more structured and healthy than that of Egypt or Tunisia. Again, the level of non-performing loans is at manageable.** Besides the exchange rate channel is found to be inoperative. To some extent, this finding is not surprising seeing the nature of the exchange rate regimes followed in Morocco.

**4.** The empirical findings relative to the case of Tunisia are not so different from those of Egypt and Morocco. To begin with, the monetary policy changes do not seem sufficient in the present context to influence significantly real activity. Neither the exchange rate channel nor the asset price one seems to be operative in Tunisia. These findings are in line with previous studies. However, the empirical evidence seems to support strongly the existence of a lending channel. This is not surprising; the reliance on bank finance has been very important in Tunisia, due not only to the underdevelopment of the capital market but also to the fact that the bulk of firms are small and medium firms, which cannot get financed in the capital market. The non-resolution of the banking sector problems, the continued expansion of non-performing loans have contributed a lot to weaken more or less this.

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### Appendix: VAR analysis

The starting point for the analysis of a structural VAR is the estimation of a reduced form VAR including sufficient lags in order to describe the underlying dynamics.

$$D(L)X_t = \varepsilon_t \quad \text{var}(\varepsilon_t) = \Omega \quad (1)$$

where  $D(L)$  is an  $(N \times N)$ -polynomial Lag such that  $D(L) = D_0 + D_1L + D_2L^2 + \dots + D_pL^p$ , and  $L$  is the lag-operator with  $L^i X_t = X_{t-i}$ . As Eq.(1) represents a reduced form then  $D_0 = Id$ . The  $p$ th order VAR process in Eq.(1) can be taken to be the true data generating process for  $X_t$  or a finite order linear approximation to an underlying infinite order linear or non-linear model. The covariance matrix of the residuals  $\varepsilon_t$  ( $\Omega$ ) is, in general, non-diagonal. Therefore, the shocks in  $\varepsilon_t$  cannot be the structural innovations which are assumed to be uncorrelated with each other. If the matrix polynomial  $D(L)$  has all its roots greater than one in modulus, it is invertible and there exists an infinite order MA-representation. This Wold representation will be written as:

$$X_t = C(L)\varepsilon_t \quad \text{avec} \quad C(L) = D^{-1}(L) \text{ et } C_0 = Id \quad (2)$$

where  $C(L) = D(L)^{-1}$ . Now suppose that the VAR representation of the structural form can be written as:

$$B(L)X_t = \eta_t \quad \text{with} \quad E(\eta_t \eta_t') = \sigma \cdot Id \quad (3)$$

Without loss of generality, the covariance matrix of the structural shocks  $\eta_t$  is normalized to Id. If the matrix polynomial  $D(L)$  is invertible, so is the matrix polynomial  $B(L)$  and one can write the structural MA( $\infty$ ) representation as:

$$X_t = A(L)\eta_t \quad (4)$$

Note that  $A(L) = B(L)^{-1}$ . The structural MA representation in Eq.(4) is also called the final form of an economic model because the endogenous variables  $X_t$  are expressed as distributed lags of the exogenous variables, given by the elements of  $\eta_t$ . However, the exogenous structural shocks  $\eta_t$  are not directly observed. Rather, the elements of  $\eta_t$  are indirectly observed through their effects on the elements of  $X_t$ . We can obtain the structural shocks  $\eta_t$  by first estimating the reduced form VAR (Eq.1) and transforming the reduced form residuals. From Eq.(2) and Eq.(4) we have:

$$A(L)\eta_t = C(L)\varepsilon_t \quad (5)$$

Let subscripts indicate the matrix of coefficients at the corresponding lag. As  $C_0 = \text{Id}$  and Eq.(5) must hold for all  $t$ , we have:

$$A_0\eta_t = \varepsilon_t \Rightarrow \eta_t = A_0^{-1}\varepsilon_t \quad (6)$$

Squaring both sides and taking expectations yields:

$$A_0\Sigma_\eta A_0' = \Sigma_\varepsilon \quad (7)$$

Combining Eq.(5) and Eq.(6) we find:

$$A(L)\eta_t = C(L)A_0\eta_t \quad (8)$$

which implies:

$$A_i = A_0C_i \quad (9)$$

Note that knowledge of  $A_0$  is sufficient for the full identification of the structural system: All structural coefficients of the lag polynomial  $A(L)$  and the structural innovations  $\eta_t$  are easily calculated from the estimated reduced form VAR using Eq.(6) and Eq.(9).

This issue has been discussed more widely and formally by other authors (Sims, 1988; Bernanke and Blinder, 1992; Christiano and Eichenbaum, 1992), we only provide informal information.

The most common solution to this problem is to diagonalize the variance-covariance matrix of the VAR system using a triangular orthogonalization scheme (the Choleski scheme). While this approach has the advantage that shocks to the VAR system can be identified as shocks to the endogenous variables, it relies on particular ordering of variables. When the off-diagonal elements of the variance-covariance matrix of innovations are large, this approach is obviously restrictive. Three solutions have been put forward. First, one may undertake additional tests to determine the variables that ought to be placed first in the VAR. Second, one may impose more structure on the VAR by assuming two-way contemporaneous feedback between some elements. This could be done by imposing short-run and/or long-run restrictions. Third, one might use different ordering of the variables in the VAR (see for instance, Christiano et al., 1996). As for the first solution, we do believe that it is totally

inappropriate in our case since it depends heavily on the institutional set-up and on the monetary policy operating procedures about which viable information is missing. As for the second solution, it is not devoid of caveats. The results it provides depend on the specific set of identifying restrictions. As for the third solution, at first glance, it appears to be very costly since for a system comprising  $n$  variables,  $n!$  models need to be estimated (for  $n=4$ , we need 24 models for each country). But, if the contemporaneously correlations are low among at least the relevant innovations for the empirical fact analysed, then the ordering will have little or no effect, and the results will be robust to the ordering of the variables.

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<sup>i</sup> See for instance, Masson et al., 1997; Taylor, 2000; Mishkin, 2002; Siklos, 2002; Siklos and Abel, 2002; Bernanke et al., 1999).

<sup>ii</sup> Some of the development banks have been transformed into commercial (universal) banks since 2006.

<sup>iii</sup> TAO stands for ‘taux d’appel d’offre’.

<sup>iv</sup> All variables are expressed in term of the natural logarithms of the corresponding macroeconomic aggregate except for ratios, growth rates and the interest rate

<sup>v</sup> Alternatively,  $y_t^n$  may be interpreted as the government’s output target.

<sup>vi</sup> An alternative way to compute the potential output could be the production function approach. In this approach, GDP is determined by the production factor inputs (capital and labour) and by the total factor productivity, or the efficiency with which these factors are used to generate output. We do not attempt, in this paper, to estimate potential output using such an approach because of the lack of reliable data. Other methods, such as the band-pass filter and regressions on polynomial trends, have been run but they provide very similar results to the Hodrick-Prescott filter. For more detailed analysis on output gap measures we refer to Almeida and Felix (2006) and Basistha and Nelson (2007).

<sup>vii</sup> Also because a lack of data.

<sup>viii</sup> Seeing that there is no clear consensus about the specification of the equation describing the NPLs dynamics, we resort in practice to the ‘general to specific’ modeling approach (see for instance, Hendry and Richard, 1982), starting from a model including a maximum of variables with a maximum of lags and then simplifying it with regard to empirical data. It is worth noting that NPLs are considered in nominal terms even though some explanatory

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variables may be reported in real terms. The issue of which variable should be included in equation 7 is essentially an empirical issue.

<sup>ix</sup> Starting from an annual balance sheet we may write (i):  $\Delta B + \Delta L^* + G$ , where  $r$  is the average net income generated by the banks' assets,  $r(B+L^*)$  the banks total revenue and  $G$  total profit. Assuming that total revenue is entirely paid to the banks owners as profits, we can write (ii):  $r(B+L^*) = G$  . Combining (i) and (ii) gives:  $\Delta B + \Delta L^* + G = \Delta(D + CCB)$ . Aggregating over time leads to:  $CCB+D= B+L^* + P$  and to Eq.(9).

<sup>x</sup> It is worth noting that when the ratio of non-performing loans to total assets, instead of the stock of NPLs, was considered, the simulation encountered numerical problems. We therefore preferred to simulate the future path of the log NPL stock under the scenarios considered. The issues of non-stationarity and cointegration have been kept for future research.

<sup>xi</sup> The dependent variables NPLs and L are considered in nominal terms.