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"Monetary Policy in Egypt: A Retrospective And Preparedness for Inflation Targeting"

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MONETARY POLICY IN EGYPT: A RETROSPECTIVE AND PREPAREDNESS FOR INFLATION TARGETING

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1. INTRODUCTION

Inflation targeting (IT) is one of the operational frameworks for monetary policy aimed at attaining price stability. In contrast to alternative strategies, notably money or exchange rate targeting, which seek to achieve low and stable inflation through targeting intermediate variables—for example, the growth rate of money aggregates or the level of the exchange rate of an "anchor" currency—IT involves targeting inflation directly (World Economic Outlook 2005). In a wider context, IT is part of a process in which economic policymaking is becoming more transparent and subject to more accountability and technical rules, and less susceptible to discretionary actions.

IT has become an increasingly popular monetary policy strategy with around 21 countries (8 industrial and 13 emerging markets) now inflation targeters. Other countries are seeking to develop the necessary "infrastructure" to implement an IT framework, Egypt being one of the forerunners. However, the technical details related to the adoption of IT are not trivial and there are several country-specific factors that need to be taken into consideration.

Since June 2005, the CBE has taken serious steps to develop its monetary policy framework with the intention to adopt IT over the medium term. The exchange rate has been abandoned as the nominal anchor and price stability has been declared the overriding policy objective. Key institutional and operational steps have been implemented in the transition.

Against this background, empirical research on monetary policy in Egypt has lately come to the forefront as researchers try to investigate the inflation process and reconcile the requirement of IT with economic realities.

This paper tries to accomplish two tasks. First, provide a retrospective of monetary policy instruments between 1996 and 2005 in an attempt to explain the decision making process. Consequently, a parsimonious empirical estimation is conducted to investigate the relationship between monetary aggregates and inflation. Second, the paper discusses the preparedness of the CBE to adopt an IT framework, in light of the new monetary policy framework launched in 2005 and compared to other emerging country cases.

The remainder of the paper is organized as follows. In the next section, a retrospective of the monetary policy instruments used in Egypt between 1996 and 2005 is presented. In Section 3, stylized facts of the relationship between money and inflation are provided. This is followed by the empirical estimation of a monetary model. Section 4 discusses the

preparedness of the CBE, highlighting the key areas of required improvement if IT is to be formally adopted. The last section summarizes the findings and presents some conclusions.

2. MONETARY POLICY IN EGYPT: A RETROSPECTIVE[1]

Since the conclusion of the stabilization program in 1996, the CBE was concerned with achieving multiple objectives simultaneously, which were in many instances conflicting.[2] These objectives included attaining high economic growth while maintaining low inflation and preserving a stable exchange rate.[3]

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. As shown in the empirics in Section 3 below, monetary aggregates largely explained inflation developments. In its toolkit, the CBE used various quantitative and price instruments at different points in time to achieve its multiple objectives, leading to a lack of consistency in monetary management.

These instruments included reserve requirements, government securities, repo and reverse repo operations and the CBE discount rate. Until June 2005, banks' excess reserves were the CBE's operational target, which were very volatile (Figure 1). Moreover, linking the policy decisions to macroeconomic outcomes has been complicated by the dominance of state-owned banks in the banking sector, which created rigidities in the interest rate structure. Moreover, the existence of large non-performing loans (NPLs) intensified the disconnect between price measures and macroeconomic outcomes.

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[1] Al-Mashat and Billmeier (2007) provide a unified empirical framework, combining a descriptive review of Egyptian monetary policymaking over the last decade with a baseline VAR model that describes the Egyptian economy. By adding extensions to the baseline model, they investigate specific monetary transmission channels.

[2] In the early 1990s, Egypt launched an Economic Reform and Structural Adjustment Program (ERSAP) to eliminate the internal and external disequilibria caused by many years of high inflation, intolerable fiscal deficits, lack of competitiveness in world markets and soaring degrees of external indebtedness. Central to the process were three critical elements: a massive fiscal adjustment, the liberalization and unification of the exchange system, including the adoption of an exchange rate anchor, and a supportive monetary policy comprising quantified targets in the context of successive financial programs. Monetary policy during this period was designed primarily to defend the exchange rate, which did not conflict with achieving the country's growth objectives as well. The stabilization program, launched in 1991 and completed in 1996, was successful in restoring the desired macroeconomic stability.

[3] According to Banking and Credit Law 163 of 1957 and the amendments in decision 59 of 1993, supporting economic development in light of the government's economic plan while maintaining the stability of the Egyptian pound were the final targets.

Figure 1. Excess Reserves
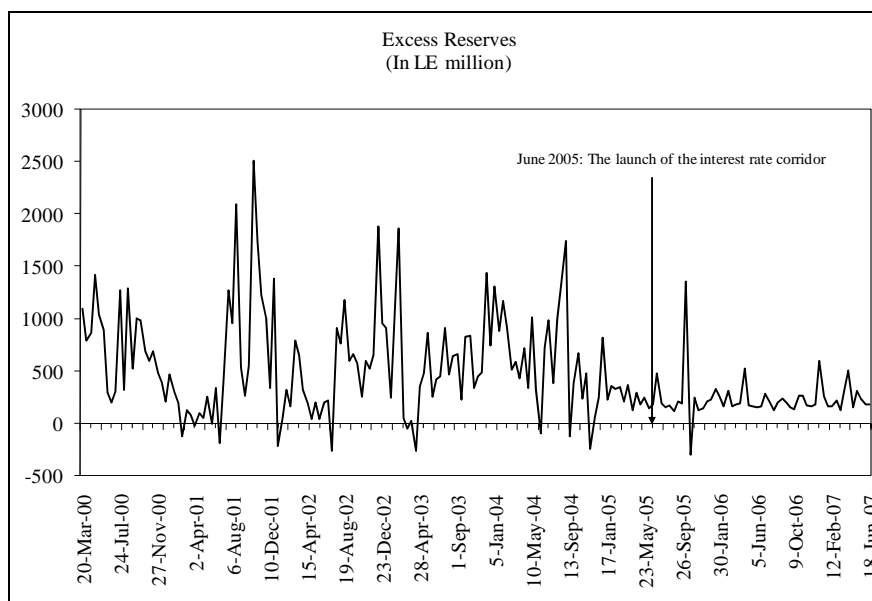
Source: Central Bank of Egypt.

A close examination of the various interest rates during 1996 and 2005 reveals that there is no single interest rate that best reflects the monetary policy stance. The movements in these interest rates appear to be secular, with no evident cyclical pattern, suggesting that the interest rate channel did not materially contribute to economic fluctuations in Egypt (Figure 2).

- The overnight domestic currency interbank market was only introduced in 2001 and the overnight interest rate proved extremely volatile in the beginning.[4]

- The 3-month treasury bill rate could be considered, to some extent, a short-term policy rate given that the securities were issued in coordination with the CBE to sterilize capital inflows, with the amount issued substantially exceeding the financing needs of the government (El-Refaie 2001).[5]

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[4] After the liquidity problems that surfaced in the market during 2000 and 2001, the CBE supported the launch of a domestic currency interbank market. The CBE's monetary policy framework change in 2001 enhanced the degree of market determination of the short-term interest rate. Before the introduction of the overnight interbank market, the short-term policy rate only moved within a very limited range, rendering it a rather weak signal of the monetary policy stance.

[5] During this period, interest rates on treasury bills provided some indication of market conditions as they served as a basis for open market operations and they were traded on a secondary market, but given their role in fiscal policy, it would be misleading to consider them as a monetary policy instrument.

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- The CBE's discount rate is also a key policy rate, notwithstanding the limited changes that took place between 1996 and 2005.

Figure 2. Interest Rate Developments, 1996-2005

Interest Rate Developments, 1996-2005
(nominal terms; in percent)
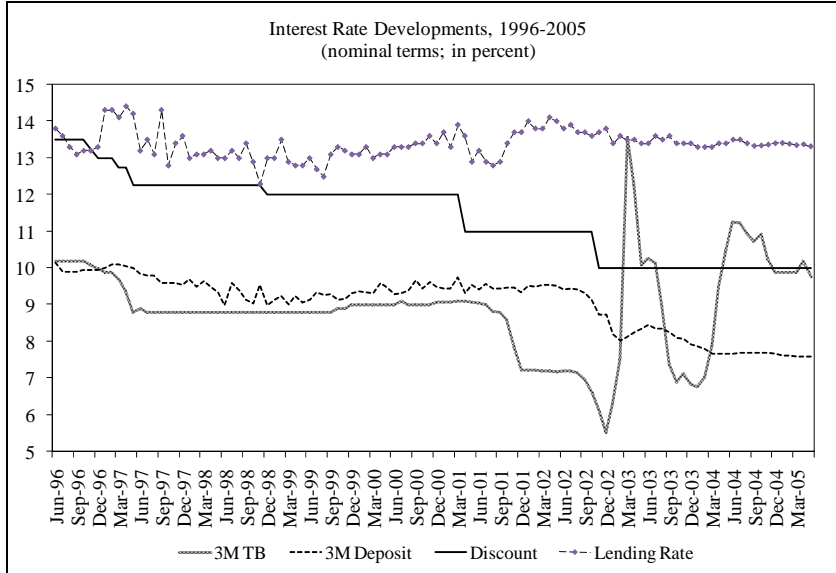
Source: Central Bank of Egypt.

Moreover, the coefficient of variation in the nominal policy interest rates (treasury bill rate and discount rate) was quite low ranging between 0.1 and 0.3 throughout the period.[6] This was reflected in the nominal retail rates as well, which also demonstrated low variability ranging between 0.04 and 0.1. In addition, Granger causality tests suggest a weak interest rate transmission channel for Egypt during this period.[7] This result is not surprising given that the CBE's operational target at the time was banks' excess reserves, which were very volatile. In other words, quantitative measures undertaken by the CBE were considered more effective in steering aggregate demand.[8]

Summing up, between 1996 and 2005, the CBE did not dispose of a continuous indicator of the monetary policy stance.[9] M2 being the intermediate target of monetary policy

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[6] The coefficient of variation is defined as the standard deviation divided by the sample mean.

[7] Results are presented in Appendix I.

[8] The empirical results in Al-Mashat and Billmeier (2007) show that the interest rate channel of monetary policy is still weak in Egypt.

[9] Moursi, Mossallamy, and Zakareya (2007) compare various strategies developed during the 1990s to identify the monetary policy stance in Egypt. They argue that the CBE, between 1980 and 2005, did not rely on a single short-term policy rate but used several interest rates

suggests that the relationship between money and inflation could be underpinned using a monetary model. This is explored in the following section.

3. MONEY AND INFLATION

Money gap models of inflation stipulate that the latter is mainly a monetary phenomenon created by a disequilibrium between the demand and supply of money.[10] In this context, the price level will adjust upwards, with a certain time lag, to an excess supply of money in order to regain equilibrium.

a. Background

Before discussing the empirics, a closer investigation of the data suggests that three distinct phases can be highlighted between 2000 and 2005.[11]

Phase I: January 2000–December 2001

Between January 2000 and December 2001, the consumer price index (CPI) and wholesale price index (WPI) inflation rates were relatively low, hovering around 2.5 percent (y/y) and 1.4 percent (y/y), respectively, with minimal signs of volatility. The low and stable inflation rates during this phase can be traced back to the prevalent exchange rate regime at the time, which in a way insulated domestic prices and in turn inflation from exchange rate shocks that could have been transferred to the WPI through import prices. Consequently, given the clear association between the WPI and the CPI, these changes would have been transferred to the CPI. The exchange rate regime, however, limited the degree of exchange pass-through to domestic prices.

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[10] It should be noted that it would not be appropriate to include the exchange rate depreciation as an additional term in the money gap model. This is because an excess demand for money should translate into higher demand for goods, generating domestic price pressures, and also higher demand for other assets such as foreign currency, leading to a depreciation of the domestic currency. As a result, a theoretically consistent money gap model should be able to explain change in both tradable and non-tradable goods prices. See Domaç (2003) for details.

[11] The empirical analysis starts in 2000 to ensure a consistent WPI series. The descriptive section of the phases and the empirical results end in 2005 for two reasons. First, this marks the beginning of the new monetary policy framework and hence the aim is to explain events and policy prior to that. Second, in 2006 there were a number of idiosyncratic shocks that influenced inflation such as the Avian Flu outbreak and hence using headline inflation in empirical estimates would have to be handled with some scrutiny.

Phase II: January 2002–April 2004

The situation changed with the beginning of 2002 and in the aftermath of the first attempt at floating the exchange rate in January 2003. Between January 2002 and April 2004, CPI and WPI inflation followed a steep upward trend to reach a peak of 17.2 percent (y/y) and 21.7 percent (y/y), respectively. The higher inflation in Phase II reflected the lagged pass-through pressures from a series of step devaluations, amounting to a cumulative depreciation of 29 percent in the nominal EGP/USD exchange rate that took place between January 2000 and December 2001.[12] These were amplified by the 19.5 percent month-on-month depreciation that followed the shift in the exchange rate regime to a managed float in January 2003.

The upward pressure on inflation was further intensified by the lax monetary policy stance pursued by the CBE at the time. This was evident in the acceleration of broad money (M2) and total domestic liquidity (M2D), which averaged more than 15 percent and 12 percent annually, to reach a peak of 20 percent and 13 percent in late 2003/early 2004, respectively. This acceleration in monetary aggregates was not accommodated by similarly high real GDP growth, leading to double digit inflation. On the contrary, the real GDP growth rate decelerated relative to Phase I to average almost 3.5 percent annually between 2002 and 2004. This seems to have strengthened the resistance of inflation to the downward pressures that were starting to pass through the exchange rate channel in the first half of 2004, delaying the fall in inflation to early 2005.

Phase III: May 2004–November 2005

During 2004 and the first half of 2005, the CBE tightened monetary policy to rein in the accelerating inflation rates and it was successful in its venture as inflation dropped to the single digit levels once again starting January 2005. As the effects of the depreciation of the Egyptian pound in early 2003 gradually dissipated and confidence in the CBE was restored, CPI and WPI inflation rates dropped significantly between mid-2004 and early 2006, averaging 7.5 percent (y/y) and 8.1 percent (y/y), respectively.

It is worth noting that in 2005, with the continuing monetary expansion, reflected in the average growth rates of 14 and 17 percent in M2 and M2D, respectively, one would have

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[12] Rabanal (2005) finds that the wholesale price index (WPI) reacts significantly to changes in the nominal exchange rate after 6–12 months, whereas the consumer price index (CPI) reacts after 12–24 months, but not significantly. This result is interpreted as evidence of specific structural weaknesses of the CPI measure used until 2003—beyond the fact that a significant share of administered prices contributes to a slow pass-through.
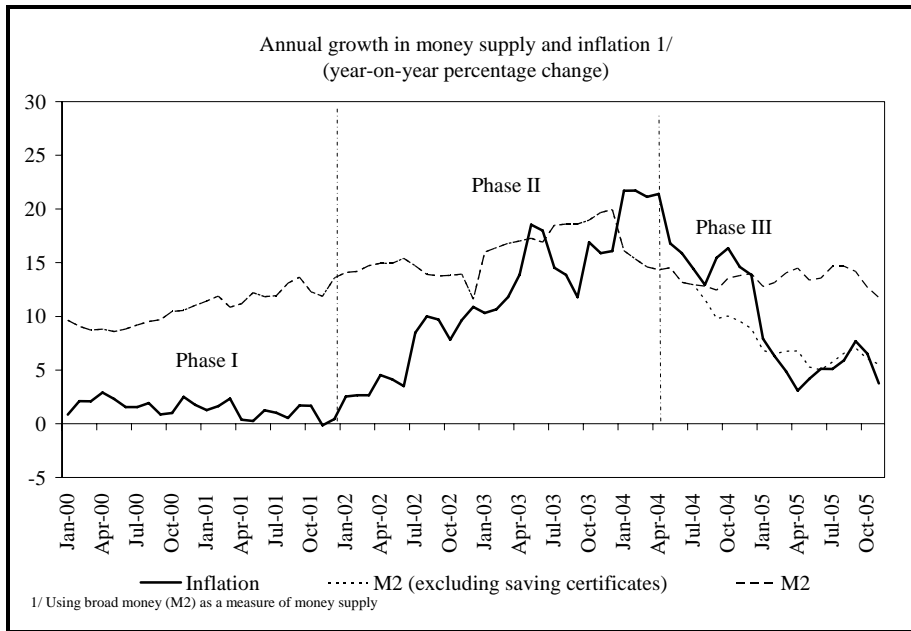
expected inflation to shoot up again like it did in phase II following similar growth rates of the money supply. This was not the case, however, as inflation fell from 7.9 percent to 2.7 percent over 2005. The stabilization of the nominal exchange rate certainly played a key role in reducing inflation but it would not have been sufficient to accommodate for lagged inflationary pressures from the money supply. Hence, it is likely that the observed money growth rates were non-inflationary. In fact, the M2 and M2D growth rates were inflated (see Figures 3-4 below) by the introduction of the 3-year saving certificates issued by the National Bank of Egypt in August 2004. Although these certificates appear as an expansion in total liquidity, they are locked up for three years. Given the interest premium paid on them at the time and the lack of alternative financial assets in the Egyptian market, it is unlikely that these certificates will be unlocked before their maturity date. Excluding the 3-year saving certificates from M2 and M2D, we observe instead a sharp deceleration in money growth, falling from an average of 16 percent and 12 percent (January 2002 to April 2004) to 8 percent and 9 percent (May 2004 to November 2005), respectively. This explains the 5 percent decline in WPI inflation over 2005.

Figure 3. Domestic Liquidity and Inflation
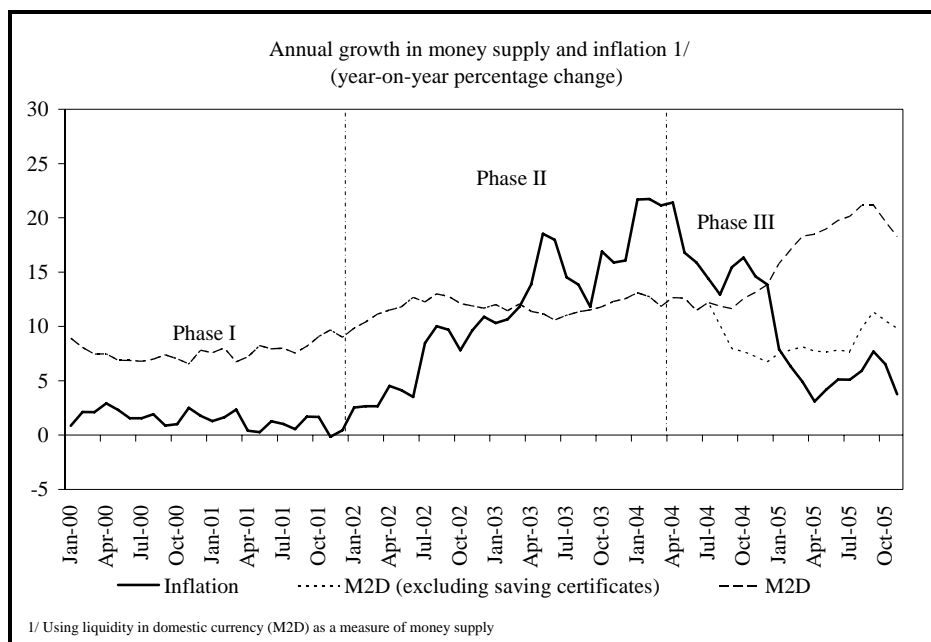
Source: Central Bank of Egypt.

Figure 4. Broad Money and Inflation

Annual growth in money supply and inflation 1/
(year-on-year percentage change)

Phase I

Phase II

Phase III

—— Inflation   ······ M2 (excluding saving certificates)   - - - M2
1/ Using broad money (M2) as a measure of money supply

Source: Central Bank of Egypt.

Figure 5. Reserve Money and Inflation

Annual growth of money supply and inflation 1/
(year-on-year percentage change)

Phase I

Phase II

Phase III

—— Inflation - left axis   -·-·- M0 - right axis
1/ Using reserve money (M0) as a measure of money supply
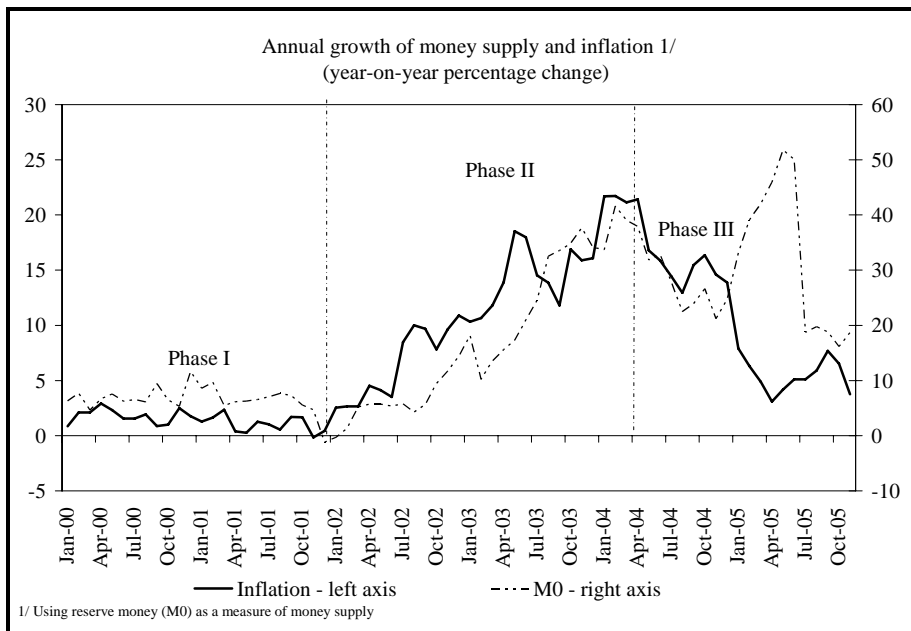
Source: Central Bank of Egypt.

Table 1 summarizes the developments in the key macroeconomic indicators during the three phases identified above.

Table 1. Developments in Key Macroeconomic Variables (average annual growth rates; in percent)

	Phase I Jan 00 to Dec 01	Phase II Jan 02 to Apr 04	Phase III May 04 to Nov 05
CPI Inflation	2.5	6.3	7.5
WPI Inflation	1.4	12	8.1
M2D 1/	7.7	11.8	9.0
Real GDP	4.3	3.5	5.7
Exchange Rate 2/	31.7	37.6	-7.3

Source: CBE staff estimates.

1/ M2D growth rates have been adjusted, to exclude 3-year saving certificates issued by

the National Bank of Egypt in August 2004.

2/ The change in the EGP/USD during the investigated phase in percent.

 A (+) indicates a depreciation while a (-) indicates an appreciation.

b. The Empirics: A Monetary Model

In empirical analysis, monetary disequilibrium is usually captured by a money gap variable, which is constructed as the difference between the actual money supply and the estimated long-run money demand. King (2002) argues that models based on monetary growth tend to perform as indicators of long-run inflationary pressures. Domaç (2003) applies the following specification for the case of Turkey.

Given the ongoing structural changes in the Egyptian economy, reliable estimates of money demand are not available. Therefore, the real money gap—defined as the deviation of the actual real money supply from its trend value—is used as a proxy for excess money supply. Hence,

$$mgap_t = m_t - m_t^{TR} \ldots \tag{0.1}$$

where m_t and m_t^{TR} are the natural logarithms of the actual supply of money and its trend value at time *t*, respectively. The long run trend value of m_t was constructed using the Hodrick-Prescott (HP) filter.

We use the above definition of money gap in deriving a single equation model of inflation as:

$$\Delta \pi_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta \pi_{t-i} + \sum_{i=0}^{n} \gamma_i mgap_{t-i} + \varepsilon_t \ldots \tag{0.2}$$

where $\Delta\pi_t$ is the first difference of the WPI inflation, which is essentially monthly change in inflation.[13] The coefficient β_i in equation (0.2) captures the impact of the lagged values of inflation on today's inflation whereas the coefficient γ_i captures the impact of current and past monetary disequilibria on inflation.

In our analysis of the money gap model, we use three definitions of the actual money supply, namely reserve money (M0), broad money (M2) and total domestic liquidity (M2D) in order to examine which monetary aggregate best captures the monetary policy. The corresponding real money gap variables for the three monetary aggregates will be referred to as m0_gap, m2_gap and m2d_gap. Hence, we will be estimating three different money gap models.

After running the appropriate unit root tests on the three series, we reach the following stationary specifications of the money gap models:

$$\Delta p_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta p_{t-i} + \sum_{i=0}^{n} \gamma_i \Delta m2d\_gap_{t-i} + \varepsilon_t \qquad (1.1)$$

$$\Delta p_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta p_{t-i} + \sum_{i=0}^{n} \gamma_i m2\_gap_{t-i} + \varepsilon_t \qquad (1.2)$$

$$\Delta p_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta p_{t-i} + \sum_{i=0}^{n} \gamma_i m0\_gap_{t-i} + \varepsilon_t \qquad (1.3)$$

In order to decide on the optimal lag length for the three models in equations (1.1), (1.2) and (1.3), we follow the sequential testing procedure.[14] As a result, we select 12 as our optimal lag length at the 95 percent confidence level.[15]

After setting the optimal lag length in the three models to 12 lags, we refer to the AIC (Akaike Information Criterion) and SC (Schwarz Criterion) criteria in eliminating

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[13] The CPI basket includes government-regulated prices, which account for over a quarter of the basket. Hence, in the empirical analysis, the WPI series is used in the estimation instead.

[14] In the sequential testing procedure, we try to figure out the highest significant lag, $p*$, by sequentially testing the following restrictions:

1. Model 1 (P_{max-1}) vs. Model 1 (P_{max}) where the null hypothesis is $H_0 : A_{12} = 0$

2. Model 1 (P_{max-2}) vs. Model 1 (P_{max-1}) where the null hypothesis is $H_0 : A_{11} = 0 / A_{12} = 0$

   Model 1 (P_{max-11}) vs. Model 1 (P_{max-12}) where the null is $H_0 : A_{p*} = 0 / A_{p*+1} = ... = A_{12} = 0$

where A_{12} denotes the coefficient on the 12th lag.

[15] The full results of the sequential testing procedure can be obtained from the author upon request.

insignificant lag terms from each model specification. Our elimination process resulted in the following models:

$$\Delta p_t = \alpha + \beta_3 \Delta p_{t-3} + \beta_{12} \Delta p_{t-12} + \gamma_0 \Delta m2d\_gap_t + \gamma_3 \Delta m2d\_gap_{t-3} + \gamma_{12} \Delta m2d\_gap_{t-12} + \varepsilon_t \quad (1.4)$$

$$\Delta p_t = \alpha + \beta_6 \Delta p_{t-6} + \gamma_0 m2\_gap_t + \gamma_1 m2\_gap_{t-1} + \gamma_{11} m2\_gap_{t-11} + \varepsilon_t \quad\quad\quad (1.5)$$

$$\Delta p_t = \alpha + \gamma_0 m0\_gap_t + \gamma_1 m0\_gap_{t-1} + \gamma_2 m0\_gap_{t-2} + \gamma_3 m0\_gap_{t-3} + \varepsilon_t \quad\quad\quad (1.6)$$

Table 2 summarizes the in-sample estimation results of the three money gap models. The results show that the past values of inflation have an inflationary impact on today's inflation, which goes in line with economic theory.[16] The degree of pass-through from past inflation to today's inflation, however, differs from one model to the other. While the m2d_gap model assumes a high degree of pass-through, of around 0.8 percent for every 1 percent increase in past inflation, the m2_gap model predicts a pass-through of only 0.2 percent.

The impact of the real money gap on today's inflation is not as clear-cut. According to theory, an increase in the money gap should have a positive impact on inflation. But if we look at both the lagged and contemporaneous coefficients on the money gap variables, we find that in the m2d_gap and the m0_gap models, the real money gap has a negative impact on inflation of 0.2 percent and 0.1 percent, respectively, which is counter-intuitive. It is worth noting, however, that the negative impact on inflation, in the three models, primarily stems from the current values of the real money gap ($mgap_t$) and not from the lagged values. This finding goes in line with the observed co-movements of the monetary aggregates with inflation over the investigated period. As we have discussed earlier, between 2000:01 and 2005:07, inflation seemed to be accelerating with a time lag in response to growth in monetary aggregates. Hence, if we only consider the lagged impact of the real money gap on inflation, we find that the m2d_gap, m2_gap and the m0_gap models estimated a 0.65 percent, 0.86 percent and 0.2 percent increase in inflation in response to a 1 percent expansion in the real money gap, respectively, which is in line with the money gap literature.[17]

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[16] Lougani and Swagel (2001) show that past realizations of inflation explain between 10 and 20 percent of inflation movements. In addition, Mohanty and Klau's (2001) findings also indicate that inflation persistence plays an important role in explaining both the average level of inflation and its variation.

[17] Although the negative sign on the estimated coefficients of the current real money gap variables might be difficult to interpret, the coefficients are statistically significant; hence, we cannot simply drop them out of the models' specifications.

In terms of model congruency and explanatory power, it is clear that the m2d_gap model is superior to the other two models. In reference to the adjusted R^2, the m2d_gap model is able to explain 90 percent of the developments in the WPI inflation over the investigated period while the m2_gap and the m0_gap capture only 85 percent and 31 percent of the WPI dynamics, respectively. Furthermore, if we rely on the model selection criteria, whether the AIC or the SBC (Schwarz Bayesian Criterion), in ranking the three models, we will reach the same conclusion supported by the adjusted R^2.[18]

Table 2. Summary of the In-sample Estimation Results for the Money Gap Models, 2000:02-2005:07

Summary of the in-sample estimation results for the money gap models, 2000:02 − 2005:07			
	$\Delta m2d\_gap$	$m2\_gap$	$m0\_gap$
Constant	0.0027 (2.968)	0.0056 (7.441)	0.0066 (4.477)
Δp_{t-3}	0.292 (2.702)	-	-
Δp_{t-6}	-	0.215 (4.329)	-
Δp_{t-12}	0.503 (4.213)	-	-
$mgap_t$	-0.847(-22.15)	-0.717 (-16.23)	-0.3065 (-4.65)
$mgap_{t-1}$	-	0.767 (16.86)	0.1362 (1.763)
$mgap_{t-2}$	-	-	0.2412 (3.114)
$mgap_{t-3}$	0.214 (2.355)	-	-0.1501 (-2.245)
$mgap_{t-11}$	-	0.093 (3.162)	-
$mgap_{t-12}$	0.437 (4.223)	-	-
R^2	0.905183	0.854736	0.354036
Adjusted R^2	0.897282	0.84521	0.311677
Schwarz criterion	-7.644604	-7.281476	-5.789285
Akaike info criterion	-7.843663	-7.447359	-5.955168
Jarque-Bera	$\chi^2(12) =$ 0.689 [0.705]	$\chi^2(12) =$ 1.11 [0.574]	$\chi^2(12) =$ 6.22 [0.0009]**
LM AR(12)	$\chi^2(12) =$ 6.89 [0.864]	$\chi^2(12) =$ 14.44 [0.273]	$\chi^2(12) =$ 17.76 [0.123]
LM ARCH	$F(12,36) =$ 1.74 [0.098]	$F(12,37) =$ 0.691 [0.749]	$F(12,37) =$ 0.744 [0.70]
Joint instability test	1.1563	2.7749**	1.199
Unstable variables	None	Constant, $m2\_gap_{t-11}$	None

** Reject the null at the 99% confidence level

1/ Note that we are using the first difference of the lagged values of the m2d_gap variable in the m2d_gap model

Source: Author's estimation.

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[18] Moreover, the results of the diagnostic tests also favor the m2d_gap model, as it is the only model out of the three that we cannot reject the null hypotheses of normally distributed residuals that exhibit no signs of serial correlation or heteroskedasticity at the 99 percent confidence level and at the same time assert the constancy of its estimated parameters. Results can be obtained from the author upon request.

On the other hand, the out-of-sample forecast of the three model specifications were evaluated re-estimating the above specifications for the period 2000:02-2004:07. Three measures of predictive accuracy, namely the root mean square prediction error (RMSE), the mean absolute percnetage error (MAPE) and Theil's inequality coefficient were used for comparison (Table 3).

Table 3. Static Out-of-Sample Forecast Performance, 2004:08 -2005:07

Model	RMSE	MAPE	Theil's Inequality
m0_gap	5.4969	0.8247	0.00485
m2d_gap	2.5272	0.3779	0.00224
m2_gap	4.6775	0.6967	0.00415

Source: Author's estimation.

Based on the static out-of-sample forecast performance reported in Table 3, we conclude that the m2d_gap money gap outperformed all other model specifications and was better at capturing the WPI inflation dynamics over the period 2004:08 to 2005:07.

In addition to estimating money gaps to explain the inflation dynamics, output gaps were also estimated. However, the output gap models were outperformed by the money gap models.[19] These results are consistent with Noureldin (2005) who estimates various inflation forecasting models and finds that monetary models outperform other models.

The case of Egypt is largely in line with other emerging country cases. The IMF (1996) shows that the output gap does not play an important role in explaining inflation in developing countries. Instead, changes in money growth and nominal exchange rates have higher explanatory power in explaining inflation. This finding does not suggest that inflation is not a function of excess demand in these countries. It simply implies that the contribution of excess demand is dominated by those of nominal shocks. More precisely, inflation in the medium-term is viewed as the result of the government financing of its deficit through the creation of money or through time-inconsistent monetary policy. Moreover, Lougani and Swagel (2001) find that either money growth or exchange rate movements explain two-thirds of the variance of inflation at both short and long horizons in their sample of developing

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[19] The methodology and results of the output gap model can be obtained from the author upon request.

countries. Overall, their findings suggest that cost shocks or the output gap are not significant factors affecting the evolution of inflation.[20]

4. EGYPT'S PREPAREDNESS FOR INFLATION TARGETING: COMPARED TO OTHER IT COUNTRIES

In the literature, a relatively long list of requirements has been identified for countries to successfully operate an IT framework. These requirements include, but are not limited to (Jonas and Mishkin 2003): (i) a strong fiscal position and entrenched macroeconomic stability, (ii) a well-developed financial system, (iii) central bank instrument independence and a mandate to achieve price stability, (iv) reasonably well-understood channels between policy instruments and inflation, (v) a sound methodology for devising inflation forecasts, and (vi) transparent policies to build accountability and credibility.

The background for implementing IT— in particular the initial conditions— has been very diverse among IT countries, including the initial inflation rates at the time of inception, the degree of exchange rate flexibility, the level of financial sector development, the government's fiscal position, and the levels of economic growth. Experience has shown that the transition to IT can vary greatly from one country to another. For instance, Chile spent more than 10 years in a transition from quasi IT to fully fledged IT. On the other hand, Brazil's transition was triggered by a crisis and continued for only a number of months. Other country examples, such as that of the Czech Republic, provide an intermediate case. It is not possible to say whether a country meets these requirements or not. It is more a question of the degree to which these preconditions are met. Generally speaking, it has been argued that countries which adopted IT met these requirements to a sufficient degree to make IT feasible (Roger and Stone 2005).

Accordingly, the CBE launched a comprehensive and far-reaching banking sector reform program in 2004. The reform program included the (Non-Performing-Loans-related)

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[20] Altimari (2001) investigates the performance of a number of monetary models of inflation for the euro area over the period 1998 to 2000. His findings suggest that monetary and credit aggregates contain significant information to forecast inflation in the euro area, particularly at medium-term horizons. Using structural VAR analysis studies by Kasumovich (1996) as well as Fung and Kasumovich (1998) shows that a monetary policy shock leads to a persistent money disequilibrium, which is eliminated as prices adjust over a number of years. Jonsson (1999) and Callen and Chang (1999) are examples of this strand of the empirical literature focusing on emerging market economies. The results suggest that monetary aggregates contain the best information about future inflation and that output gap is not of significant explanatory power.

restructuring and privatization of banks with state participation, a new banking law and other regulatory reforms, the liberalization of the foreign exchange and money markets, and ongoing efforts to strengthen the supervision of banks. This program contained important steps to help overcome the previous shortcomings in the banking sector and fulfill the prerequisites for inflation targeting. Several institutional and operational changes were initiated under the program to help facilitate monetary policy formulation and assessment, and lay the ground for formally adopting an inflation-targeting regime over the medium-term.

In light of the banking system reform program and taking into account the experiences of other countries, this section assesses and compares Egypt's preparedness for IT with that of other emerging market inflation targeters.

a. Macroeconomic Stability

Macroeconomic stability supports monetary policy formulation and creates a conducive environment to build policy credibility, an important pre-requisite for IT. In determining the appropriate disinflation path, the central bank should have an estimate of the sacrifice ratio in order to weigh the costs of foregone output against the benefits of lower inflation. Therefore, adopting IT is largely complicated when inflation and output are high and volatile since disinflation is unlikely to be achieved without significant costs to output.

Based on the indicators for macroeconomic stability presented in Table 4, Egypt could be considered eligible to adopt IT. Egypt has experienced lower inflation rates and output variability than the comparator IT countries listed. In addition, compared to the other countries, it has been running a current account surplus over the comparison period (Soderling 2003).

Table 4. Macroeconomic Indicators in Egypt and Comparators

		Macroeconomic Indicators				
	IT Adoption	Inflation Rate (CPI/Period Average)	Inflation Variability	Real GDP Growth Rate	Output Variability	Current Account/GDP
Chile	Sep-99	5.48	0.31	4.23	0.84	-3.44
Czech Republic	Jan-98	9.29	0.10	3.76	1.66	-4.52
Turkey	Jan-06	9.34	0.80	7.05	0.20	-3.59
Poland	Oct-98	18.67	0.38	8.86	0.63	-2.30
South Africa	Feb-00	6.13	0.46	1.75	0.68	-0.97
Israel	Jun-97	10.63	0.14	5.97	0.40	-4.50
Mexico	Jan-01	12.09	0.41	3.84	0.74	-3.26
Brazil	Jun-99	6.34	0.58	1.74	0.84	-4.04
Comparator IT average		*9.75*	*0.40*	*4.65*	*0.75*	*-3.30*
Egypt		7.14	0.59	4.71	0.34	2.90

1/ Numbers refer to the annual average between 2003-06 for Egypt. 2003 marks the beginning of banking reforms.
2/ Numbers for the IT comparators are the four year averages prior to the adoption of IT.

Source: International Finance Statistics; Respective Central Banks' web-sites; and Author's calculations.

b. Central Bank Independence and Credibility

Banking Law 88 of 2003 granted the Central Bank of Egypt (CBE) instrument independence and declared price stability as the overriding objective. The CBE is instrument independent (meaning that the central bank is free to set monetary policy instruments, but not necessarily free to determine the ultimate inflation target) as monetary policy decisions are confidential and discretionary and the sole responsibility of the Monetary Policy Committee (MPC) within the CBE in accordance with Banking Law No. 88 for 2003.[21]

The CBE has full operational independence to achieve the inflation target. It is important to underscore that the interest rate decisions of the MPC are not known to the government and the market except on the following business day through the officially published press release (MPC statement).

These institutional settings are important and provide the adequate mechanisms to the CBE to decide on the target once the CBE makes the transition from price stability to IT. It has not been decided which entity will be responsible for eventually setting the target, the CBE or the government.

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[21] In addition, Banking Law 88 for 2003 asserts the independence of the CBE and its Board, who are appointed directly by the President of the country.

In other words, whether the CBE will have target independence or not is yet to be determined. However, experience from other countries has shown that it works better if the target is set by the government not by the central bank (Mishkin and Schmidt-Hebbel 2001). Debelle and Fischer (1994) and Fischer (1994) make a useful distinction between goal independence, in which the central bank sets the goals of monetary policy, and instrument independence, in which the central bank controls monetary policy instruments. Instrument independence for central banks is supported by the need to insulate the central bank from short-run political pressures that may lead it to pursue time inconsistent, expansionary policy that produces bad long-run outcomes. However, the argument that central bank's long run preferences should coincide with society's preference, suggests that a central bank should be goal dependent. Having the government decide on the long-run inflation target for the central bank is thus salubrious.

Table 5 below shows that in IT comparators in emerging markets the central bank has instrument independence. However, goal independence is not granted in all cases and has varied across countries. In some instances, the government and the central bank jointly decide on the target while in other cases that does not hold.

Table 5. Accountability in Selected Inflation Targeting Countries

Country	Instrument Independence	Inflation Targeting Explicitly in the Law	Target Announcement	Hearing in Parliament
Brazil	Yes	No	Set by National Monetary Council, composed of finance minister, planning minister, and central bank president	No
Chile	Yes	Price stability + financial stability	Central bank	Yes
Czech Republic	Yes	Price stability	Government + Central bank	Yes
Israel	Yes	Price stability	Government	Yes
Mexico	Yes	No, price stability	Central bank	Yes
Poland	Yes	No, price stability	Central bank	Yes
South Africa	Yes	No, currency stability	Government	No
Turkey	Yes	Price stability	Government + Central bank	No

Source: Roger and Stone (2005).

Furthermore, the autonomy of the central bank under an IT regime is important for credibility. In the literature, credibility has been proxied by the actual inflation outturn and by market ratings of long-term local currency government debt. The ratings are forward-looking and directly capture market perceptions of the degree of long-term market confidence in the stability of a currency, which ultimately is the responsibility of central banks. At the same time, the ratings reflect factors beyond the scope of monetary policy, especially the strength of the fiscal position, which also bears on the credibility of a commitment to an inflation target (see Carare and Stone 2003 for details). Since the launch of the banking reform program, Egypt's rating has been upgraded, a testimony of increased credibility. For example, Standard & Poor's improved the rating on the local currency debt to BBB- stable in December 2006 (investment grade).

c. Monetary Policy Operating Targets and Instruments

Under an inflation-targeting regime, price instruments for the conduct of monetary policy are most commonly used by central banks. In addition, inflation targeting relies on a functioning and competitive banking system. Only in these circumstances, the interest rate channel can become strong, which is the most convenient mechanism, as the exchange rate channel should not be relied upon actively. Under IT, the exchange rate is abandoned as the nominal anchor and replaced by an explicit price stability objective.[22] Interest rate decisions and the interest rate transmission channel, therefore, become important given that they are easy to interpret and communicate to the public.[23] Schmidt-Hebbel and Tapia (2002) argue that central banks require a thorough understanding of the intensity and lags with which their policy interest rate impacts the economy and in particular the dynamics of their policy objectives—the inflation target in case of inflation targeting.

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[22] Although a functioning exchange rate transmission channel may add to the effectiveness of monetary policy under IT, it is likely that actively manipulating the exchange rate along with inflation is likely to worsen the performance of monetary policy; see Jonas and Mishkin (2003). However, this does not imply that central banks should not pay attention to the exchange rate (Mishkin and Schmidt-Hebbel 2001).

[23] As described in Schaechter, Stone, and Zelmer (2000), earlier experiences of IT countries involved a combination of exchange rate and inflation targeting. For example, Chile spent more than 10 years in a transition from quasi inflation targeting to fully fledged inflation targeting. During this period, the monetary policy framework was based on a crawling peg exchange rate regime as well as announcements of an inflation target. The aim in announcing inflation targets was to gradually reduce inflation by providing a focal point anchor for monetary policy that was supplemental to the existing crawling exchange rate band. Similarly, in Israel the long transition to inflation targeting began with the move to a crawling exchange rate band, which necessitated inflation targets to define the upward slope of the crawl. See also Roger and Stone (2005).

Restoring confidence in the foreign exchange market and replacing quantitative monetary instrument with price instruments were the cornerstones in the CBE's monetary policy reform program, important pre-requisites for launching IT. The exchange rate has been abandoned as the nominal anchor and price stability has been declared the overriding policy objective. The CBE is committed to achieving, over the medium term, low rates of inflation, which it believes are essential for maintaining confidence and for sustaining high rates of investment and economic growth.[24]

Egypt made the transition to a unified, flexible exchange rate regime during 2004. The parallel market rate, which had a premium of over 15 percent in late 2003, converged with the banking rate in the second half of 2004 as confidence was restored leading to strong current account inflows (Figure 6). In December 2004, the government abolished the surrender requirement (introduced in 2003) and formally launched an inter-bank market by enacting a convention governing foreign exchange trading among all signatory banks. In subsequent weeks, activity in the inter-bank market surged and flexibility in rate-setting was restored. Furthermore, on January 2, 2005, Egypt accepted the obligations of the IMF's Article VIII. The CBE focused on ensuring an orderly functioning of the inter-bank market, including opportunistic purchases of foreign exchange. The establishment of the inter-bank market for foreign exchange was a key milestone in Egypt's transition to a unified flexible exchange rate system and the CBE is committed to allowing market forces to determine the exchange rate. Favorable trends in the balance of payments and increased confidence contributed to the high volume of trading of the market and to the appreciation of the pound. Since the launch of the inter-bank market, the pound appreciated by over 12 percent.

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[24] The CBE's Monetary Policy Statement published in June 2005.

Figure 6. Exchange Rate Developments

Exchange Rate Developments
(In Egyptian pounds per US dollar)

Official Rate — — Parallel Rate
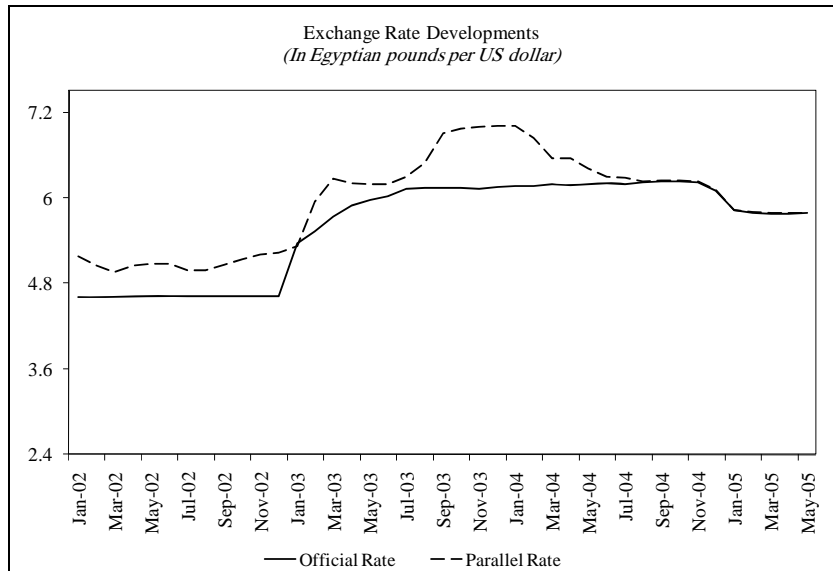
Source: Central Bank of Egypt.

As highlighted above, it was important for the CBE to move from quantitative to price tools of monetary policy. On June 2, 2005 the CBE introduced an interest rate corridor. The interest rates on the CBE's two standing facilities, the overnight lending facility and the overnight deposit facility, define the ceiling and floor of the corridor, respectively. By setting the rates on the standing facilities, the MPC determines the corridor within which the overnight rate can fluctuate (International Monetary Fund 2005). Table 6 highlights the monetary policy instruments used by the CBE.

Effectively, steering the overnight rate within this corridor is the operational target of the CBE. This is what defines the CBE's operational independence. Moreover, in August 2005, CBE certificates of deposit were added to the toolkit. The CBE issued its own securities as the primary instruments for liquidity management through open market operations. Since the launch of the corridor, volatility in the overnight inter-bank rate declined and has remained within the corridor.[25]

Since the launch of the new monetary policy framework, the results of the Granger causality test indicate that the overnight inter-bank rate has started to assume a strong role in the interest rate channel. It Granger-causes both the interest rates on 3-month deposits and

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[25] Given the current liquidity within the market, the overnight inter-bank rate has remained close to the floor of the corridor.

new bank borrowing.[26] This supports the CBE's monetary policy strategy going forward as the overnight rate continued to maintain this clear signaling role.

Table 6. Egypt: Monetary Policy Instruments

	Status (Yes/No)
INDIRECT INSTRUMENTS	
The Corridor ⟶ Standing deposit facility	
Standing credit facility	Yes, used
Interbank rates stay within a corridor	Yes, used
Deposit auctions	Yes, used
Central bank securities auctions	Yes, used
Open market operations with securities	Yes, used
Derivatives in the foreign exchange market	Yes, there are swap operations
DIRECT INSTRUMENTS	
Frequent changes to required reserves	No
Differentiated requirements depending on currency	Yes

Source: International Monetary Fund (2005); and Central Bank of Egypt.

d. Strengthening and Developing the Banking Sector

A deep and well-developed banking sector is also important to allow for proper transmission of monetary policy actions. Monetary policy within an IT framework is highly market-oriented and the banking sector is expected to function based on market principles. The dominance of the state-owned banks in the market has tended to create rigidities in the interest rate structure in Egypt as discussed previously.

Under the banking system reform program, the banking sector is undergoing substantial transformation that has entailed the exit of several weak banks, large-scale financial restructuring, and divestiture of state shares in private banks and privatization of a major state

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[26] The results are presented in Al-Mashat and Billmeier (2007).

bank. These actions have reduced the share of banks with state participation significantly.[27] The large stock of NPLs is being addressed through provisioning and cash settlements. The government and the CBE have been implementing programs designed to clean up banks' balance sheets and settle NPLs of public and private enterprises.

Compared to a sample of emerging market IT countries in Table 7, Egypt's banking sector is reasonably well-developed as reflected in the growth rate of monetary aggregates and M2/GDP. Nonetheless, credit to the private sector as a percent of GDP has been exceptionally low in contrast to the IT comparators. This, however, is expected to improve as competition in the banking sector intensifies further.

Table 7. Financial Sector Indicators in Egypt and Comparators

|	**Financial Sector Indicators**			
	IT Adoption	**M2/GDP**	**M2 Growth**	**Credit to the Private Sector/GDP**
Chile	Sep-99	41.7	16.3	57.6
Czech Republic	Jan-98	61.6	11.5	59.0
Turkey	Jan-06	21.4	33.9	24.6
Poland	Oct-98	29.7	30.0	20.0
South Africa	Feb-00	49.7	12.7	58.2
Israel	Jun-97	68.7	21.6	66.8
Mexico	Jan-01	40.5	20.8	18.3
Brazil	Jun-99	25.6	11.7	38.8
Comparator IT average		*42.4*	*19.8*	*42.7*
Egypt		88.3	14.6	6.0
1/ Numbers refer to the annual average between 2003-06 for Egypt. 2003 marks the beginning of banking reforms.				
2/ Numbers for the IT comparators are the four year averages prior to the adoption of IT.				

Source: International Finance Statistics; Respective Central Banks' web-sites; and Author's calculations.

It is important to underscore that since the launch of the reform program, the spread between the retail lending and deposit rates has narrowed, an indication of increased efficiency in the banking sector (Figure 7). This is important as monetary policy decisions will be better translated into retail interest rates.

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[27] The number of banks has declined from 57 in 2004 to 39 in 2007.

Figure 7. Interest Rate Spread

Interest Rate Spread
(In percentage points)

— Lending less Deposits (one year)
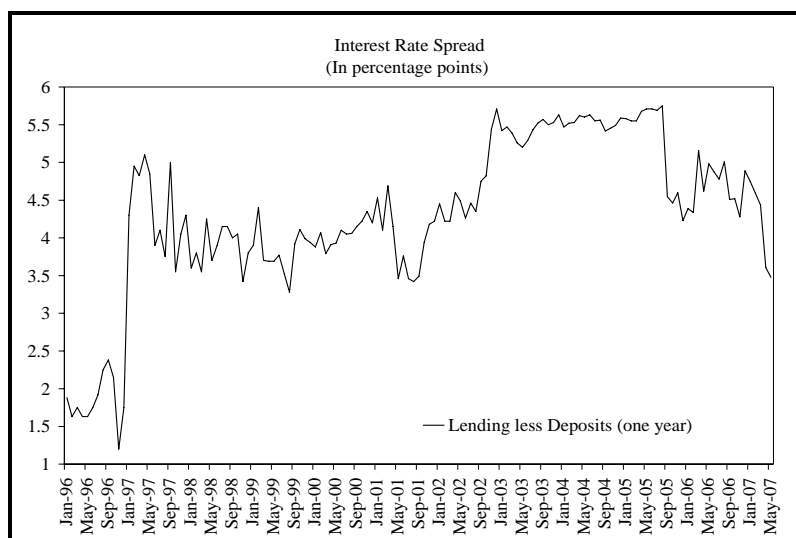
Source: Central Bank of Egypt.

e. The Fiscal Position

Fiscal discipline is an integral requirement for IT. Large levels of indebtedness that could be monetized by the central bank jeopardize its credibility in meeting the inflation target over the medium term. In addition, if central banks are politically pressured to finance the government deficits or to avoid a policy tightening when needed to account for a rising interest rate bill, the credibility of the price stability mandate is compromised. Therefore, in many instances, the central bank legal framework in inflation targeting countries limit or prohibit financing of government spending. Moreover, instrument independence is intended to ensure that political interests do not impair monetary policy-making.

Compared to other emerging market countries that implement an IT framework, Egypt's budget deficit has been high and the level of public debt has been around 95 percent of GDP. These comparisons are presented in Table 8.

It is worth mentioning that a process of fiscal consolidation is currently underway in Egypt. The Government outlined a range of measures aimed at bringing the deficit down by at least 1 percent of GDP annually for five years. The plan involves a mix of measures—that has been phased in gradually since 2006/07 (Appendix II).

Table 8. Fiscal Indicators in Egypt and Comparators

	Fiscal Indicators	
	IT Adoption	Fiscal Balance/GDP
Chile	Sep-99	0.1
Czech Republic	Jan-98	-0.4
Turkey	Jan-06	-7.0
Poland	Oct-98	-3.1
South Africa	Feb-00	-2.7
Israel	Jun-97	-2.9
Mexico	Jan-01	-5.0
Brazil	Jun-99	-7.7
Comparator IT average		-2.8
Egypt		-9.1
1/ Numbers refer to the annual average between 2003-06 for Egypt. 2003 marks the beginning of banking reforms.		
2/ Number for the IT comparators are the four year averages prior to the adoption of IT		

Source: International Finance Statistics; Respective Central Banks' web-sites; and Author's calculations.

f. Transparency of Monetary Policy

Transparency and open communication are key features to adopting a successful IT framework. In addition, public accountability is essential. The need for explicit accountability mechanisms in IT is due to the lag between monetary policy actions and inflation. The appropriateness of the monetary policy stance cannot be assessed based on the latest inflation figures. Equally important to underscore is that in the absence of credibility, the inflation target will not be a useful guide for inflation expectations, rendering monetary policy actions ineffective. In IT countries, policy actions tend to be announced immediately by a press release, and minutes of Monetary Policy Committee meetings are often published. Heenan, Peter, and Roger (2006) provide a detailed discussion on this and also highlight country examples.

In the Egyptian context, to enhance transparency and help anchor inflation expectations, MPC's decisions are communicated to the market through a monetary policy statement, which is released on the CBE's external web-site after each meeting. There are plans to publish the minutes of the MPC meetings. In addition, a comprehensive communication strategy has been developed and is under implementation. This strategy includes regular meetings with commercial banks, representatives of the private sector, journalists, think tanks, and research institutions. In addition, designing the modalities of regular press conferences

and presence in academic conferences are part of the communication strategy. The blueprint of the inflation report and analytical notes on key macroeconomic variables, to inform the public about macroeconomic developments and explain its monetary policy stance, have already been prepared but have yet to be published. Compared to other IT countries, there is wider scope for improvement in this area for Egypt.

g. Data Requirements and Strengthening the Macroeconomic Database

Monetary policy under IT requires relatively high quality, timely and high frequency macroeconomic data. Strengthening the macroeconomic database has been a key priority in Egypt. Egypt subscribed to the IMF's Special Data Dissemination System (SDDS), which requires prompt posting of various macroeconomic datasets, compiled in line with best international practice and comparable across countries. Moreover, recognizing the need to further improve statistics, in 2005 the CBE agreed to the publication of the IMF ROSC (Report on the Observance of Standards and Codes), which evaluates the macroeconomic datasets and provides recommendations to improve them (International Monetary Fund 2005, 2007).

Despite data shortcomings, the CBE has strengthened its analytical and forecasting capabilities. The Monetary Policy Unit was established within the CBE to play a key role in providing objective monetary policy analysis, assessment and modalities of communication with the market through its research and other functions. Alternative models to forecast inflation have also been developed. Assessing and improving the current forecasting models used in monetary policy formulation is a continuous process. Table 9 below highlights the status of inflation modeling and forecasting.

Table 9. Status of Forecasting and Modeling

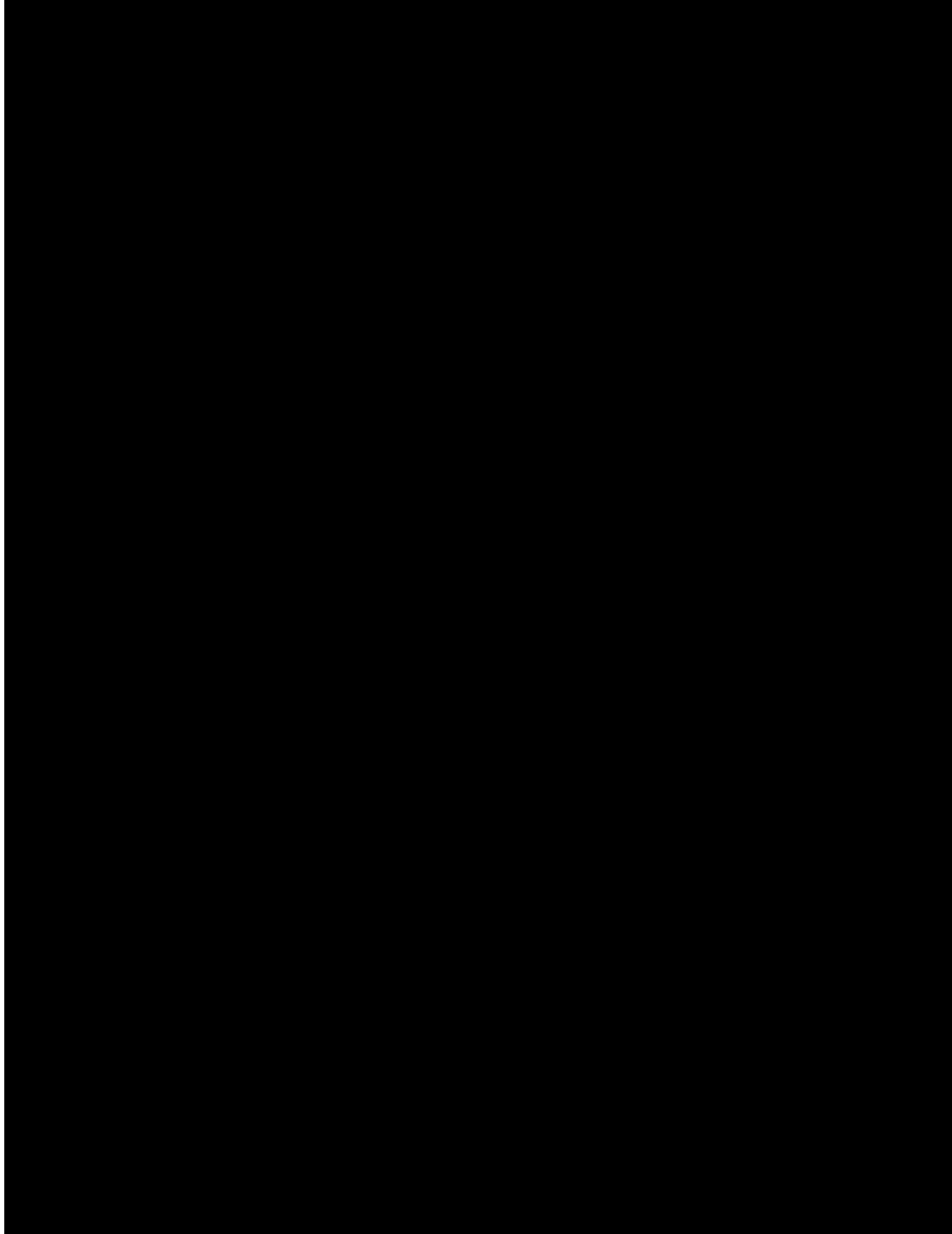|	Status (Yes/No)	Details
CPI and core inflation		
Construct core CPI	Yes	The CBE constructs its own core inflation measures, excluding regulated items and volatile food items. To date, these measures have been for internal circulation, not for publication. Going forward, there are plans to publish these measures.
Seasonally adjusted estimates of CPI	Yes	
Estimate sub-groups of CPI	Yes	The CPI basket has been split into sub-groups, food, non-food and service.
Modeling		
- Analysis of exchange rate pass-through	Yes	The degree of pass-through from the exchange rate to the CPI and WPI inflation rates was quantified in an empirical study, utilizing a 5-variable VAR model. The responses of CPI and WPI to exchange rate shocks have been obtained.
- Effect of interest, credit and exchange rate channels	Yes	VAR analysis has been conducted. The relationships between the variables and the response have been obtained.
- Inflation forecasting	Yes	The CBE carries out near-term forecasts for one quarter ahead. In addition, there are medium-term forecasts.
- Quantitative	Yes	
- Graphic and numeric	Yes	
- Stochastic	Work in Progress	Developing these types of models is underway in the CBE.
Estimate of potential GDP	Yes	
Quarterly structural model (multi-equation)	Work in Progress	Developing these types of models is underway in the CBE.
Other		
Business surveys with inflation indicators (wage, profitability, capacity constraints, input and output prices, and inflation expectations)	Yes	The ECES puts out a business barometer, which surveys business confidence. However, more needs to be accomplished in this area.
Household surveys of inflation expectations	No	

Source: Central Bank of Egypt.

5. CONCLUSION

The CBE has taken many important steps to upgrade Egypt's monetary policy over the last few years with a view to adopting inflation targeting as a monetary policy framework once the prerequisites are fulfilled. Under the new banking law, the CBE was granted more independence and an explicit institutional framework was set up for interest rate determination. In addition, the structural reforms underway in the banking sector have led to improved efficiency and competition among banks, steps expected to facilitate monetary policy transmission.

There is, however, a number of outstanding issues that need to be addressed before Egypt is ready to adopt a fully fledged IT framework. In particular, efforts are needed to consolidate the fiscal position and improve the macroeconomic database. A medium-term fiscal consolidation strategy will be a crucial element of Egypt's transition to IT.

The Interest Rate Granger Causality Tests

Table A1. Pairwise Interest Rate Granger Causality Tests, 1996:1-2005:5/1

The Fiscal Consolidation Program

As the CBE is preparing the grounds for the introduction of a formal inflation-targeting regime in the medium term, it is important that fiscal dominance is curbed significantly. In all countries that have successfully implemented inflation targeting, fiscal consolidation had been a key pre-requisite since the high and rising public debt ratio keeps pressure on monetary policy and interest rates, and ultimately weakens investor confidence in macroeconomic management.

The Government's fiscal consolidation plan aims to bring the deficit down by 1 percent of GDP annually to the range of 3-4 percent of GDP over the next five years. The plan involves the following mix of measures (International Monetary Fund 2006):

- Reforming domestic fuel subsidies by targeting them more effectively to the poor and providing incentives to switch to natural gas;
- Streamlining and improving the product targeting of food subsidies;
- Instituting wage and employment measures designed to contain the wage bill, including a partial hiring freeze and measures to slow wage drift; the authorities planned to submit to parliament in 2006 a comprehensive reform of the civil service expected to contribute to fiscal consolidation;
- Reforming the General Sales Tax into a unified VAT with a broader base, a single rate, and a higher threshold, with a presumptive tax regime for small businesses;
- Broadening the base and streamlining rates for the property tax and stamp taxes;
- Introducing a Treasury Single Account (TSA) to help improve cash management and increase control over off-budget resources kept by budget entities in the banking system;
- Reorganizing the institutional layout and streamlining the flow of funds between the budget, the National Investment Bank (NIB), and the Social Insurance Funds (SIFs);
- Tightening controls on operating flows with state enterprises to increase the transparency and control of expenditures;
- Improving debt management; and
- Launching public private partnerships (PPPs) to finance the provision of much-needed public investment, particularly for schools and health clinics.

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