MONETARY POLICY RESPONSES TO THE GLOBAL FINANCIAL CRISIS: A CASE STUDY OF EGYPT

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Abstract

Among the triggers of the Arab Spring are the declining living standards of the middle and lower income groups. Undoubtedly, the global financial crisis (GFC) is to be partially blamed for weakening the economies of these nations. But was monetary policy ineffective in combating inflation and reducing the meltdown? This paper employs a dynamic stochastic general equilibrium model to assess the effectiveness of the monetary policy in the wake of the GFC. Egypt is selected as a case study due to its overdependence on imported food, the prices of which are relentlessly soaring. The results of the study reveal that the ideal operating targets for the Central Bank of Egypt are the overnight rate and legal reserve requirements. Interest rates are more suitable for long-run impact on the ultimate goals of growth, price stability and job creation. The study culminates in designing a framework to enhance central bankers' political independence and transparency, which is imperative for nations with high levels of corruption. The study is not only informative to the new Egyptian policymakers, but also to other developing and emerging economies that suffer from symptoms of chronic inflation and looming socio-political turmoil.

Keywords: Monetary Policy, Interest Rate Policy, Balance Sheet Policy

JEL Classification: E40, E52, E58, E60

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1 Introduction

As economic fragility and financial weakness become mutually reinforcing during the global financial crisis (GFC), prompt policies were globally undertaken to undermine the virulence of the meltdown (ECB, 2009). But conventional monetary policy instruments were unable to solely reverse the meltdown. First, waning consumer spending reduced the money supply multiplier, attesting to the fact that severe economic shocks may not have a time-invariant Gaussian distribution, but rather demonstrate excessive kurtosis or fat-tail risk (Kim *et al*, 2005). Second, in view of the decline in collateral values, dysfunctional financial intermediation has been primarily blamed for aggravating the impact of credit market frictions and reinforced the propagation of the adverse feedback loop (Mishkin, 2010). Third, the global recession was triggered by factors responsible for subduing real microeconomic performance, hence slowing down potential macroeconomic growth.

While emerging market economies (EMEs) did not experience the slide of nominal interest rates towards the theoretical zero bound, lower discount rates did not trigger economic growth. This was experienced especially in nations that were heavily dependent on food imports.

In 2006, food prices soared well above the new equilibrium level. Numerous factors were responsible for the overshooting of prices, namely financial speculation on food commodities, rising demand by the populous emerging markets, higher fuel and transportation costs, export restrictions, depreciation of the US dollar, and environmental conditions that led to reductions in grain stocks (Headey, 2011). With the resurgence of the crisis at the dawn of 2011, food prices recorded new peaks exceeding the historical

2006-2007 levels. As a result, governments in the developing world have been rocked by protests, many of which led to ousting autocratic regimes.

People's dissatisfaction with their living standards and the persistent food insecurity contributed to the recent uprisings in the Middle East (Breisinger *et al*, 2011). One of the triggers of the Arab Spring was the oversight of the autocratic regimes in regard to using short term fire-fighting measures such as raising public servants' salaries, increasing subsidies, devaluing domestic currencies and building up stocks of strategic food items (Brinkman and Hendrix, 2010). In accordance with the theory of democratic transitions, whereby transient economic shocks give birth to a "democratic window of opportunity", the elected governments of the Arab Spring nations are commendably placing much emphasis on transitioning towards democracy and eradicating cronyism and corruption (Arezki and Bruckner, 2011). However, this does not suffice in nations that are overly dependent on food imports. While an equitable and transparent economic system is imperative for economic development and political stability, the governments of EMEs should prioritize designing long-term solutions to improve the living standards of their citizens. Fighting inflation is among the prime factors that are apt to enhance the purchasing power of households. Hence, the design of an efficient monetary policy is among the most effective tools to combat persistent inflationary pressures (Kletzer and Spiegel, 2004).

Undoubtedly, the global financial crisis is to be partially blamed for weakening the economies of these nations. But was monetary policy ineffective in combating inflation and prompting GDP growth? This study utilises a dynamic stochastic general equilibrium (DSGE) benchmark model incorporating features of middle-income open market economies to assess the effectiveness of monetary policy in meeting the ultimate goals of price stability, GDP growth and job creation. Being the Arab nation with the largest population and chief geostrategic importance, Egypt is selected as a case study. Indeed, one of the prime triggers of the Egyptian Revolution was the untamable inflation that was held responsible for the declining purchasing power and deteriorating living standards of the middle and lower income segments of the Egyptian populace. In view of the massive reshuffling of Egyptian policymakers and central bankers, it becomes imperative to assess the efficiency of monetary policy in achieving its goals and targets. The policy implications of the study are intended to alert the newly elected Egyptian policymakers to the best operating tools to achieve the inflation and growth targets. This research could be also informative to other developing nations and emerging economies that suffer from symptoms of chronic inflation and looming socio-political turmoil. The rest of the paper is designed as follows. Section 2 reviews how the goals of monetary policy have evolved since the seventies. Section 3 elucidates the stance of monetary policy in Egypt. Sections 4 and 5 detail the DSGE model and the last section concludes with policy implications.

2 The Evolution Of Monetaryn Policy Goals

The seventies marked a major paradigm shift from Keynesianism towards monetarism (Hall, 1993). Since the same period stood witness to high inflation rates, interest-rate policy and inflation targeting became the central methods for containing business cycle fluctuations (Bernanke and Mishkin, 1997). But one major consequence of these policies was asset-price volatility and housing bubbles, culminating in booms and busts similar to the American slowdown of 1991 and the 1997-Asian equity market crashes (Barro, 2006).

Asset market drains and economic downturns could not be solely circumvented through the establishment of sound legal systems and prudent regulatory supervision, but monetary policy is the most important instrument that can reduce the impact of deflationary contractions (Clarida *et al*, 2000). With these mounting concerns Bernanke, Gertler and Gilchrist (1999) introduced the financial accelerator model, which does not only emphasize how the ailing firms' balance sheets constrain their ability to obtain investment funds, but also elucidates the monetary policy tools needed to arrest the recessionary dynamic. Ironically, this is exactly when central banks in western economies panicked into massive interest rate cuts by the dictates of fragile markets (English *et al*, 2003). With the gloom of an imminent asset market crash, the proposals of alternatives to conventional monetary policy arose, where most of these schemes were triggered by the interest rates being constrained at their zero-bound (Bernanke *et al*, 2004).

Since EMEs do not suffer from the drawbacks of zero-bound interest rates, and since they are more affected by their home-grown financial crises, different fiscal and monetary tools were used to mitigate the crises (Allen *et al*, 2002). Us (2004) utilizes a small model combining the short-term real interest rate

and the real effective exchange rate as the monetary policy instrument. But in the case of high interest rates, it is best to revert to methodologies such as those proposed by Clarida *et al* (1999) using a dynamic general equilibrium model to derive the optimal monetary policy under discretion. Svensson (2000) builds a forward-looking aggregate demand-aggregate supply model for a small open economy.
As the world economy is climbing out of the financial meltdown and since the problems that policy goals are meant to be addressing have changed, the global community is embarking on another paradigm shift (Taylor, 2009). Instead of focusing on a nominal policy anchor, the international community has called for the largely conflicting goals of strict financial supervision, price stability, augmented economic activity and job creation (Champonnois, 2009). Indeed, the main criticism of the DSGE technique is its weak modeling of financial markets, limiting stress testing in financial stability exercises (Tovar, 2008). However, two factors make this model highly applicable to the case of emerging market economies. First, the DSGE model has been successfully utilized to detect the sources of business cycle fluctuations and to explain the cross correlation between output and inflation (Smets and Wouters, 2007). Secondly, the prudent control by the CBE legitimizes the use of this model for Egypt, an economy that has been largely sheltered from the assaults of financial sector precariousness due to its recent banking reform.

3 The Stance Of Monetary Policy In Egypt

As a reaction to the waves of non-performing loans (NPLs) between 1997 and 2003, the Central Bank of Egypt (CBE) adopted the Banking Reform Plan (BRP) in 2004, which rested on four pillars: imposing stringent controls on banks to enhance and consolidate the banking sector; reforming state-owned banks; rigorous capital adequacy compliance; and settling NPLs. Also, in accordance with the surge in food and oil prices and the thirty-year record inflation rate of 23.6 per cent as of August 2008, the CBE espoused on inflation targeting as its nominal anchor, whilst maintaining an implicit annual GDP growth goal of 5-7 per cent.

Prior to the BRP the CBE neither had an explicit monetary policy tool nor a specific operating target; sometimes it used interest rate and exchange rate targets, while at other times it targeted inflation. The CBE was obliged to follow a managed-peg, leading to the serious predicament of the exchange rate overshadowing the inflation target as the nominal anchor. This problem resulted in the accumulation of huge foreign reserves as an endeavour to stabilize the exchange rate. Consecutively, this culminated in expanding monetary aggregates and inflationary pressures. As credit conditions tightened, investment and consumer spending were depressed which, in turn, fed back to a further tightening of credit conditions and the adverse feedback loop emanated (Jonas and Mishkin, 2003).
Ever since the instigation of the BRP, the CBE adopted the overnight inter-bank rate as its operational tool; inflation as its nominal anchor; and price stability, investment and GDP growth as its ultimate goals; as clarified in figure 1.

Figure 1. CBE Monetary Policy subsequent to the BRP

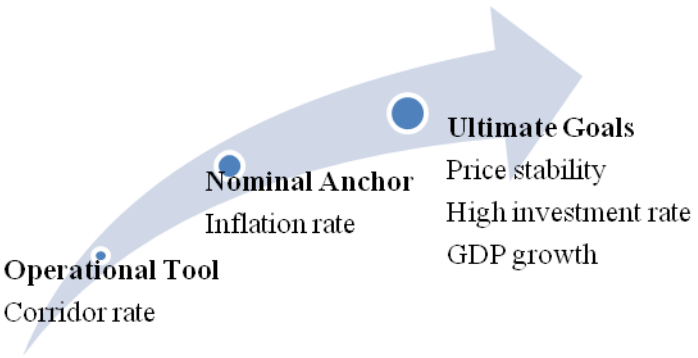
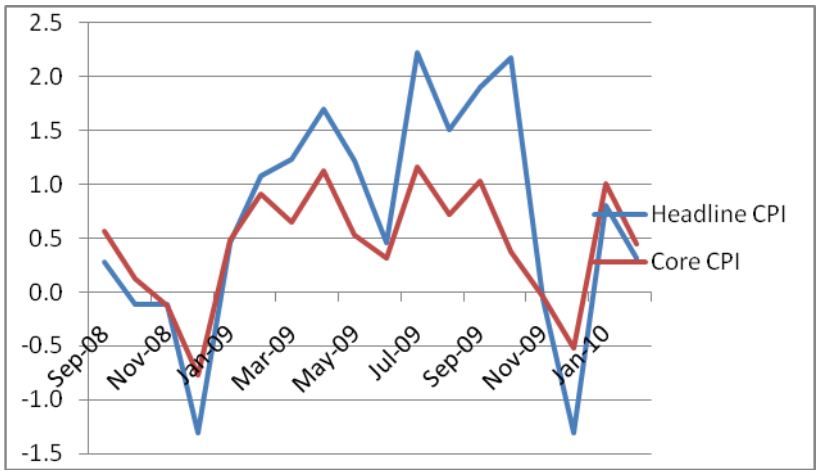


Figure prepared by the researcher

Due to the declining living standards and the recurrent protests in Egypt, the CBE responds to two factors only: (1) widening output gaps, and (2) inflation. On the other hand, in nations with deep financial markets and/or aggressive speculation on assets, central banks respond principally to fluctuations in asset prices. In order to allow fluctuations within a given band, the CBE applies the corridor system, where the ceiling and the floor are the overnight lending and deposit rates respectively. This has successfully narrowed the historical interest rate spread from 2 per cent to 1.5 per cent in 2008 (CBE, 2010). By

relentlessly raising the discount rate, the CBE managed to reduce inflation to 11 per cent, as detailed in figure 2.

Figure 2. Comparison of Core Inflation and CPI



Source: Central Bank of Egypt (2010) *Monthly Statistical Bulletin*, CBE, Cairo.

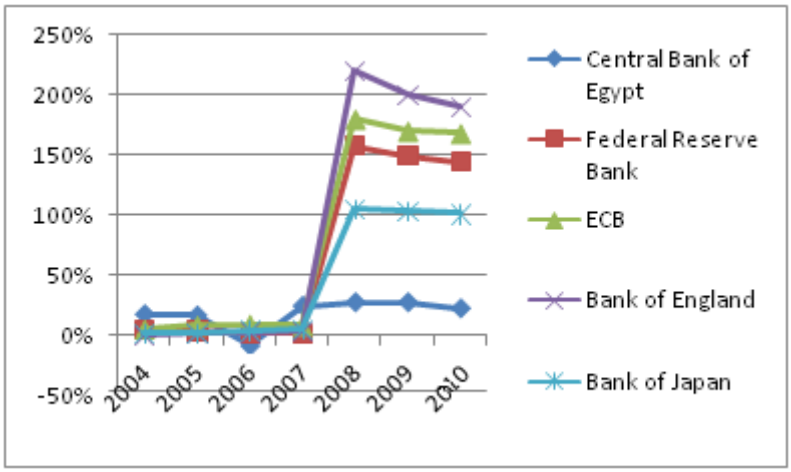
3.1 Monetary Policy and Asset Price Fluctuations

The consensus among economists is that conventional monetary policy is a very helpful instrument, albeit being insufficient, when attempting to contain the damaging effects of fluctuations in asset prices (Mishkin, 2007). The first element of monetary policy is interest rate signalling mechanisms; the second uses the central bank's balance sheet to render that policy stance effective. Since this normally involves managing the amount of central bank funds in the system, these policies have come to be known as "liquidity management operations" (Borio and Disyatat, 2009). A number of central banks habitually used these liquidity management operations, dubbed "balance sheet policies" to help boost their economies. For example, at the twilight of the millennium, Bank of Japan bought long-term illiquid government bonds instead of short-term bills, to pump liquidity into debt and equity markets. In this case the channel through which a central bank can affect economic activity is either by altering the balance sheet of private sector agents, or through influencing expectations. However, the fiscal agent could mete out the same effect if it issues government bonds and uses the proceeds to retire the less liquid outstanding bonds (King, 2004).

3.2 Balance Sheet Policies in the Aftermath of the Crisis

Specifically at the dawn of the GFC in August 2007, many Western central banks elicited the deployment of a target interest rate, which has dropped to near zero. Yet, towards the end of 2007 it became apparent that the reduced discount rates in most western economies were not delivering results. This tempted central banks to inject liquidity into the economy through purchases of toxic assets. Some central banks went as far as injecting equity into financial institutions to ease deleveraging pressures (Adrian and Shin, 2008). Figure 3 shows that most central banks drastically swelled their balance sheets, with the highest expansion being undertaken by Bank of England and the European Central Bank. Similar to most EMEs, the extent of the intervention by the CBE was minimal, where it expanded its balance sheet by 25 per cent amidst the crisis, compared to 152 per cent by the Federal Reserve Bank. This is due to the fact that the impact of the global recession on the highly sheltered and heavily regulated banking sectors of most EMEs was not as drastic as in mature financial systems.

Figure 3. Changes in Sizes of the Balance Sheets of Selected Central Banks (2004-2010)



Source: Various publications of Central Banks.

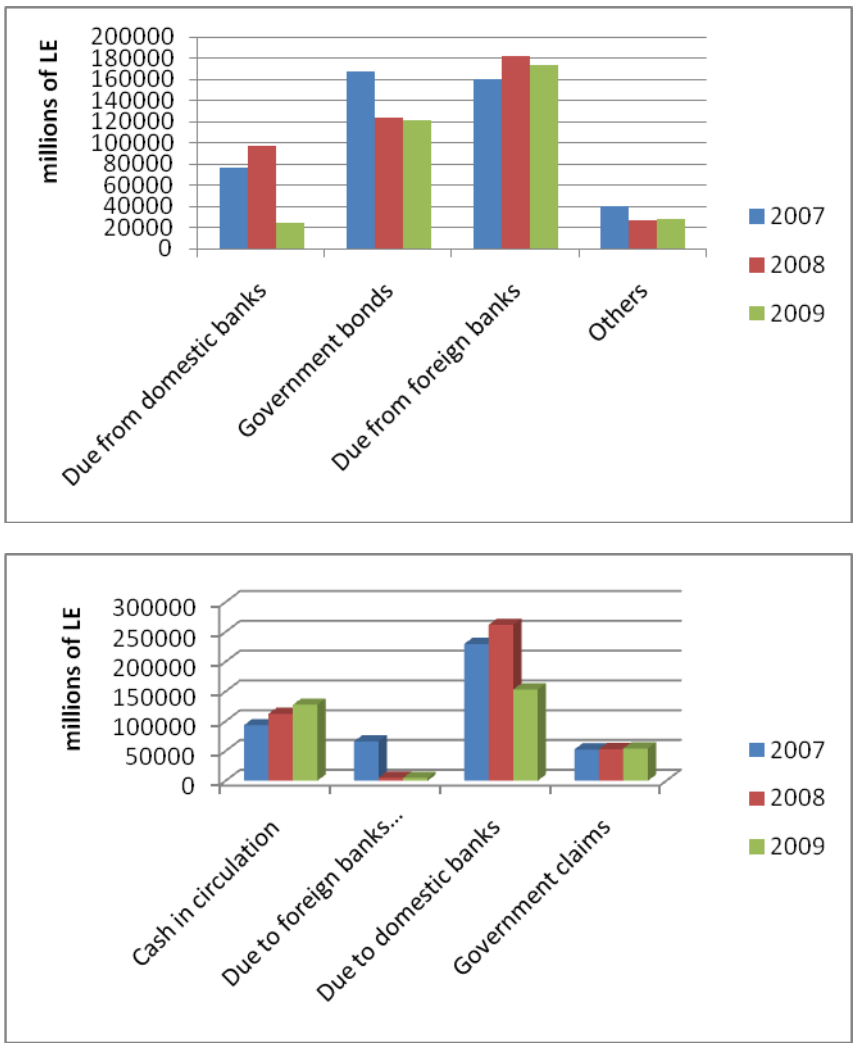
3.2 The Response of the Central Bank of Egypt: Quantitative and Qualitative Easing

The prohibition of the issuance and trading in asset-backed securities and collateralised debt obligations kept the balance sheets of Egyptian banks devoid of toxic assets. Yet, the decline in global demand led to the reduction in the Suez Canal receipts, workers' remittances and tourist revenue by more than 25 per cent. It was the hefty domestic demand, mainly triggered by a colossal population, which came to the rescue of the economy allowing GDP to slow down from 7 per cent prior to the recession to the much acceptable rate of 4.7 per cent in 2009.

In response to the crisis, the CBE mainly swelled its balance sheet by pumping much needed liquidity into the Egyptian banking sector and the real economy by introducing a new overnight auction lending outlet. Second, it purchased government bonds to finance the LE 15.5 billion (US$3.5 billion) fiscal stimulus package. Yet, a close examination of figure 4 reveals that the main expansion of the balance sheet of the CBE stemmed from its accumulation of huge foreign reserve balances that it placed with its foreign correspondents. Most of the foreign currencies were purchased from the local market to augment the Egyptian pound in order to make the seven million tonnes of annually imported wheat less costly. Also, the CBE implemented new measures to revive the repo market to manage liquidity for both depository institutions and primary dealers, rendering the CBE rescue tools milder than those of western nations.

In addition to quantitative easing, the CBE purchased riskier assets and corporate securities at their lowest levels and reaped capital gains. Also, spurred by the increasing risks and fluctuations in the foreign exchange rates, it diversified its holdings of foreign currencies and acquired commodities and precious metals to maintain the 20 per cent targeted safety level of foreign reserves to GDP. But as benign as these actions may appear, have they managed to meet the multiple targets or were they simply spontaneous reactions? In order to answer this question, the impact of these interventions is gauged in the next two sections by the DSGE model.

Figure 4. Changes in the Assets and Liabilities of the CBE in Response to the GFC



Source: Central Bank of Egypt (2009) *Annual Report (2008-09)*, Cairo: Central Bank of Egypt.

4 The Empirical Model

Several central banks employ the DSGE model to establish a theoretical framework for macroeconomic analysis (Smets and Wouters, 2003). The appeal of this new-Keynesian framework is that it utilizes the IS-LM model, while grounded in the dynamic general equilibrium theory. To detect the efficacy of the Egyptian monetary policy during the GFC, the study constructs a DSGE model for a small open economy in accordance with Clarida *et al* (1999) during 1993:01-2010:04.

To expand money supply, the CBE is currently exempting banks from the 14 per cent legal reserve requirement (LRR) for loans extended to small and medium enterprises (SMEs), which are responsible for the bulk of job creation in the economy (IMF, 2010). Hence, the LRR could be treated as an implicit short term or operational policy tool that was adopted by the CBE in the wake of the global recession. The CBE employs both the auction window as well as open market operations (OMO) to influence the market interest rates. Moreover, with short-term nominal price rigidity, the overnight rate will be influenced by OMO. The intermediate targets were altered to comprise of M2 monetary aggregate (M), the real effective exchange rate index (s) in addition to the core inflation rate (πc), which excludes commodities with either highly volatile and/or regulated prices. The monetary authority does not target a particular level of the exchange rate, but it simply reacts to large changes in the effective exchange rate, which is calculated according to the price of the Egyptian pound against the weighted average of a basket of the currencies of Egypt's main trade partners. The core inflation is used to separate temporary from persistent price fluctuations. On the other hand, the ultimate goals primarily include changes in the annual

growth rate of output (x), the yearly increase in the consumer price index (π) and changes in the unemployment rate (U). Figure 5 summarizes the temporary shift in the monetary policy paradigm in the wake of the financial crisis.

Figure 5. Alterations in CBE's Monetary Policy Stance in the Wake of the GFC

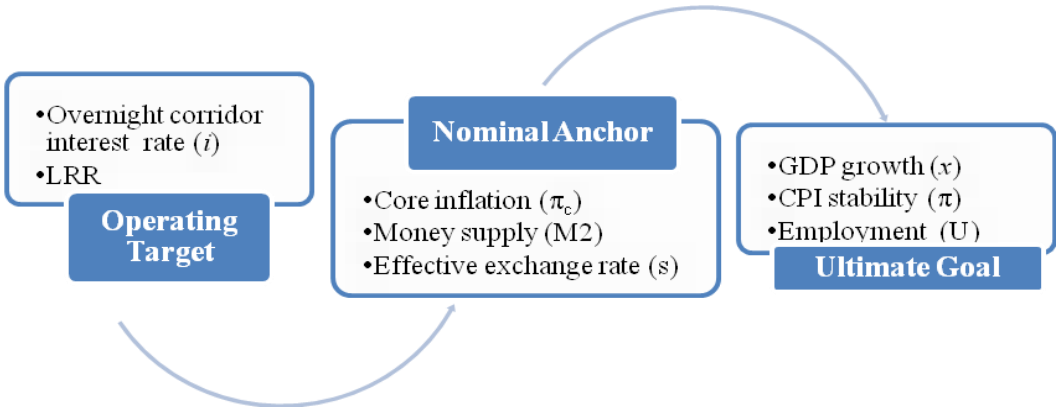


Figure prepared by the researcher

The fit step in constructing the DSGE model is to specify the key economic players: households, businesses, the CBE and the rest of the world. Households decide on the level of consumption and savings and each household supplies a different type of labour. The monopolistic competition market comprises of businesses producing an array of products, setting prices, and deciding on inputs to employ.

The baseline model representing the economy is presented using the traditional Keynesian IS-LM model and the Phillips curve. Equations 1-4 summarise the model, where the first two equations represent the product market and the last two capture the money market. All equations reflect expectations of the future stance of monetary policy. They contain disturbance terms (ε), which is a collection of independent and identically distributed independent and identically distributed (i.i.d.) random variables.

Equation 1 represents the short-run aggregate supply curve or the Phillips curve. πg is the CPI gap. Producers index prices to lagged inflation rates to increase the persistence of inflation. This is especially important for Egypt where inflation has been a relentless problem since the outbreak of the Global Food Crisis in 2006. The import-oriented nature of the Egyptian economy culminated in huge balance of payments deficits amounting to 15.7 per cent of GDP. Hence, there is a negative relationship between the effective exchange rate (s_t) and the inflation gap.

$$\pi_g = a_0 + a_1 x_t - a_2 s_t + a_3 \pi_{t-1} + \varepsilon_1 \quad (1)$$

Equation 2 is the aggregate-demand schedule embedding the variables determining the output gap. These comprise the real interest rate (i_r), which measures the opportunity cost of investment; the real balance of money supply ($M2$); the expected effective exchange rate; and the future expected output during the following business cycle.

$$x_t = b_0 + b_1 i_{r_t} + b_2 M2_{t+1} - b_3 s_{t+1} + b_4 x_{t+1} + \varepsilon_2 \quad (2)$$

Equation 3 captures the money demand function, which is determined by the output, the price level, the exchange rate and the real interest rate. The expectations of inflation tempt individuals to prefer holding assets, which leads to a negative relationship with money demand. Usually, the future inflation depends on the past expectations of current inflation.

$$M_d = c_0 + c_1 x_t - c_2 \pi_{t+1} + c_3 s_{t+1} + c_4 i_{r_{t+1}} + \varepsilon_3 \quad (3)$$

Finally, the money supply schedule reflects how the CBE uses OMO to affect the corridor interest rate, hence arises the positive relationship between the monetary base (B) and money supply (Ms). Also, as

previously mentioned, the CBE has implicitly used LRR (*R*) to affect money supply. The amount of cash holdings (*M0*) curtails the growth of *Ms* indicating a negative relationship. The last determinant of money supply for Egypt is the real interest rate.

$$M_s = d_0 + d_1 B_t - d_2 R_{t+1} - d_3 M0_t + d_4 i_{r_{t+1}} + \varepsilon_4 \quad (4)$$

As summarized in figure 4, the ultimate long-term goals of the CBE are: (1) a targeted rate of GDP growth; (2) a specific CPI; and (3) a precise unemployment rate. In fact, these goals are specified in accordance with the quarterly deliberations and consensus of the summit level economic group. Equation 5 reflects the loss function or the cost to the CBE for the implementation of these three goals. The CBE endeavours to minimize these costs by ensuring the credibility of its policies in accordance with the constraints of the above equations.

$$L = \alpha \text{ var} x_t + \beta \text{ var } \pi_t + \gamma \text{ var} U_t \quad (5)$$

5 Results

Quarterly data is collected from the CBE and CAPMAS databases over the period 1993:01-2010:04. The software used is MATLAB. The effectiveness of the new monetary policy shifts are first tested by measuring the correlation coefficients between the operational targets, intermediate targets and ultimate goals. The least squares method is used to regress each operating target on intermediate targets and ultimate goals. Consequently, the three ultimate goals are regressed on the intermediate goals.

5.1 Cointegration Tests

After running unit root tests, variables were found to be homogeneous and non-stationary of degree one. To rank the efficacy of monetary tools, cointegration tests are run among the operating targets and the nominal anchors, operating targets and ultimate goals and finally, nominal anchors and the ultimate goals. Using *Akaike Information Criterion*, 4 lags sufficiently obtain a general dynamic model with residuals of no significant autocorrelation.

Table 1. Cointegration Results of Intermediate Goals and Operating Targets

	i	***LRR***
π_c	+0.56	- 0.28
M2	+0.45	- 0.38
s	+0.84	- 0.22

Values at 5% significance level

Table 1 summarizes the results of the long-run Johansen and Julius (1990) JJ-cointegration tests. The intermediate goals and operating targets are cointegrated, with no lags.

Table 2. Cointegration Results of Ultimate Goals and Operating Targets

	i	***LRR***
x	-0.36	- 0.51
π	+0.09	- 0.26
U	0.02	- 0.07

Values at 5% significance level

Table 2 shows that output is affected by interest rates with one lag and by the LRR after 2 lags, while inflation is affected after only one lag. The impact on unemployment is minimal.

Table 3. Cointegration Results of Ultimate Goals and Intermediate Targets

	π_c	*M*	*s*
x	- 0.99	+ 0.69	+ 0.88
π	- 2.91	+ 0.33	- 0.97
U	0.83	- 0.12	- 0.11

Values at 5% significance level

Table 3 shows that the intermediate targets and the ultimate goals are cointegrated. The results are consistent with theory and the prime goal of price stability, where a revaluation of the Egyptian pound lowers the cost of production lowering inflation and expanding GDP. But the effect on unemployment is less pronounced with 2 lags.

Table 4. Summary of Policy Rules for Operating Targets

	M2		***s***	
i	-1.9894 (0.9925) Log likelihood -524.1269		4.2879 (1.1128) Akaike info. criterion 6.3256	
LRR	-0.8345 (0.4673) Log likelihood -1254.0157		-0.2361(0.2387) Akaike info. criterion 2.2213	
	x	***π***	***U***	***Constant***
i	-3.4219 (0.0469) Log likelihood -115.7001	4.2381(2.4589)	1.1534 (0.1983) Akaike info. criterion 1.5413	-22.71971 (7.0512)

Cointegrating coefficients in parentheses

Finally, table 4 shows the normalized cointegrating equations and summarizes the policy rules for the operating targets. The priority of the operating targets is the overnight rate followed by the LRR, while the nominal anchor is selected as M2 and the effective exchange rate.

5.2 Testing the DSGE Model

The equations of the DSGE model are estimated using the least squares method and the lag values are selected from the results of the cointegration equations; variables are specified as under adaptive forecasts. One-period forecast is run using the maximum likelihood method with *ex-post* forecasts. Table 5 shows the DSGE model and Equations 6-9 demonstrate the structural form of the linear space empirical model. All state variables (SV) are recursive except for SV_1, SV_5, SV_{11}, SV_{16} and SV_{19}, which are random walk state variables, while all others are recursive state variables. Corresponding to the random state variables are the variances exp[C(3)] to exp[C(7)]. Equation (10) shows the overnight interbank overnight rate (*i*) as the operating target since the model is not converged when the LRR is used as the operating target. Figure 6 shows the simulations of the endogenous variables: *x*, *π*, *i*, *M0*, *M2* and *B*. The disturbance terms of the equations are not correlated excluding the risk that the equations suffer from simultaneity bias.

$$\pi_g = C(1)x_{t-1} + C(2)\Delta s_t + SV_1 \quad (6)$$

$$x_t = SV_2\, i_r + SV_3 M2 - SV_4(s_t - s_{t-1}) + SV_5 \quad (7)$$

$$M_d = SV_6 + SV_7\, x_{t-1} - SV_8(\pi_{t-1}) + SV_9(s_{t-1}) + SV_{10}(i_{t-1}) + SV_{11} \quad (8)$$

$$M_s = SV_{12}(B_{t-1} - B_{t-2}) - SV_{13}(R_{t-1} - R_{t-2}) - SV_{14}(M0_{t-1}) + SV_{15}(i_{t-2}) + SV_{16} \quad (9)$$

$$i = SV_{17}(M2_{t-1} - M2_{t-2}) + SV_{18}(s_{t-1}) + SV_{19} \quad (10)$$

Figure 6. Historical Simulations

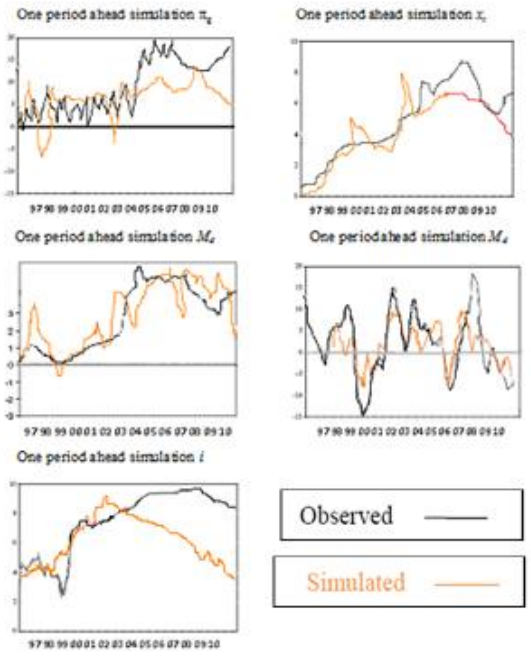


Figure 6 shows the historical actual and simulated paths of endogenous variables during 1997:01-2010:04. This period is selected to capture the financial distress emanating from the Asian Crisis and the NPLs, currently counting for 14.7 per cent of the loan portfolio as of 2009 (IMF, 2010). If the DSGE model is successful in forecasting the performance of the economy in the short to medium run, then it should be able to replicate the past behaviour of the variables. The model captures most turning points in real GDP, money demand and money supply. The size, direction and magnitude of fluctuations of are well reproduced over the whole period.

Table 5. DSGE Model

Estimation Method: Maximum likelihood (Marquardt)				
	Coefficient	**S.E.**	**z-statistic**	**Probability**
C(1)	0.1914	0.1766	1.2883	0.1899
C(2)	-0.1014	0.0713	- 1.6213	0.0933
C(3)	-0.1811	0.2256	- 1.9989	0.0312
C(4)	2.8914	0.1703	11.4412	0.0000
C(5)	11.4379	0.2175	45.1167	0.0000
C(6)	1.1257	0.5614	7.1288	0.0000
C(7)	12.7845	0.6739	25.6701	0.0000
	Final State	**Root M.S.E.**	**z-statistic**	**Probability**
SV(1)	1.9763	0.8956	2.9981	0.0021
SV(2)	- 0.1212	0.6714	- 0.1701	0.7912
SV(3)	0.0312	0.3157	0.1278	0.8912
SV(4)	- 0.0061	0.4289	- 0.0148	0.8711
SV(5)	1.2927	19.8812	0.0912	0.8127
SV(6)	- 2.1086	34.2218	- 0.0616	0.8012
SV(7)	- 0.0109	33.1221	- 0.0191	0.9918
SV(8)	- 0.0121	19.1195	- 0.0816	0.9128
SV(9)	0.0419	0.3572	0.1107	0.8485
SV(10)	0.0038	0.0304	0.1207	0.8714
SV(11)	- 0.0374	7.5840	- 0.0019	0.9812
SV(12)	- 2.3991	14.1761	- 0.0685	1.0000
SV(13)	- 4.0189	2.3861	- 1.8138	0.9191

SV(14)	- 5.2971	55.8927	- 0.0009	0.9318
SV(15)	- 6.3909	75.9018	- 0.0007	0.9728
SV(16)	2.6439	22.2875	0.0118	0.9889
SV(17)	- 0.3871	0.9479	- 3.0198	0.9981
SV(18)	2.5755	12.3319	0.0011	0.9995
SV(19)	- 0.0389	0.3519	0.1219	0.9998
Log likelihood	-2911.14			
Parameters	7			
Diffuse priors	18			
Akaike information criterion	54.1892			
Schwarz criterion	53.9912			
Hannan-Quinn criterion	54.0085			

6 Concluding Remarks

The Arab Spring is yet at its dawn, but signs of a democratic transition are already unfolding. Egypt is gradually undergoing a political transformation that has strengthened parliamentary democracy, undermined the role of the police state, and diminished cronyism and corruption. These political reforms are steadily allowing moderate Islamists to peacefully and democratically co-exist with secular groups and elites. While the political triggers of the popular leaderless Revolution are being adequately addressed, the economy has been badly impacted. The CBE has utilized more than half of its foreign reserves to support the Egyptian pound and to meet import needs. The constant labour strikes have substantially decreased industrial production by more than 15 per cent. Many foreign investors have fled the country and the stock exchange has lost around half of its capitalisation. In spite of the slowdown in consumption, inflation is still staggering at around 10 per cent (The World Bank, 2011). The elected government needs to focus on rapidly revamping the economy, promptly introducing structural all-inclusive reforms and forcefully addressing the inflationary pressures.

6.1 Policy Implications

As such, investigating the efficacy of monetary policy adopted by the Central Bank of Egypt is imperative during this transitional period. This research has studied the impact of the shifts in monetary operational tools, nominal anchor and ultimate goals in response to the global meltdown using the DSGE model to provide guidelines for future actions. The results of the study could be summarized as follows:

- Targeting core inflation instead of the CPI is not useful to control inflationary pressures, albeit being more effectual for both output and unemployment.
- If the operating targets are to be ranked, interest rates are the most effective.
- Interest rates have a large impact on both core inflation and the effective exchange rate. But the impact on unemployment is minimal, which indicates the need for the utilization of additional tools to solve this stringent problem.
- The revaluation of the Egyptian pound lowers the cost of production, hence curbing inflation and expanding GDP. Thus, inflation targeting dictates the usage of this tool to face price hikes.
- The employment of the LRR as an operational target has minimal stabilising effects and is ineffectual in curbing inflation. The costliness of exempting funds loaned out to SMEs from the LRR rests on them crowding out other sectors which could have been more capable of generating higher GDP growth. It is recommended that this operating target be immediately discontinued. Yet, given the importance of SMEs in generating jobs, the CBE should request national and intergovernmental developmental agencies to provide subsidized loans to small business and social entrepreneurs so that they could directly benefit from credit availability and lower costs of production.
- Given the import-oriented nature of the Egyptian economy, the negative relationship between the LRR and the effective exchange rate should be addressed. Future studies require more investigation of the effect of REER in the short run to see if the CBE could encompass this as a tool to stabilise monetary disturbances.

Lastly, one must enter the caveat that the study has not investigated the method of phasing out NPLs from the balance sheets of Egyptian banks; hence this issue has to be carefully planned out. The following are the specific monetary policy implications for future central bank actions in the post-Revolution context in order to meet the multiple goals of curbing inflation and enhancing growth:

- The priority of the operating targets employed by the CBE should be the overnight rate followed by the LRR.
- The nominal anchor should be selected as follows: (1) M2 and (2) the effective exchange rate.
- Interest rates are more suitable for long-run impact on all ultimate goals of output, inflation and job creation.

6.2 Proposed Framework for the Accountability and Political Independence of the Central Bank

To ensure that the aforementioned goals are adequately met, there should be a substantial restructuring of the institutional and regulatory framework. If the new constitution is to grant the CBE independence, then it is equally imperative to ensure utmost transparency and accountability of the central bankers and the Monetary Policy Committee (MPC). Currently, the MPC simply publishes a concise note via its website announcing the result of each of its monthly meetings in regard to interest rates only. In view of the fact that the CBE is not following the optimal operating targets and nominal anchor, more transparency and accountability are needed at the various stages of monetary policy implementation.

Figure 7. Proposed Framework for Monetary Policy Transparency

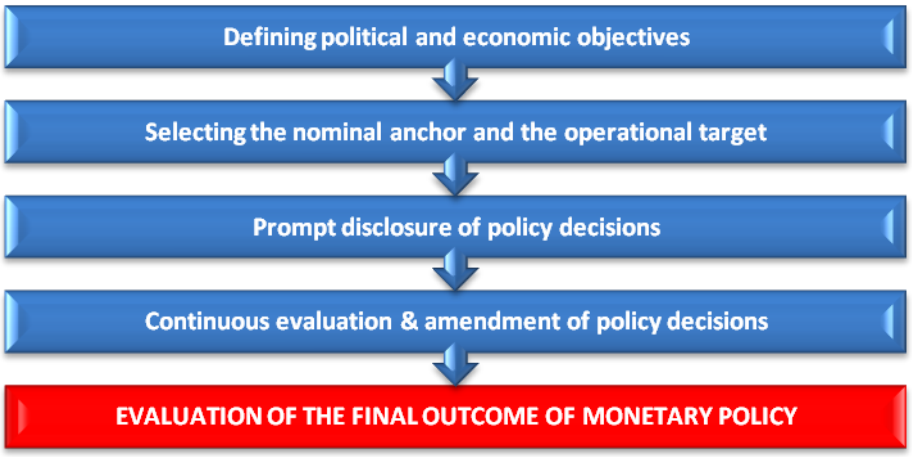


Figure prepared by the researcher

Figure 7 proposes a framework to increase the level of transparency so that the central bank could transform its actions from mere policies to tangible outcomes.

- The CBE needs to explicitly outline its political and economic motives. The preceding Egyptian monetary agents have been heavily criticized for not announcing an explicit inflation target, which has rendered their policies sporadic and unsystematically geared towards installing political stability and extinguishing social turmoil (Awad, 2008). In the spirit of the need to address the collective societal goals and attain higher standards of living, the CBE has to vigilantly calculate the price level that would ensure an acceptable living standard for Egyptians. But what it historically did was to succumb to political pressures and to ensure the longevity of the *ancien régime*. Hence, the new constitution needs to specifically identify (1) the domain of political influence that could be exerted on central bankers and (2) the incentive schemes and remuneration of the CBE Board of Directors.
- In this vein, the theoretical and analytical processes utilised to select the nominal anchor and the operational targets have to be published on the website of the CBE.
- The CBE has to explain all of its policy decisions whenever any of the conventional monetary tools are used, instead of solely issuing a concise briefing including solely the discount rates.
- Similarly, utmost transparency has to be promptly exercised whenever the CBE uses any of the unconventional monetary tools such as balance sheet policies or bailouts of financial institutions.
- Derived from these requirements, central bankers have to invite and encourage the feedback and input of specialists by issuing periodical consultative documents prior to introducing any major policy amendment. Thus, the CBE needs to (1) publish monthly detailed technical reports explaining the rationale behind monetary policy decisions; (2) disclose forecasts and analyses of both backward-

looking and forward-looking analyses including the assumptions made by the CBE researchers about key macroeconomic variables; and (3) issue consultative documents

- The final outcome and impact of the policies adopted have to be evaluated and assessed in order to take necessary and prompt corrective actions to meet the societal aspirations.

Such a framework is intended to strike a balance between maintaining the political independence and impartiality of the central bank, whilst simultaneously ensuring the highest levels of transparency and accountability. This balance is specifically important for nations with high levels of cronyism and corruption such as Egypt (Adly, 2009). The encouraging signal is that the CBE has already taken strides since January 2011 to establish codes of corporate governance for banks and restructured the composition of its Board of Directors to be void of private bankers to eradicate conflicts of interest and to reduce the principal-agent problem.

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