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ARAB REPUBLIC OF EGYPT

Selected Issues

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Approved by the Middle East and Central Asia Department

November 6, 2007

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I. INTRODUCTION

1. **The Egyptian economy has delivered another year of impressive performance, but the government will need to address several key issues in the future.** Sustaining high growth will require domestic and external stability. One issue in this context is to ensure that the level of Egypt's real exchange rate is appropriate. The still large—if declining—fiscal deficit shows clearly that further fiscal adjustment continues to be crucial for enhancing fiscal sustainability. The Central Bank of Egypt (CBE) intends to adopt inflation targeting as a monetary policy framework as soon as the institutional environment is appropriate.

2. **In providing greater in-depth analyses of these challenges, this set of selected issues papers complements the staff report on the 2007 Article IV Consultations.** Specifically, the following three issues are covered:

- whether Egypt's current account and exchange rate are in broad equilibrium, thus underpinning external stability;

- what areas of fiscal spending have the biggest saving potential in a cross-country perspective; and

- to what extent has a crucial component of inflation targeting—a functioning monetary transmission mechanism—developed over the last ten years.

3. **An assessment of Egypt's real exchange rate is made in Chapter II**. Egypt's current account is compared with several benchmarks or norms that arise from various approaches to assess external stability. While the results differ somewhat across empirical approaches, the conclusion is that the exchange rate is broadly in line with fundamentals.

4. **Making fiscal spending more efficient should be an integral part of the government's fiscal adjustment strategy.** Chapter III uses data envelopment analysis to analyze the relative efficiency public spending on health, education, and social protection relative to comparable countries. The results suggest significant scope to improve efficiency in all three social areas, and room for fiscal savings is particularly apparent in social protection and education.

5. **Except for the exchange rate channel, monetary transmission in Egypt is weak, but recent developments are promising.** Based on a forthcoming working paper, Chapter IV discusses empirical evidence on various channels of monetary transmission in Egypt. While most channels are rather weak at present, there is some evidence that recent reforms on the monetary policy framework are contributing to strengthening the

transmission of the monetary stance via interest rates to macroeconomic variables such as output and prices.

II. External Competitiveness and the Real Exchange Rate in Egypt[1]

Summary

- Egypt's current account, in surplus over the last 6 years, has been declining on trend and is projected to turn into a deficit over the medium term.
- Various approaches to assess the equilibrium levels of the current account and the Egyptian pound suggest that the REER and the current account balance are broadly in line with macroeconomic fundamentals.

A. Introduction

6. **The real effective exchange rate (REER) of the Egyptian pound has been highly volatile over the past 10 years**. The pound experienced a sustained real effective appreciation during the second half of the 1990s, reflecting the combination of a fixed nominal exchange rate of the pound vis-à-vis the U.S. dollar, the depreciation of the Euro vis-à-vis the U.S. dollar, and a positive inflation differential between Egypt and its main trading partners. As a result, the current account of the balance of payments deteriorated toward the end of the 1990s. After it reached a deficit of 3 percent of GDP in 1997/98, foreign exchange controls were tightened, leading to a 22 percent decline in the U.S. dollar value of non-oil merchandise imports between 1997/98 and 2001/02. During the same period central bank reserves declined by US$6 billion and real GDP growth slowed to 3¼ percent. Subsequently, Egypt's external competitiveness improved substantially as a result of a sharp depreciation of the nominal exchange rate during 2001–03. During this period, inflation in Egypt was only modestly higher than in its main trading partners, and the pass-through of the nominal depreciation into higher consumer prices was remarkably subdued, causing most of the competitiveness gains from the nominal depreciation to be maintained.

7. **More recently, Egypt's balance of payments has been strong.** The reinvigoration of the reform momentum since mid-2004 along with the oil-price induced economic upswing in the Middle East have helped the Egyptian economy take advantage of the improved competitiveness resulting from the depreciation of the REER during 2001–03.

8. **From early 2005 through mid-2007, the authorities have been managing the exchange rate in a way that ensured stability of the LE/US$ rate, despite a de jure**

[1] Prepared by Geert Almekinders (PDR).

managed float. This approach reflected concerns that greater exchange rate flexibility could lead to a large appreciation—hurting non-hydrocarbon exports and tourism—and that volatility could weaken confidence in the interbank foreign exchange market established in December 2004. However, maintaining a stable nominal LE/US$ exchange rate akin to a peg has complicated the conduct of monetary policy and has carried rising sterilization costs. Since mid-2007, the exchange rate has been managed more flexibly, akin to a managed float regime.

9. **This paper investigates the determinants of recent movements in the REER and analyzes whether the REER is in line with macroeconomic fundamentals**. The next two sections briefly discuss movements in Egypt's REER over the past 35 years, and recent trends in the REER and the balance of payments, respectively. Section D tries to answer the question of whether the REER is in line with macroeconomic fundamentals by using four different methodologies: the purchasing power parity approach, the equilibrium real exchange rate approach based on a vector error-correction model, applications of the macroeconomic balance approach, and the external sustainability approach. Section E provides conclusions.

B. A Long-Term Perspective on Egypt's REER

10. **Egypt's REER has been on a slight downward (depreciation) trend over the past 35 years, with high volatility around the trend** (Figure II.1). The volatility of the REER is related to the stability of the pound vis-à-vis the U.S. dollar (Figure II.2) in the face of a positive inflation differential between Egypt and its main trading partners. Sharp real appreciations during the early 1980s and late 1990s eventually caused the current account of the balance of payment to become unsustainable. However, the policy responses to these real appreciations of the official exchange rate during the 1980s and 1990s differed:

- During the 1980s, the authorities responded to the real appreciation of the official exchange rate by letting an increasing share of foreign currency transactions take place at increasingly more depreciated nominal exchange rates.[2] As a result, while

[2] From the early 1980s until May 1987, the interbank foreign exchange market was organized in two official pools, the central bank pool and the commercial bank pool, each handling different foreign exchange transactions. The official exchange rates in the two markets were set at US$1.43 and US$0.74 per pound, respectively, and did not reflect market forces. In addition, a nonbank free market was officially tolerated. In May 1987, a new bank foreign exchange market was introduced. The rate was initially set at 0.462 U.S. dollars per pound, well below the pool rates, and subsequently allowed to slide, reaching US$0.33 at the end of 1990. The central bank pool rate was devalued a number of times to reach US$0.50 on July 1, 1990. The old commercial bank pool ceased to exist in March 1989. To simplify the exchange rate system and ensure a more competitive exchange rate, the multiple exchange rate system was replaced

(continued…)

the official exchange rate of US$1.43 per Egyptian pound became increasingly overvalued during the second half of the 1980s, the transaction-volume-weighted average of the multiple nominal exchange rates of the pound depreciated steadily and so did the REER based on the "weighted average" exchange rate.[3] When the official exchange rate was eventually brought in line with the "weighted average" exchange rate in 1991, this had only a limited effect on the economy.

- Toward the end of the 1990s, extensive foreign exchange controls were put in place to limit pressures on the current account and arrest the decline in central bank reserves (Figure II.3) in the face of the ongoing sustained appreciation of the REER. As a result, the bulk of foreign exchange transactions continued to be effected at the fixed official exchange rate, but this approach was associated with low growth, a decline in central bank reserves, and import compression (Figure II.4). The devaluation of the official exchange rate that took place during 2001–03 coincided with a cyclical improvement in foreign currency availability in the Middle East. The resulting strengthening of the balance of payments allowed a gradual abolition of the exchange controls and a strong recovery of import growth.

11. **The REER depreciation trend has been associated with a decline in real GDP per capita relative to trading partners from 1985 onward and with a moderation of key current account inflows from 1980 onward:**

- During 1975–85, Egypt achieved marked gains in real GDP per capita relative to its trading partners (Figure II.5). These gains were associated with the strong increase in certain current account inflows, notably oil exports, Suez Canal fees, foreign aid, tourism, and workers' remittances (Figure II.6).[4] In particular, following the large oil price increases in 1973–74 and the emigration of an increasing number of Egyptians to neighboring oil producing countries, recorded workers' remittances rose from less than US$0.4 billion in 1975 to US$2.9 billion in 1980. Egypt also became a net oil exporter in 1975 and, on account of large increases in domestic production and international price increases, receipts from

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by a temporary dual exchange rate system consisting of a primary market and a secondary (free) market in February 1991. These markets were subsequently unified in October 1991; see Handy (1998), p. 34.

[3] Until the liberalization of the exchange system in February 1991, the transaction-volume-weighted average of the multiple exchange rates vis-à-vis the U.S. dollar is used to calculate the "weighted average" U.S. dollar exchange rate used in the calculation of the effective exchange rate in this paper.

[4] These flows are heavily determined by conditions in the external environment and henceforth referred to as "exogenous," as opposed to, say, manufacturing exports more influenced by domestic factors.

oil exports rose from US$0.4 billion in 1975 to US$2.7 billion in 1980. Similarly, the Suez canal, which had been closed in 1967, was reopened in 1975, and payments of dues by transiting ships rose from US$0.1 billion in 1975 to US$0.7 billion in 1980. During the first half of the 1980s, when these current account inflows remained at around 30 percent of GDP, the increase in Egypt's real per capita GDP relative to trading partners was also associated with expansionary fiscal policies and the implementation of large public sector development projects, which were largely financed by bilateral and multilateral external loans.

- Between 1985 and the early 1990s, however, Egypt experienced a decline in real per capita GDP relative to its trading partners. As global growth slowed and world oil prices fell, inherent structural rigidities began to exert strains on the economy. The steady decline in current account inflows during 1990–2002 became a drag on growth.

- The most recent growth spurt that started in 2004/05 has finally begun to improve relative per capita income, which nonetheless remains well below the 1985 level.

12. **The sustained appreciation of the REER during the 1990s, which interrupted the trend depreciation of the REER, did not prevent a solid recovery of non-oil merchandise exports.** Reflecting Egypt's earlier inward-oriented development model, non-oil merchandise exports amounted to only 3.5 percent of GDP in 1996. However, stimulated by market-based reforms, and notwithstanding the ongoing REER appreciation, non-oil merchandise exports rose to 5.4 percent of GDP in 2002 (see text table).

Non-Oil Merchandise Exports

	US$bn	In percent of World non-oil imports (1996 = 100)	In percent of GDP
1996	2.4	100.00	3.5
1997	2.8	111.63	3.7
1998	3.4	136.29	4.1
1999	3.6	139.73	3.8
2000	4.5	156.17	4.1
2001	4.7	166.82	4.7
2002	4.8	163.98	5.4
2003	5.4	161.18	6.2
2004	7.5	184.62	8.3
2005	8.6	188.99	8.7
2006	10.0	193.93	8.5
2007	11.9	...	9.3

Sources: Central Bank of Egypt and DOTS

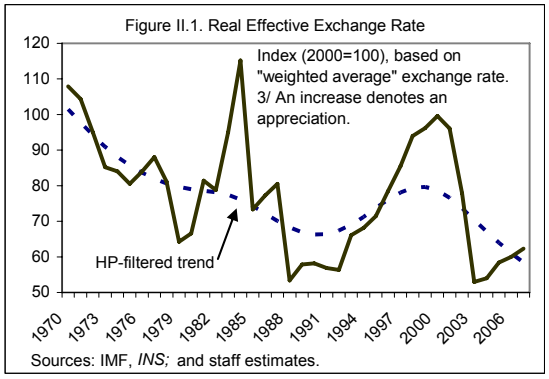


Figure II.1. Real Effective Exchange Rate
Index (2000=100), based on "weighted average" exchange rate. 3/ An increase denotes an appreciation.
HP-filtered trend
Sources: IMF, INS; and staff estimates.

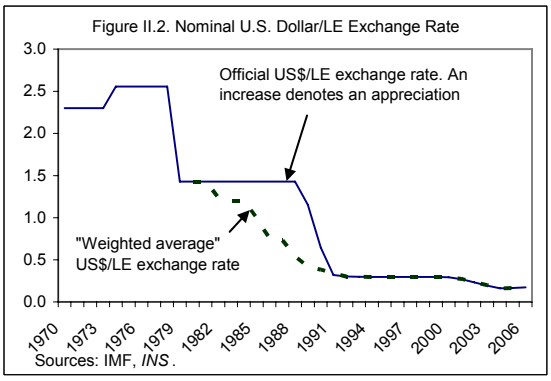


Figure II.2. Nominal U.S. Dollar/LE Exchange Rate
Official US$/LE exchange rate. An increase denotes an appreciation
"Weighted average" US$/LE exchange rate
Sources: IMF, INS.

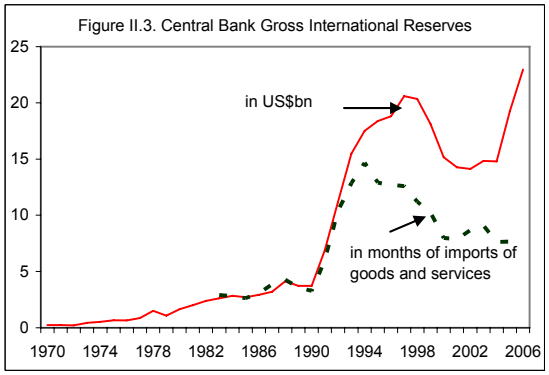


Figure II.3. Central Bank Gross International Reserves
in US$bn
in months of imports of goods and services

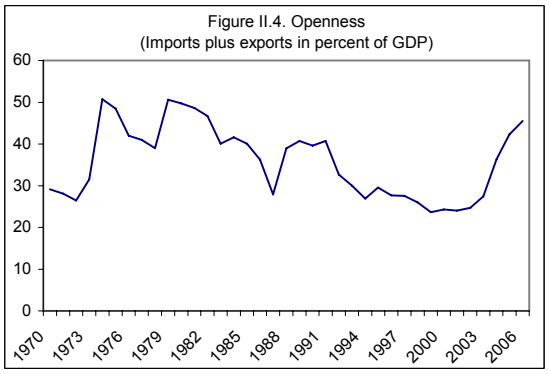


Figure II.4. Openness
(Imports plus exports in percent of GDP)

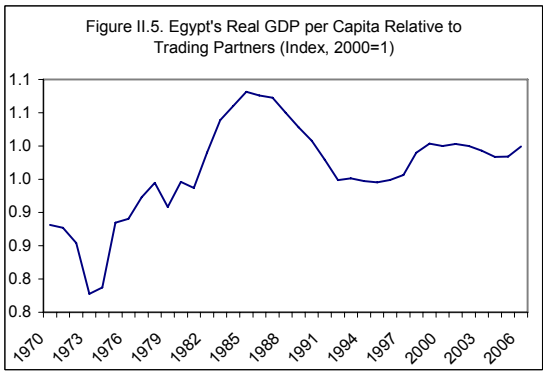


Figure II.5. Egypt's Real GDP per Capita Relative to Trading Partners (Index, 2000=1)

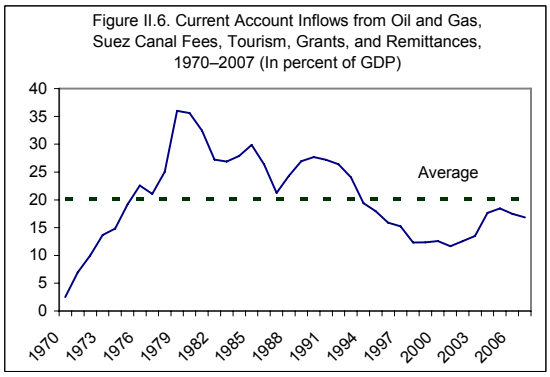


Figure II.6. Current Account Inflows from Oil and Gas, Suez Canal Fees, Tourism, Grants, and Remittances, 1970–2007 (In percent of GDP)
Average

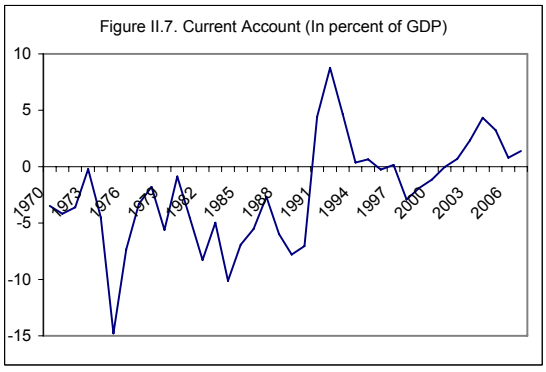


Figure II.7. Current Account (In percent of GDP)

C. The REER and the Balance of Payments in Recent Years

13. **Most of the improvement in Egypt's competitiveness caused by the depreciation of the REER during 2001–03 has so far been maintained.** Aided by the depreciation of the U.S. dollar, to which the Egyptian pound was once again closely tied until mid-2007, the REER appreciated by less than 20 percent at end-2003, notwithstanding a temporary acceleration of inflation in 2006/07.

14. **The current account has been in surplus over the last 6 years,** reaching about 1.5 percent of GDP in FY2006/07 (Figure II.7) after non-oil merchandise exports staged a major recovery following a still-unexplained slump in FY2005/06. Reserves have been rising steadily, reaching a comfortable level of six months of next year's imports of goods and nonfactor services at the beginning of FY2007.

15. **On the other hand, the current account surpluses have been declining on trend and the current account is projected to turn into a deficit over the medium term.** The end of the large depreciation of the REER (2001–03) coincided with the beginning of an oil-price induced cyclical upturn in the Middle-East region and a reinvigoration of the reform momentum in Egypt from mid-2004 onward. Cuts in import tariffs (September 2004, February 2007), the establishment of the interbank foreign exchange market (December 2004), dramatically improved availability of foreign exchange from record inflows of remittances, FDI, and, more recently, portfolio inflows, facilitated the sustained strong growth of non-oil imports. As a result, the non-oil merchandise trade deficit widened by about 5.5 percentage points of GDP over the past three years to 17 percent of GDP in FY2006/07. Given that import growth remains very high (the U.S. dollar value of non-oil merchandise imports grew by 45 percent during April-June 2007 y-o-y), and in view of the already-large non-oil trade deficit, the current account balance is likely to continue its declining trend and turn into a deficit over the next two years. Capital inflows are also expected to moderate from the record levels in FY2006/07.

16. **One-off factors contributed to the strength of the balance of payments.** Over the past two fiscal years, the CBE's foreign exchange reserves and commercial banks' net foreign assets (NFA) have increased by a combined total of US$23 billion, due in part to one-off capital account inflows:

- Non-resident holdings of Treasury Bills, Treasury Bond, and CBE notes increased by US$8.1 billion, at least partly reflecting a portfolio adjustment as Egypt appeared on the "radar screen" of foreign investors.

- The sale of a GSM license and of the Bank of Alexandria, among other divestitures, contributed to exceptional FDI inflows of US$5.5 billion, half of total FDI inflows in 2006/07.

- EGPC's forward sale of oil resulted in inflows of US$1.55 billion.
- The government's U.S.-guaranteed eurobond issue mobilized US$1.25 billion.
- Loans in support of financial sector reforms from the World Bank and the African Development Bank brought in US$1 billion.

D. Estimates of the Equilibrium Real Effective Exchange Rate

17. **Estimates of the equilibrium real effective exchange rate (EREER) tend to be quite sensitive to the methodology used and are particularly challenging in developing countries where the data are weaker** (Dunaway and others (2006) and Di Bella and others (2007)). The IMF's Consultative Group on Exchange Rate Issues (CGER) recently revised and extended methodologies for exchange rate assessments to cover not only advanced countries—as in the past—but also emerging market economies (IMF (2006b)). The CGER's assessments are based on three complementary approaches: the macroeconomic balance (MB) approach, the equilibrium real exchange rate (ERER) approach, and the external sustainability (ES) approach. The CGER has not included an assessment for Egypt in its reports to the IMF's Executive Board, mostly because sectoral productivity data needed for the CGER's ERER approach are not available.

18. **This paper assesses if Egypt's REER is in line with macroeconomic fundamentals by using four different methodologies:** (i) the purchasing power parity approach (PPP), (ii) the ERER approach based on a vector error-correction model (rather than panel regression techniques as in the CGER), (iii) applications of the MB approach, and (iv) applications of the ES approach similar to those used by the CGER.

Purchasing power parity approach

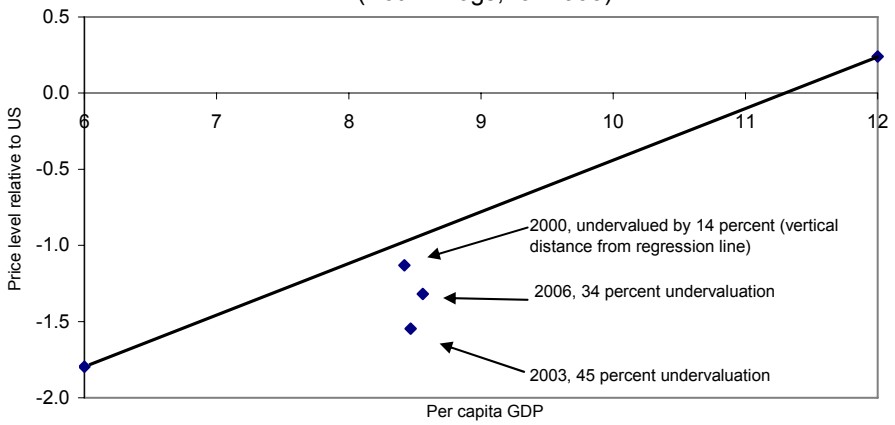
19. **One way to assess the deviation of a country's real exchange rate from its long-run level is through an international comparison of price levels.** According to the theory of purchasing power parity (PPP), prices of an identical consumption basket should be the same in all countries once expressed in a common currency. However, a comparison of consumer prices across countries needs to account for the presence of nontraded goods and differences in consumption baskets. Nontraded goods (whose prices equalize across countries only if all production factors are internationally mobile and production technologies are identical) constitute a sizable share of consumption baskets. Empirically, nontradables prices tend to be higher in countries with higher wages and incomes, as shown in Figure II.8. The data—obtained from the Penn World Tables (PWT)—compare the U.S. dollar prices of each GDP basket relative to the US GDP deflator among a large number of countries. Cross-section regressions of this bilateral real exchange rate (vis-à-vis the U.S.) on real per capita GDP (in 2003, the latest year

available) indicate that for every 1 percent increase in a country's real per capita income, its real exchange rate is stronger by about 0.35 percent.

20. **The strong correlation between absolute price levels and income is usually attributed to the Balassa-Samuelson effect, which relates the long-run real exchange rate to relative productivity differentials.** Countries with relatively higher productivity growth in the tradables relative to the nontradables sector (compared to trading partners) tend to experience real appreciation (increase in the relative price of nontradables to tradables). In essence, higher tradables productivity pushes up wages in the tradables sector, which leads to higher wages in the nontradables sector and, consequently, to higher nontradables prices. Since tradables prices are set in international markets, the relative price of nontradables to tradables rises in these circumstances. As the overall (consumer) price level is a weighted average of tradables and nontradables prices, the higher price of nontradable goods leads to an increase in the overall CPI. Assuming that real per capita GDP differentials across countries are a reasonable proxy for relative productivity differentials, the Balassa-Samuelson effect implies a positive correlation between relative income levels and the real exchange rate. It also suggests that as a country's (relative) income level rises over time; its real exchange rate will appreciate.

21. **Analysis of cross-country data based on this approach suggests that the Egyptian pound was undervalued in real terms in relation to its estimated long-run PPP level in 2000 and substantially more so in 2003.** The regression line for the cross-section data in 2003 (the line for 2000 is virtually identical) along with the position of Egypt in various years are shown in Figure II.8. The vertical distance between Egypt's actual position in the graph and the estimated regression line—which provides an estimate of the long-run real exchange level—would indicate the deviation of the actual real exchange rate from its long-run value. The chart indicates that Egypt's actual real exchange rate was substantially below its estimated long-run PPP level in 2000 and the gap had widened markedly by 2003. The real appreciation since then has reduced the gap, despite an increase in per capita income.

Figure II.8. Cross-section Regression of Price Levels (Relative to the United States) on Per Capita Income (Both in logs, for 2003)



Source: *Penn World Tables*. Price levels in each country are proxied by their GDP deflator.

22. **The finding of significant undervaluation of the pound in 2000 is puzzling**—the economic slowdown and reserve losses at the time and the subsequent sharp depreciation of the REER clearly point in the opposite direction—**and raises doubts about the applicability of the purchasing parity approach in the case of Egypt**. As tested here, the PPP approach may be hampered in several ways. First, real per capita GDP may be a weak proxy for productivity differentials in the case of Egypt because of the large share of income only loosely related to domestic productive activity. Second, many basic goods have been subject to price controls and explicit or implicit subsidies, causing the prices of many of these items to be artificially low (e.g. basic food stuffs, energy) and inflexible.[5] Third, the bilateral real exchange rate vis-à-vis the United States may not proxy well the "true" multilateral (trade weighted) real exchange rate. With respect to the first point, relative productivity in tradables per worker may be overestimated by using real per capita income as proxy, because Egypt receives substantial income that is not related to productivity. In particular, Egypt's strategic geographical location (Suez canal fees), natural resource endowment (oil and increasingly gas), substantial foreign aid, and its historical treasures (tourism) produce income only loosely related to the productivity of Egyptian labor. In addition, facilitated by the proximity to GCC countries and the absence of cultural and language barriers, many Egyptian workers, both skilled and unskilled, find employment in the region and send remittances back home. During 1970–2007, these "exogenous" current account inflows averaged about 20 percent of GDP per annum (Figure II.6). On this basis, it seems that a comparison of price levels in Egypt with those in other countries leads to

[5] The limited variability of consumer prices, possibly reflecting price controls and subsidies, also emerged from Rabanal (2005) who found a pass-through from exchange rate movements to the CPI that was statistically insignificant and much lower than typically found in other countries.

implausible conclusions regarding the competitiveness of goods produced in Egypt. As shown below, other approaches to assess the equilibrium REER indicate a very different view that is more consistent with actual macroeconomic developments.

Equilibrium real exchange rate approach

23. **Another commonly used approach is the equilibrium real exchange rate (ERER) approach**. It consists of (i) estimating a vector error-correction model (VECM) for the REER and its determinants (certain macroeconomic fundamentals), and (ii) using the cointegrating vectors to infer the equilibrium path of the REER.[6,7] The results of the VECM confirm the existence of a unique cointegrating relationship between the REER and the specified determinants of Egypt's equilibrium real exchange rate (Table II.1).

24. **The equilibrium REER is found to appreciate as Egypt's relative productivity and key current account inflows strengthen and to depreciate with greater openness**. These results are broadly intuitive and in line with studies for other countries. An increase in the productivity of the tradable sector (relative to its trading partners; proxied by relative real per capita GDP)[8] would tend to appreciate its real exchange rate (the Belassa-Samuelson effect discussed before). An increase in the "exogenous" current account inflows not related to nonhydrocarbon merchandise exports can also be expected to appreciate the real exchange rate (the traditional "Dutch Disease" effect). Such an increase would similarly induce higher wages and a higher price of nontradables. A more open trade regime is likely to be associated with a more depreciated exchange rate. By increasing the range of available tradable goods, trade liberalization amplifies the effect of price discipline from international competition and reduces the domestic price of tradable goods, thereby lowering the overall price level and the real exchange rate (see Goldfajn and Valdes, 1999).

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[6] An important advantage over single-equation methods (such as the Engle-Granger method) is that this approach accounts for simultaneity and autocorrelation of the endogenous variables.

[7] As in other applications of VECM models, the first step is to test for the presence of unit roots in the macroeconomic series being examined. Augmented Dickey-Fuller unit root tests for stationarity are calculated and reported in Appendix 1. The main data series are found to be (i) nonstationary in levels (have unit roots) and (ii) stationary in first differences.

[8] It is quite common to proxy productivity differentials with developments in relative per capita GDP. However, the issue raised in paragraph 22 (that variations in per capita GDP in Egypt may also reflect variations in income not related to domestic productive activity) may also influence the present estimation results.

Table II.1. Results of the VECM

1. Number of cointegrating vectors	
According to trace statistic at 1% significance level	1
According to Maximum eigenvalue statistic at 1% significance level	1
2. Estimates of the cointegrating relationship 1/ 2/	
Log of the REER	1
Log of relative per capita GDP	-1.18
	(-2.73)
Trade to GDP ratio	2.98
	(4.25)
"Exogenous" current account inflows to GDP	-2.09
	(-2.72)
Constant	-4.97
3. Estimates of the speed of adjustment based on the cointegrating equation for the REER	
CointEq1	-0.24
	(-1.53)
4. Time required to adjust by 50 percent any deviation from the equilibrium REER	
in years	2.5

Source: IMF staff estimates.

1/ Written as:
log REER - α1 log (relative per capita GDP) - α2 (trade/GDP) - α3 ("exogenous" CA inflows/GDP) - α4 = v
Therefore, a negative sign for a coefficient denotes a positive association between the relevant variable and the REER.
2/ t-statistics in parenthesis

25. **More specifically, the regression results in Table II.1 can be interpreted as follows:**

- A 1 percent improvement in Egypt's relative productivity, proxied by real per capita GDP in Egypt relative to its trading partners (see Figure II.5), has a more than one-to-one effect on the REER (i.e., a 1.2 percent appreciation effect)—somewhat lower than in studies for countries at a similar stage of development.[9]

- A 1 percentage point of GDP increase in openness (proxied by the sum of merchandise imports and exports in percent of GDP, see Figure II.4) is associated with a 3 percent real depreciation of the REER.

- A 1 percentage point of GDP increase in "exogenous" current account inflows (Suez canal fees, private and official remittances, net exports of oil and gas, and

[9] Koranchelian (2005) and Zalduendo (2006) find coefficients of 1.4 for Algeria and 1.9 for Venezuela.

tourism inflows, see Figure II.6) is associated with a 2.1 percent real appreciation of the REER.[10]

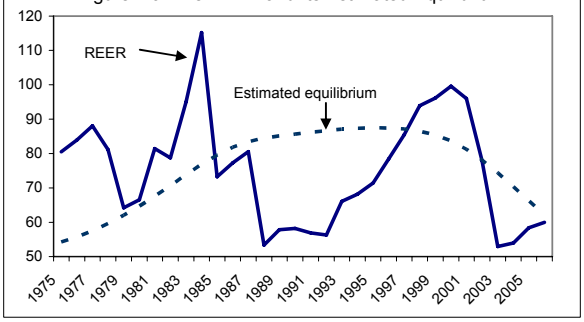
- The price of oil, the terms of trade, government expenditure, and various measures of Egypt's net foreign assets were not found to be statistically significant determinants of the equilibrium REER**.**[11]

- The cointegrating coefficient implies that it takes about 2½ years to reduce by half any deviation between the actual REER and the equilibrium rate. This is in line with findings for other emerging-market countries (see for example MacDonald and Ricci (2003), Cashin and others (2002), and Zalduendo (2006)).

These findings are consistent with the Balassa-Samuelson hypothesis and also confirm the important role of key current account inflows in assessing the equilibrium REER—as suspected in the discussion of the PPP approach.

26. **The path of the equilibrium REER can be derived from the estimation results** (Figure II.9). This is done by applying the coefficient estimates of the cointegrating relationship on the determinants of the equilibrium real exchange rate. To eliminate variations that arise from the short-run fluctuations in these determinants, the HP-filtered series of each of these determinants is used to estimate the equilibrium rate.

Figure II.9. The REER and Its Estimated Equilibrium



27. **The real effective exchange rate in 2006 appears to be broadly in line with its fundamentals-based equilibrium level.** The graphs of the actual and equilibrium REER indicate that, according to this approach, the pound was substantially overvalued between 1998 and 2001. However, the subsequent large correction in the nominal exchange rate caused the real exchange rate to undershoot its equilibrium. By mid-2003, the pound was substantially undervalued. Since then, the gap between the actual and the smoothed

[10] Given that the openness variable refers to total merchandise trade and the "exogenous" current account inflows variable refers, for the most part, to inflows on the services account of the balance of payments and transfers, multicollinearity of the two variables does not seem to be an issue.

[11] The "exogenous" current account inflows variable may largely capture the effect of international oil prices. Higher oil prices have a direct impact on this variable (through higher net oil exports) as well as an indirect one (higher oil prices raise GCC countries' demand for immigrant workers from Egypt, thereby boosting remittances, and make it more costly for East-West trade to circumnavigate South Africa, thereby raising Suez Canal traffic and fees).

equilibrium REER has narrowed steadily: the equilibrium REER depreciated (driven mostly by increasing trade openness) and the actual REER appreciated, partly as a result of the appreciation of the nominal exchange rate vis-à-vis the U.S. dollar.

28. **The ERER approach, as applied here, has several potential shortcomings,** and some caution in overly relying on this approach is therefore warranted. First, the implicit assumption of a zero average misalignment over the sample period may not hold. Second, the sample period may not have been without structural breaks, making any long-run cointegrating relationship between the REER and key fundamentals questionable. For example, the sample period 1975–2006 contains several episodes during which extensive foreign exchange controls and segmentations of foreign exchange markets were enforced. Such restrictions typically increase the domestic price of tradable goods, thereby raising the overall price level and the real exchange rate.

The macroeconomic balance (MB) approach

29. **The centerpiece of the MB approach is the estimation of a country's current account "norm."** The norm is calculated by estimating an equilibrium relationship between current account balances and a set of macroeconomic fundamentals. The next step involves estimating the adjustment in the REER needed to eliminate the gap between the estimated current account norm and the "underlying" current account balance, often proxied by the medium-term projection of the CA balance.

30. **Application of the MB approach suggests that the medium-term current account is close to the relevant norm, both in the high-growth scenario ("adjustment scenario") and the low-growth scenario ("current policies")** (Table II.2):

Table II.2. Comparing Medium-term CA Projections with the Relevant Norms
(According to the Macroeconomic Balance Approach)

	Adjustment scenario (Authorities' plans)	Low-growth scenario ("Current policies")
Fundamentals in 2010/11		
Fiscal balance (in percent of GDP)	-3.0	-9.7
Real GDP (annual percent change)	7.8	4.0
Current account norm (percent of GDP)	-1.7	-2.3
Current account projection (percent of GDP)	-2.2	-0.8
Estimated overvaluation (in percent)	3	-8

- The baseline adjustment scenario assumes continued strong growth driven by high investments, a narrowing of the oil trade balance from 2.5 percent of GDP in 2006/07 to 0.5 percent of GDP in 2011/12, and a reduction in the overall central

government fiscal deficit from 7¾ percent of GDP in 2006/07 to 3 percent in 2011/12, in line with the authorities' plans. Under those circumstances, Egypt's CA norm in 2011/12 is estimated at -1.7 percent of GDP, using CGER's estimation (see Box II.1). This is close to the staff's CA projections for 2011/12 (-2.2 percent of GDP).

- In the low-growth scenario, the planned reduction in the fiscal deficit to 3 percent of GDP by 2011/12 and other envisaged structural reforms do not materialize, resulting in much lower investment levels. Accordingly, the staff projects a CA of -0.8 percent of GDP. The CA norm in the low-growth scenario, using CGER's estimation, is about -2.3 percent of GDP.

Using an elasticity of the current account balance with respect to the real exchange rate of 0.15 (Box II.2) and taking into account a correction factor needed to ensure multilateral consistency,[12] the gap between the current account norm and the projected current account would suggest that the pound is overvalued by some 3 percent in the adjustment scenario. In the low-growth scenario, the pound would be undervalued by about 8 percent. In both cases, the degree of over- or undervaluation is within conventional error margins.

[12] Once exchange rate adjustments are calculated for all 54 countries included in the CGER's panel, a final correction is made to these adjustments to ensure that they are mutually consistent. This multilateral consistency is required by the fact that there can only be *n-1* independent exchange rates among *n* currencies (See IMF (2006b).

Box II.1. MB Approach: Estimation Results for a Current Account Panel Regression

The results of CGER's pooled regression of the equilibrium current account (ECA) on key macroeconomic fundamentals for 54 industrial and emerging market economies, including Egypt, over the period 1973-2004 imply the following:

- A 1 percentage-point increase in the government budget balance (relative to trading partners) improves the ECA by 0.19 percentage points.
- A 1 percentage-point increase in the population growth rate relative to trading partners deteriorates the ECA by 1.22 percent of GDP.
- A 1 percentage-point increase in the oil balance improves the ECA by 0.23 percentage points.

CGER Estimation Results

Regressor	Coefficient
Fiscal balance	0.19
Old-age dependency	-0.14
Population growth	-1.22
Initial NFA	0.02
Oil balance	0.23
Output growth	-0.21
Relative income	0.02

Note: Dependent variable is the equilibrium current account (ECA).

Source: IMF (2006b)

- A 1 percentage-point increase in real GDP growth of an emerging market economy like Egypt (compared to the trading-partner average) reduces the ECA by 0.21 percent of GDP.
- The coefficient of 0.02 on relative income implies that, ceteris paribus, a country whose income is half the U.S. level will have on average a current account balance that is 1 percentage point of GDP smaller than that of the United States.

The external sustainability (ES) approach

31. **The ES approach involves estimating the adjustment in the REER needed to stabilize Egypt's NFA to GDP ratio at a certain benchmark level.** The ES approach complements the MB and ERER methodologies by focusing on the relation between the sustainability of a country's external stock position and its flow current account position, trade balance, and real exchange rate. It consists of three steps: The first step involves determining the current account balance to GDP ratio that would stabilize the NFA position at a given "benchmark" value.[13] The second step compares this NFA-stabilizing current account balance (ES-norm) with the level of a country's underlying current account balance. And finally, the third step consists of assessing the adjustment in the real effective exchange rate that is needed to close the gap between the underlying current account balance and the ES-norm.

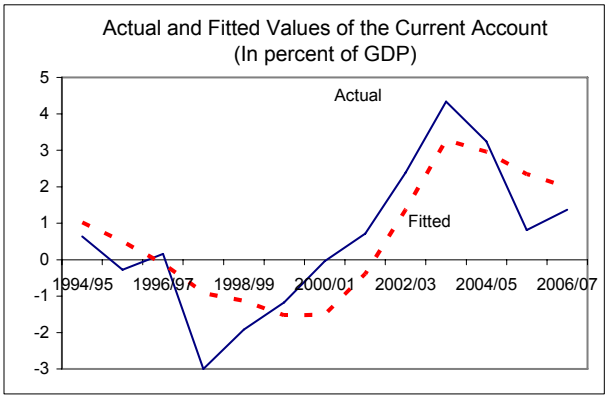
[13] It is common to take last year's value of the NFA/GDP ratio as the benchmark.

Box II.2. The Elasticity of the Current Account to Changes in the REER

The econometric estimates reported in IMF (2006a) suggest that, for a country with an initial trade balance and an export-to-GDP ratio of 40 percent, a 10 percent permanent nominal exchange rate depreciation would improve the trade balance by 1½ to 2 percent of GDP over the medium term depending on the class of exporter, with most of the adjustment occurring within the first 3 to 5 years.

A simple regression for the 13-year period 1993/94–2006/07 suggests that for every 10 percent appreciation of the REER, the current account worsens by 0.8 percent of GDP (see graph of the actual and fitted path of the current account to GDP ratio). Neither real income, nor (lagged) oil prices were found to be significant determinants of Egypt's current account balance for this short sample.

However, the actual medium-term elasticity of the CA to the REER may be higher and closer to 0.15, the level reported in IMF (2006a), because the current account improvements over the last decade partly reflect exogenous events (the start of LNG exports and the establishment of qualified industrial zones whose output has duty-free access to the US market) and exchange controls in place during most of the sample period, which may cause an underestimation of the elasticity. In fact, the recent narrowing of Egypt's current account surplus from 4.3 percent of GDP in 2003/04 to 1.4 percent of GDP in 2006/07 has been associated with a real appreciation of the pound of 17½ percent, suggesting an arc elasticity of 0.17.



32. **Depending on the choice of the benchmark, a different assessment of over- or undervaluation will result (Table II.3).**

Table II.3. Benchmarks for 2005 NFA and Overvaluation 1/
(According to the External Sustainability Approach)

Source	NFA	NFA-stabilizing CA-balance		Overvaluation (in percent)	
		High-growth	Low-growth	High-growth scenario 1/	Low-growth scenario 2/
	(In percent of GDP)				
IMF (Lane/Milesi-Ferretti)	-9.3	-0.8	-0.5	7	1
CBE (IIP data)	-14.9	-1.4	-0.9	5	0
CBE plus NPV of gas exports	10.3	0.9	0.6	17	8

1/ In the adjustment scenario the CA is projected at -2.2 percent of GDP in 2010/11.
2/ In the low growth scenario ("current policies") the CA is projected at -0.8 percent of GDP in 2010/11.

- The database used by the IMF's Research Department (see Lane and Milesi-Ferretti (2006) for the data through 2004) estimates Egypt's NFA in 2005 at -9.3 percent of GDP. Under the high growth scenario, Egypt could run a current account deficit of 0.8 percent of GDP without causing the NFA to GDP ratio to fall. In the adjustment scenario, the CA is projected at -2.2 percent of GDP in 2010/11. Using an elasticity of the current account balance with respect to the real exchange rate of 0.15, and taking into account a correction factor needed to ensure multilateral consistency (see footnote 12), the gap between the NFA-stabilizing current account deficit and the projected medium-term CA could be closed by 7 percent depreciation of the REER. In the low-growth scenario, the CA is projected at -0.8 percent of GDP in 2010/11, nearly equal to the NFA-stabilizing CA balance.

- The CBE's data on Egypt's International Investment Position (IIP) indicate that Egypt's gross foreign liabilities exceed its gross foreign assets by US$16 billion at end-December 2005 (14.9 percent of GDP). Therefore, compared to the IMF data, the CBE data suggest that Egypt could afford to run a somewhat larger current account deficit and still stabilize the NFA position, albeit at a lower level. The implied overvaluation of the REER in the high growth scenario, at 5 percent, is therefore somewhat smaller, and is zero under the low-growth scenario.

- The REER is, however, significantly overvalued if the net present value (NPV) of the contracted exports of natural gas are included in NFA. It could be argued that, in order to include intergenerational equity considerations also, Egypt's true NFA position includes the NPV of non-renewable energy reserves. The IIP data already includes the foreign investment liabilities incurred to develop the LNG sector. If the NPV of prospective gas export revenues is also included, the current NFA amounts to +10.3 percent of GDP.[14] To stabilize NFA at this level, Egypt would need to run current account surpluses of around 1 percent of GDP. To achieve

[14] Egypt's proven reserves of natural gas amounted to 72.3 trillion cubic feet (tcf) in 2006/07. The government has indicated that one third of reserves are available for exports. Indeed, gas production has been increasing rapidly in recent years, allowing for gas exports through the pipeline to Jordan and from the LNG plants in Damietta and Idku to rise from virtually zero in 2004 to US$3 billion in calendar year 2006. Given the level of proven reserves and assuming that one third of these reserves will be exported, the current level of exports (about 0.7 tcf per annum) could be sustained for about 33 years. Using conservative assumptions on contracted export prices, the costs of operating the gas plants, and the discount rate, the NPV of the contracted stream of gas export revenues is about US$27 billion. Specifically, at an assumed price of US$148 per thousand cubic meters—which, in combination with the reported gas export volumes, explains the gross export revenues reported in the balance of payments over the past two years—gross export receipts will amount to about US$3.1 billion per annum. The plants operation costs are put at US$500 million per annum, and the discount rate is put at 8.8 percent, in line with interest rates on the recently internationally issued 5-year government bonds denominated in Egyptian pounds.

this, the REER would need to depreciate by 17 percent in the high-growth scenario and by 8 percent in the low-growth scenario.

33. **Stabilizing NFA (however defined) at the 2005 level may in any case not be optimal for Egypt**. As a fast-growing developing country with high population growth, and a need to expand its capital stock, Egypt could arguably sustain a CA deficit that is somewhat larger than 0.8 percent of GDP, stabilizing its NFA position at a lower level. For instance, under the staff's projection of a current account deficit under a high-growth scenario of 2.2 percent of GDP in FY2011/12 and beyond, the NFA to GDP level would fall over the medium term and stabilize in the long run at about -24 percent of GDP. Reasoning along these lines, the pound would currently be close to its equilibrium level again.

E. Conclusions

34. **Egypt's REER is broadly in line with fundamentals**. The four approaches to assess the current valuation of the Egyptian pound against its estimated equilibrium level suggest that the real effective exchange rate of the pound is broadly in line with macroeconomic fundamentals:

- **A comparison of price levels in Egypt with those in other countries (absolute PPP) leads to implausible conclusions regarding the equilibrium exchange rate**. Price controls and subsidies on the one hand, and large somewhat exogenous current account inflows, which represent income that is at best loosely related to the productivity of workers in Egypt, bias the comparison with other countries. Furthermore, the required cross-country data are available only through 2003, making any assessment on this basis potentially outdated.

- **Applying the equilibrium real exchange rate approach yields more meaningful results**. Using coefficient estimates of a cointegrating relationship between the REER and key determinants of Egypt's equilibrium real exchange rate (Egypt's productivity relative to trading partners, openness, and exogenous current account inflows), the path of the equilibrium REER indicates that the pound was overvalued during 1998–2001 but that the REER undershot its equilibrium level in 2003–04. However, by 2006, the gap between the REER and its estimated long-term equilibrium level had virtually closed.

- **The macroeconomic balance and the external sustainability approaches suggest that the REER is broadly in line with macroeconomic fundamentals**.

Appendix 1. Stationarity Tests

Prior to applying the vector error-correction estimations, tests were carried out for the presence of unit roots in the macroeconomic series being examined. Augmented Dickey-Fuller unit root tests for stationarity were calculated and are reported in Table II.4. The lag structure was determined using the Schwarz criterion. The main data series were found to be (i) nonstationary in levels (have unit roots) and (ii) stationary in first differences.

Table II.4. Augmented Dickey Fuller Unit Root Tests 1/
(1975–2006; annual data)

	In levels t-ADF	In difference t-ADF
REER INS EOP	-2.18	-5.37 ***
LRGDPC	-2.46	-4.01 ***
OPEN2	-1.73	-5.02 ***
WINDFALL	-1.61	-4.10 ***
NFA4	-0.77	-6.33 ***
LROIL	-1.34	-5.52 ***
TOT	-3.23 *	-7.47 ***
GOVEXP	-2.51	-5.94 ***

1/ * and *** denote rejection at, respectively, 10 and 1 percent level.
Lags were chosen using the Schwarz criterion.

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III. Focusing Fiscal Adjustment on Relatively Inefficient Spending[15]

Summary

- In light of the government's commitment to reducing the fiscal deficit, making core fiscal spending—education, health, social protection—more efficient will be key to minimizing the burden of adjustment.
- The efficiency of education and health spending in Egypt is about average, but social protection is below that of Egypt's international peers. There is significant scope for improving efficiency in all three social areas, but room for securing fiscal savings is most apparent in social protection and education.
- Efficiency could improve, in particular, by adopting a greater result-oriented focus in the budget process and by reducing the inefficient energy and food subsidies while strengthening social safety nets through better targeting.

A. Introduction

42. **The need for a significant fiscal adjustment over the medium term offers a good opportunity to examine the efficiency and scope of public services.** The consolidated fiscal deficit in Egypt has averaged about 9 percent of GDP since FY2002, which required sizable financing from the banking system and resulted in a high net public-debt ratio of about 70 percent of GDP.[16] In this context, the government has announced its intention to reduce the fiscal deficit to 3 percent of GDP by FY2011. Expenditure rationalization will be important to achieve this objective. This chapter assesses the scope for future fiscal adjustment in areas of relatively inefficient spending to avoid relying on restraining public investment and other traditionally flexible components of the budget. In this manner, expenditure rationalization need not undermine social outcomes linked to productive public spending.

43. **The chapter examines the relative efficiency of public spending in social areas—health, education, social protection—at the general government level.**[17] The focus on these sectors is determined by the availability of data on public sector performance—such as hospital beds, pupil-teacher ratios, or poverty indicators—, which are much more scarce in other areas such as general administration or infrastructure

[15] Prepared by Todd Mattina and Aliona Cebotari (FAD).

[16] The fiscal year begins July 1. For example, FY 2002 refers to the fiscal year July 2001 to June 2002.

[17] Social protection spending includes subsidies, grants, and social benefits.

investment.[18] The efficiency of spending is measured in terms of the ability to transform given public spending into outcomes, relative to other countries of comparable income. Because these comparisons are sample-specific and do not take into account many factors that could affect outcomes, the results should be interpreted with care and should be viewed only as indicative of potential inefficiencies.

44. **Results suggest significant scope for improving efficiency in all three social areas, but room for securing fiscal savings is particularly apparent in social protection and education.** Spending in the latter two areas is high relative to that in similar countries and has not been matched by correspondingly stronger social outcomes. At a general government level, Egypt spent about 12 percent of GDP during FY2007 on social protection, but social indicators appear to be lagging behind other countries in the region, with the population subsisting on less than US$2 per day—in purchasing-power-parity (PPP) adjusted terms—almost double the level in similar countries. Given that poorly targeted subsidies account for about half of the social protection spending, there may be significant scope for "doing more with less" by eliminating inefficient spending while enhancing social outcomes. Spending on education was about 5 percent of GDP in 2006—the last year for which cross-country data are available—compared to about 4 percent in similar countries. However, literacy rates are comparatively low, and scores on internationally standardized tests—a proxy for the quality of education—are also below those of comparator countries. The relatively high spending and the inefficient use of resources suggests that there could also be scope to achieve fiscal savings while enhancing outcomes, although the expected growth of school-age population would make significant savings more difficult to achieve. In the case of healthcare, on the other hand, spending is in line with or even below countries of similar incomes. This suggests that, while the relative efficiency of healthcare spending also appears to be weak in Egypt, there may be less scope to secure significant fiscal savings in the health sector. Consequently, the medium-term focus for policy makers should be on making better use of existing resources to improve health sector outcomes.

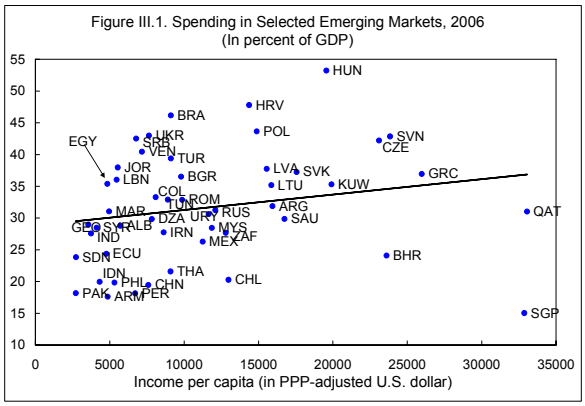
B. Recent Trends in Public Expenditure

45. **General government spending is relatively high in Egypt compared to similar emerging markets.** As seen in Figure III.1, total spending in Egypt (at 35½ percent of GDP in FY2007) is above the average for emerging economies included in the sample, especially for countries with similar incomes.[19,20] This reflects a high interest bill

[18] Even the available data, however, suffers from many weaknesses, including the potential lack of comparability across countries in terms of concepts, coverage, and timing.

[19] Countries tend to consume larger and more varied packages of public services as they grow wealthier (e.g., the Wagner effect).

(5½ percent of GDP) due to a sizeable public debt, a relatively large wage bill (7 percent of GDP), and significant spending on subsidies and transfers (about 12 percent of GDP). Investment and outlays on goods and services, on the other hand, are in line with countries of similar income level.



46. **In the social area, public health expenditures relative to GDP are lower than in similar countries, but education and social protection are relatively high** (Figures III.2–4). Public spending on health, at 2.2 percent of GDP in FY2004, is broadly in line with the average for the comparator countries in the sample, suggesting that the resources allocated to the sector may be broadly adequate. Public spending on education and social protection, on the other hand, is relatively large by international standards. Education expenditure, at 4.8 percent of GDP in FY2006, is closer to OECD averages (5 percent of GDP) then to the average spending in comparator countries (4 percent of GDP). The difference relative to the comparator group is somewhat larger in the case of social protection, at 12 percent of GDP in Egypt compared to an average of 10¾ percent in the comparator group. This suggests that there is potential scope both for expenditure savings and for efficiency improvements in education and social protection relative to similar countries.[21]

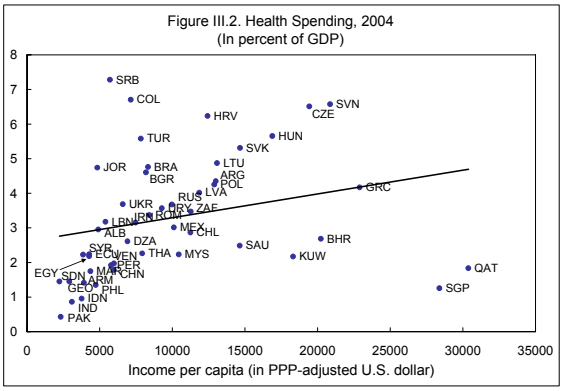
47. **The composition of social spending in Egypt is heavily tilted toward fuel and in-kind commodity subsidies for social protection.** Domestic energy subsidies accounted for 6.8 percent of GDP in FY2006, almost double the level three years ago as a result of higher international oil prices. While the fiscal cost of fuel subsidies has declined in FY2007 to 5.5 percent of GDP, owing partly to a hike in domestic fuel prices in summer 2006, Egypt still provides one of the highest domestic fuel price subsidies in the world (CR/06/253). As discussed below, these subsidies are generally found to be poorly targeted (World Bank, 2005c). In-kind food subsidies ranged from 1¼ to 2 percent of GDP since FY2002, depending largely on import prices. These are provided as government transfers to the General Authority for the Supply of Commodities (GASC) to

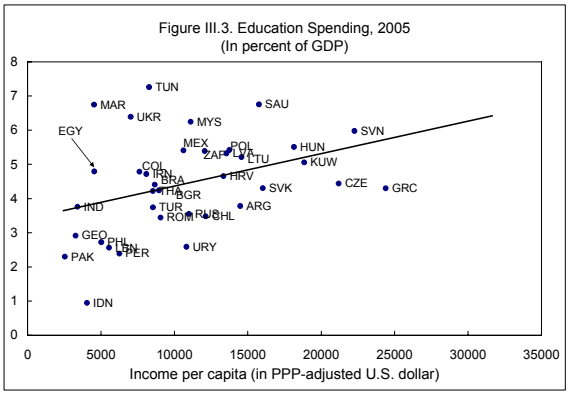
[20] In this note, comparator countries refer to emerging markets with a GDP per capita of up to US$12,000 in PPP-adjusted terms (Egypt's GDP per capita in PPP terms is US$4,800).

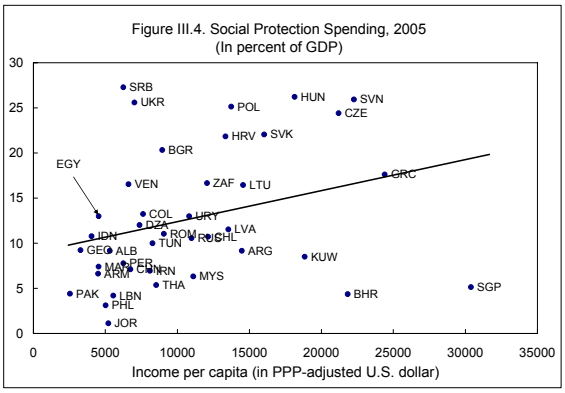
[21] Public healthcare spending in Egypt accounts for close to 40 percent of total healthcare spending. This is broadly consistent with the share of public healthcare spending in similar income countries (48 percent) in the region, including Jordan, Iran, Syria, and Tunisia. In contrast, the public share of healthcare spending in Turkey and Algeria is about 70 and 80 percent, respectively.

subsidize the cost of several basic food staples, including bread, wheat flour, sugar, cooking oil, vegetables, rice, flour, and pasta.

48. **The recent fiscal adjustment efforts led to some retrenchment in social spending.** General government spending, including net acquisition of financial assets (NAFA), declined by about 4 percent of GDP between FY2003 and FY2007 to reach about 35½ percent of GDP.[22] While the functional classification of spending is not available for the general government, at the central government level data show that the adjustment occurred across most spending categories, including health, education and social protection, where spending was reduced by over 3 percent of GDP during this period (Figure III.5).[23]





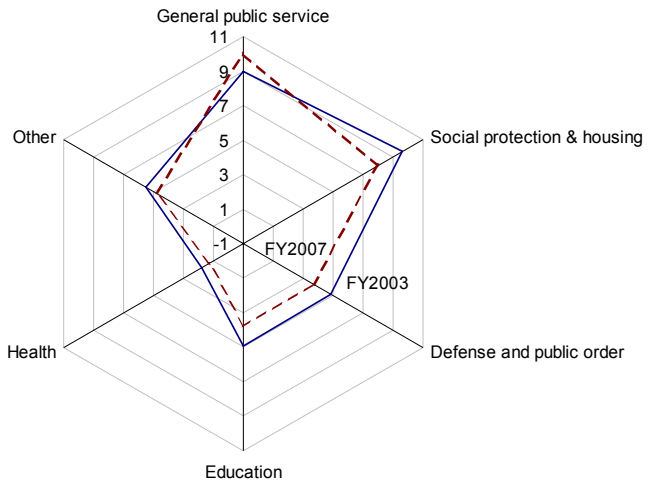


Sources: World Development Indicators (WDI), International Financial Statistics (IFS), World Health Organization; and IMF staff calculations. Figures correspond to latest available observations.

[22] The data on government spending discussed in this section adjusts for the estimated cost of fuel subsidies prior to FY2006, when these were not recorded on budget. For example, expenditures for FY2003 were increased by 3.9 percent of GDP to reflect estimated fuel subsidies not captured in the fiscal data.

[23] Looking ahead, the authorities envisage greater use of public-private partnerships (PPPs) to meet Egypt's sizable social and infrastructure needs. PPPs are also envisaged for water treatment centers in Cairo, major hospital facilities, and infrastructure to support the Nile river transportation corridor.

Figure III.5. Egypt: Composition of the Expenditure Adjustment, FY2003–07
(In percent of GDP)



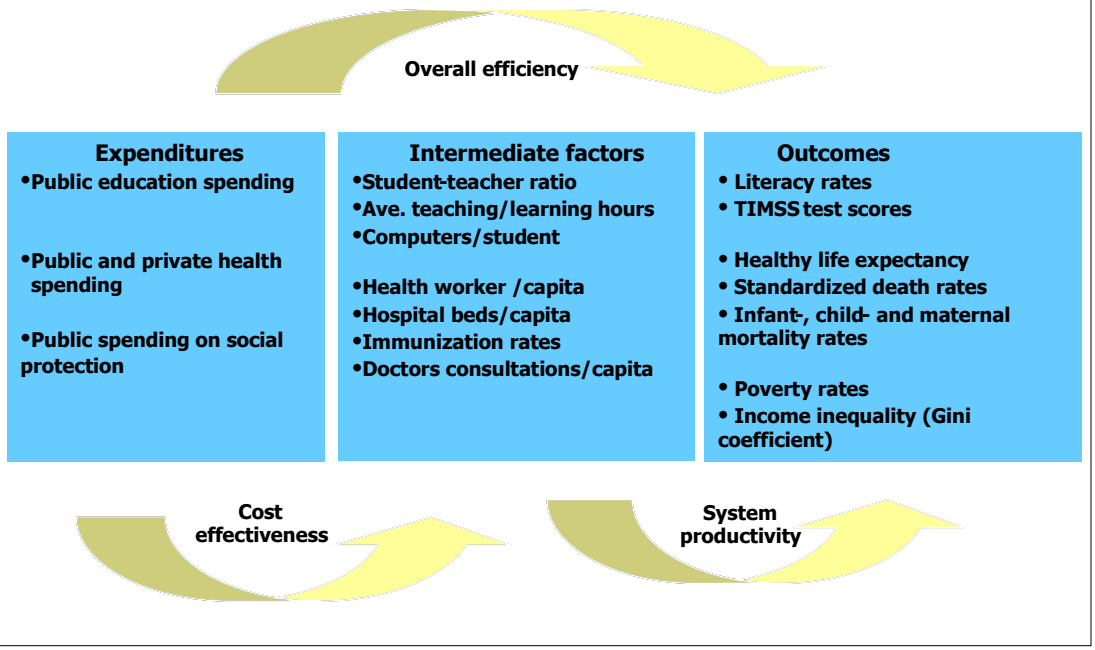
Sources: Egyptian authorities; and Fund staff estimates. Data refer to the central government.

C. Relative Efficiency of Public Spending and Scope for Fiscal Adjustment

49. **This chapter assesses the efficiency of social spending in Egypt relative to other countries, based on the relationship between expenditures and desired outcomes** (Figure III.6).[24] The *overall efficiency* of public spending is defined as the effectiveness of a functional component of public spending (e.g., health or education) to deliver a desired result or outcome (e.g., lower child mortality rates or higher standardized test scores). The overall efficiency can be considered in two stages: (i) the *cost effectiveness* of public expenditure in producing intermediate factors, such as the number of hospital beds or skilled medical staff; and (ii) *system productivity* in using these intermediate factors to produce desired final outcomes, such as a lower rates of child and maternal mortality.

[24] The framework applied in this chapter was originally developed in Verhoeven, Carcillo, and Gunnarsson (2007).

Figure III.6. Overall Efficiency of Public Expenditure



Measuring the Relative Efficiency of Spending[25]

50. **Efficiency is measured in terms of the ability to transform given spending into desired outcomes, relative to other countries of comparable income**. This is done by adopting the "efficiency frontier" approach from the finance literature, which has been increasingly used in public finance and other fields. Efficiency frontiers are constructed by generating combinations of observed inputs (spending) and outputs (desired social outcomes) that dominate the combinations for other countries in the sample in the sense of obtaining maximum output from a given level of inputs or using minimum inputs to obtain a certain level of outputs. In this manner, countries operating on the frontier are said to reflect "best practice" relative to the countries operating below the frontier (rather than relative to an absolute efficiency standard). Efficiency frontiers can be estimated using parametric techniques (by econometrically estimating an assumed production function), as done in the *stochastic frontier analysis*, or nonparametric techniques that use linear programming estimation, as used in *data envelopment analysis* (DEA). The latter approach is used in the literature to estimate efficiency of public spending, and it is adopted in this chapter.

51. **DEA is a tool to benchmark the relative efficiency of spending**. Figure III.7 illustrates a stylized example of DEA based on a single spending input and a single

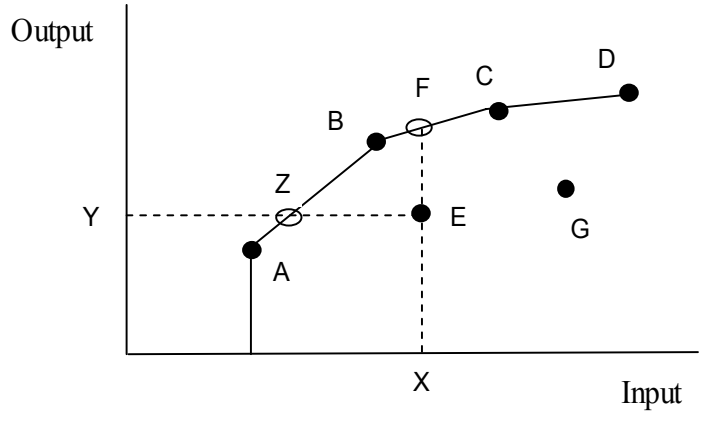
[25] See Mattina and Gunnarsson (2007), and Mattina (2007) for a similar discussion.

performance indicator for a sample of countries.[26] The efficiency frontier of "best practice" connects the country observation points A, B, C and D as these countries dominate countries E and G in the interior. The convexity property allows an inefficient country (point E) to be assessed relative to a hypothetical position on the frontier (point Z or F) by taking a linear combination of efficient country pairs (points A and B or B and C).[27] In this manner:

- An *input-oriented efficiency score* is calculated as the ratio of YZ to YE. It measures the share of actual spending that would be sufficient to produce the actual output if the country's public sector was as efficient as the countries on the frontier to its left (countries A and B in Figure III.4). This score is thus bounded between zero and one. For example, a score of 0.6 implies that an unchanged outcome could be achieved through adopting the "best practice" available to countries of equal or lesser income, yielding potential savings of 40 percent of current spending.

- An *output-based efficiency score* is calculated as the ratio of FX to EX. It measures the proportionate increase in the output that could be obtained with unchanged inputs if the country's public sector was as efficient as that of countries operating on the frontier above it (countries B and C in Figure III.7). The output-oriented score has a minimum value of 1 for countries operating on the frontier, where scores exceed one, implying that spending could achieve better output

Figure III.7. Example of DEA Application



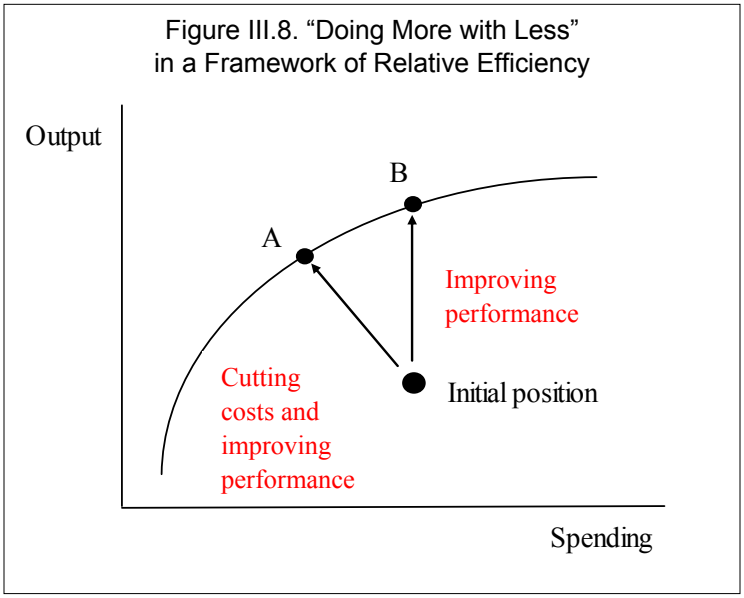
[26] The DEA approach readily accommodates multiple-output and multiple-input "production technologies" for transforming inputs into outputs. The former is used in this chapter, given the trade-offs involved in allocating public spending among various desired outcomes.

[27] By construction, the set of feasible input-output combinations is convex.

performance. For example, a score of 1.2 suggests a potential improvement of 20 percent in the social outcome in question, by adopting "best practice" at unchanged spending.

52. **The analysis for assessing the relative efficiency of spending in this chapter incorporates both input- and output-oriented efficiency scores.** Specifically, input-based efficiency scores are used to assess spending efficiency in line with the Egyptian government's commitment to significantly reduce the fiscal deficit and are applied to areas where there appears to be room for savings.[28] Output-based efficiency scores are also used to assess efficiency consistent with the broader objective of enhancing social outcomes in Egypt and are applied to areas where room for savings is more limited. In this manner, the analytical framework is consistent with "doing more with less" by eliminating wasteful spending while achieving improved social outcomes. Figure III.8 illustrates this conceptual framework. If Egypt initially operates below the frontier of best practice in any given area, then policymakers can opt to move in a north-west direction (e.g., to point A) to cut spending while improving performance. Over the medium term, the objectives might be to raise spending in a cost-effective manner by moving along the frontier in a north-east direction to enhance social outcomes (e.g., from point A to B).

Figure III.8. "Doing More with Less"
in a Framework of Relative Efficiency



53. **There are advantages and weaknesses to the DEA approach, and care must be exercised in interpreting its results**. DEA does not require an assumption about unknown functional forms for the frontier of best practice or complex distributional

[28] The input- and output-based efficiency scores equally assume constant returns to scale. However, the DEA models considered in this chapter permit variable returns to scale. See Zhu (2003) for a technical elaboration of the DEA approach.

properties for econometric analysis. It generates intuitive results that can be useful to benchmark the extent of inefficiencies within and across sectors to prioritize reforms. However, there are important weaknesses as well. In particular, many factors affect the link between public spending and performance.[29] "Inefficient" health spending, for example, may not reflect weaknesses in the management and allocation of health spending, but say, poor water quality due to environmental pollution that raises child mortality. DEA results may therefore not necessarily imply that the solution lies in improved expenditure management in the health sector but remains a valuable diagnostic tool to detect or suggest the analysis of such factors. Other weaknesses of the approach include (i) sensitivity of the results to sample selection, as the country's performance is measured against the closest two countries on the frontier; (ii) the assumption that the "production technology" for transforming inputs into outputs is identical across countries and does not directly take into account differences in exogenous factors that affect the efficiency of spending not directly controlled by policy makers;[30] (iii) difficulties in quantifying differences in quality or in matching spending to an appropriate indicator of the policy objective; and (iv) a bias due to private spending.

Data and comparative country sample

54. **The selection of an appropriate comparator group is critical to ensure robust results.** Efficiency scores generated by the DEA approach are sensitive to the composition of the country sample, especially countries that represent outliers. As a result, comparator countries should be broadly similar to Egypt in terms of economic development and the available technology to transform inputs into results. Specifically, it would be inappropriate to assess the efficiency of public spending in Egypt relative to advanced OECD countries or less developed countries in Sub-Saharan Africa. In this context, the country sample consists mainly of emerging markets of similar income per capita in PPP-adjusted terms.[31]

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[29] Ideally, these factors should be controlled in a second stage, using bootstrapping techniques as discussed by Simar and Wilson (2007). DEA results can be biased due to a small sample, as discussed by Simar and Wilson (2000). Initial bias-corrected results using a bootstrapping technique did not affect the rankings presented in this study. However, this chapter presents unadjusted efficiency scores owing to convergence problems in some of the results.

[30] For a clear example, a country with a mountainous terrain would have a much higher cost of producing an equivalent road network than a country with a flat terrain, but the DEA analysis would label the former as "inefficient." More generally, the DEA analysis can be extended to evaluate the importance of exogenous factors affecting cross-country differences in efficiency. This is usually done through Tobit regressions, by using DEA efficiency scores as the dependent variable and various exogenous factors as explanatory variables, or through truncated regressions as suggested by Simar and Wilson (2007).

[31] Depending on data availability, the comparative country sample includes countries listed in Tables III.1–3.

55. **The data are drawn largely from the World Bank's database on World Development Indicators (WDI) and a World Health Organization (WHO) database covering health indicators.** Performance indicators are selected to match the timing of expenditure as closely as possible. Some indicators respond with long lags to policy decisions. For instance, life expectancy reflects policies and lifestyles over the course of a generation. For this reason, spending inputs are linked as much as possible to indicators that respond directly and concurrently to current spending decisions. The indicators include: (i) maternal and infant mortality rates, health workforce density, number of hospital beds per a thousand people, and births attended by a skilled medical person (WHO and WDI); (ii) pupil-teacher ratios, secondary enrollment, primary completion rates relative to the respective school-age populations, literacy rates for youths ages 15 to 24 (WDI), and an international standardized test score in mathematics (TIMSS);[32] and (iii) poverty, nutrition, and inequality data (WDI). Data are drawn for the widest possible country sample. Expenditure data are expressed in U.S.-dollar terms after adjusting for purchasing power parity differentials.[33]

D. Health Care

56. **The healthcare system in Egypt consists of significant public and private components** (Table III.1).[34] The private share of total healthcare spending in Egypt is about 60 percent, which is broadly consistent with the private share of spending in comparator countries, including Jordan, Syria, Morocco, Indonesia, and the Philippines. Public spending in Egypt includes social health insurance, covering about 40 percent of the population (mostly children), and spending on a network of healthcare providers that offer subsidized service for people lacking healthcare coverage. The government also finances 9 large teaching hospitals affiliated with universities, 34 tertiary hospitals, and specialized medical centers to treat specific disorders such as cancer.

[32] The International Association for the Evaluation of Educational Achievement (IEA) administers a cross-country standardized test in mathematics and science called the Trends in International Mathematics and Science Study (TIMSS). In 2003, the test was taken by eighth-grade students in 46 countries.

[33] Real spending is measured in PPP terms to account for the higher relative price of non-tradable inputs in richer countries (e.g., the Balassa-Samuelson effect).

[34] For a complete overview of the healthcare system, see World Bank (2005a).

Table III.1. Health Spending and Indicators in Selected Countries

		Intermediate Factors			Outcomes		
	Per Capita Health Spending (in U.S. dollars, PPP corrected)	Hospital beds (per 10,000 people)	Health worker index (per 1000)	Births attended by skilled health staff (percent of total)	Healthy Life Expectancy (years)	Infant Mortality (per 1,000) live births)	Maternal Mortality (per 100,000 live births)
Albania	269.7	59	16	55	59	16	55
Algeria	240.6	60	35	140	60	35	140
Argentina	968.4	62	16	70	62	16	70
Armenia	207.1	59	29	55	59	29	55
Azerbaijan	122.9	56	75	94	56	75	94
Brazil	622.7	57	32	260	57	32	260
Chile	580.9	65	8	30	65	8	30
Ecuador	180.0	60	23	130	60	23	130
Egypt	**228.4**	**58**	**26**	**84**	**58**	**26**	**84**
Georgia	98.3	62	41	32	62	41	32
Indonesia	99.3	57	30	230	57	30	230
Iran	429.5	56	32	76	56	32	76
Jamaica	203.9	64	17	87	64	17	87
Jordan	400.3	60	23	41	60	23	41
Lebanon	530.3	59	27	150	59	27	150
Malaysia	342.1	62	10	41	62	10	41
Mauritania	72.7	43	78	1000	43	78	1000
Mexico	573.6	63	23	83	63	23	83
Morocco	200.5	59	38	220	59	38	220
Pakistan	47.5	54	80	500	54	80	500
Philippines	131.9	57	26	200	57	26	200
Romania	398.0	61	17	58	61	17	58
Russia	527.7	53	13	65	53	13	65
Saudi Arabia	444.2	60	22	23	60	22	23
South Africa	842.6	43	54	230	43	54	230
Sri Lanka	130.0	59	12	92	59	12	92
Syria	170.1	60	15	160	60	15	160
Thailand	247.8	58	18	44	58	18	44
Tunisia	380.3	61	21	120	61	21	120
Turkey	506.7	61	28	70	61	28	70
Ukraine	349.4	55	14	38	55	14	38
Uruguay	739.1	63	12	20	63	12	20

Sources: World Health Organization, *WDI,* and IMF staff calculations.

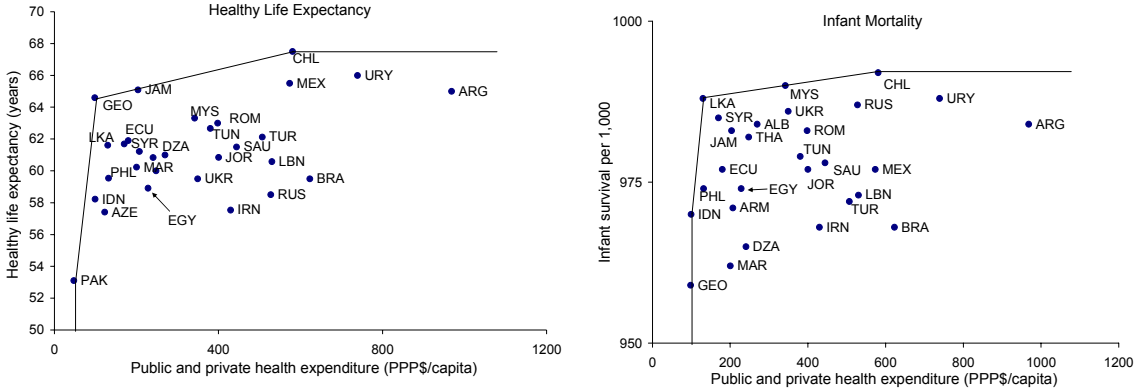
57. **In 2005, the government announced a strategy to reform its healthcare system over the medium term.** The strategy includes consolidating fragmented social insurance programs (governed by numerous laws) into a national health insurance system and extending the social health insurance coverage to all uninsured Egyptians, among other things. These may involve additional pressures on public resources.

58. **DEA results for healthcare suggest that the overall efficiency of healthcare spending is about average for Egypt compared to the countries in the sample**. The output-oriented scores—more informative in the case of healthcare spending, given its broad comparability to peers—suggest that a more efficient use of the existing healthcare spending could translate into about 10 percent higher life expectancy or 60–70 percent lower infant and maternal mortality rates. This puts Egypt in the 50th percentile in the sample of 32 emerging countries. The results are broadly consistent with the input-oriented efficiency measures that place Egypt in the 41st percentile among the sample countries and suggest that equivalent healthcare outcomes could be achieved in Egypt with about 30 percent of the current health spending (Figure III.9)[35]. The analysis is

[35] References to percentiles should be interpreted as share of countries that do worse than Egypt.

based on total healthcare spending, given the important role of private out-of-pocket spending in the health sector of many countries and because focusing on public spending in isolation would bias the efficiency results in favor of countries with high private shares in healthcare spending. However, this also implies that low efficiency of healthcare spending might reflect market failures rather than just inefficient public spending.

Figure III.9. Selected DEA Results to Assess Overall Efficiency Results in Health Care



Sources: *WDI, IFS;* and IMF staff calculations

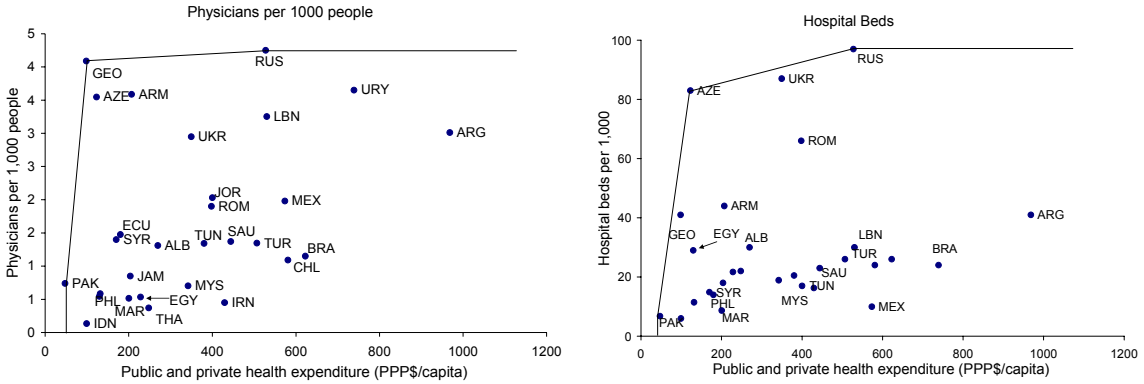
59. **These results reflect weaknesses in both cost effectiveness and system productivity:**

- Healthcare spending in Egypt does not produce comparable levels of real resources (e.g., the number of physicians, healthcare workers, or hospital beds per thousand people) or a comparable level of service delivery (e.g., number of births attended by skilled healthcare staff). In line with the overall efficiency results, DEA scores for cost effectiveness indicate that, on average, Egypt scores in the 53rd percentile in terms of transforming total healthcare spending into intermediate factors (physicians, hospital beds) when measured by output-oriented scores (Figure III.10). However, Egypt would score higher on several indicators if compared to the countries in the region, as the reported results are heavily influenced by the presence of ex-socialist economies that boast a much larger number of healthcare workers and hospital beds than others.

- Similarly, the analysis suggests that Egypt could significantly strengthen its performance in generating social outcomes, given its level of real resources and service delivery (i.e., intermediate factors). System productivity is calculated for the healthcare sector by considering an equally-weighted average of the available real resources (e.g., hospital beds, healthcare workers) and the level of service delivery (e.g., births attended by skilled medical personnel), and by measuring the

productivity of using these real resources in reducing the rates of infant and maternal mortality and increasing life expectancy. The DEA scores for productivity put Egypt in the 30th percentile among the sample countries, a worse performance than in the case of cost effectiveness. These findings confirm results in a study of Egypt's healthcare system, which pointed to the low productivity of the healthcare system, one measure of which could be the bed occupancy rate: Although Egypt's bed capacity is comparable to that of other countries of similar income levels, the average bed occupancy is estimated at 25–35 percent compared to 80 percent of the international standards of good practice (World Bank, 2005a).

Figure III.10. Selected DEA Results to Assess Cost Effectiveness in Health Care



Sources: *WDI, IFS;* and IMF staff calculations

60. **The analysis above suggests that the focus of reforms in the health sector should be to strengthen the overall efficiency of healthcare spending by enhancing the productivity of intermediate factors rather than reducing the spending level, which is in line with international peers**. Specifically, inefficiencies in public health spending should be seen as opportunities to reallocate resources to higher priority areas within the health budget, including to the most cost-effective services and programs, and to better target government health subsidies to priority population groups. There are also significant regional disparities in key health indicators that should be addressed, especially between urban and rural areas.[36] In addition, strong population growth, population aging, and the proposed healthcare reforms will add pressure on public healthcare resources over the medium term. In this context, the focus of reforms should be on enhancing system efficiency rather than reducing spending.

[36] The World Bank's (2005a) recent note on the health sector in the context of the Public Expenditure Review indicates that the rural infant mortality rate is 50 percent higher than the urban rate.

61. **A greater results-oriented focus in the healthcare budget could enhance the relative efficiency of overall healthcare spending.** The current public system relies on financing from the state budget, weakening accountability for results. Greater delegation of management authority to local spending units could improve the quality of service delivery. This would require greater flexibility in employment and compensation policies. In addition, the public share of healthcare spending should be targeted to benefit the poor, as the current system finances large comprehensive state hospitals and medical centers that disproportionately benefit urban and higher-income households.[37]

E. Education

62. **The Egyptian government provides free public education in line with constitutional requirements.** As a result, the majority of students from primary to tertiary levels (some 85 percent) are enrolled in public institutions and the university system is largely publicly financed (Table III.2).[38] Public spending on education is therefore somewhat high by international standards, as discussed earlier, at 4.8 percent of GDP in FY 2005 compared to an average of 4 percent for similar countries. Nevertheless, there is also evidence of sizable private education spending (estimated at 3.6 percent of GDP), in part reflecting spending on extra tutoring (often from the same teachers children have in public schools), which would bring overall education spending in Egypt above most developed and developing countries.

63. **The performance of the education sector, however, has not kept pace with expenditures.** In particular, literacy rates are relatively low, at 85 percent of youths ages 15–24, compared to 93 percent in comparator countries. The average TIMSS scores—which offers a glimpse into the quality of Egypt's education—are also below the comparator average (Figure III.11). DEA results suggest that equivalent outcomes (in terms of literacy rate and test scores) could be achieved with about a quarter of the public spending on primary and secondary education, placing Egypt in the 50th percentile among the countries in the sample in terms of the overall efficiency of education spending.

[37] See World Bank (2005a).

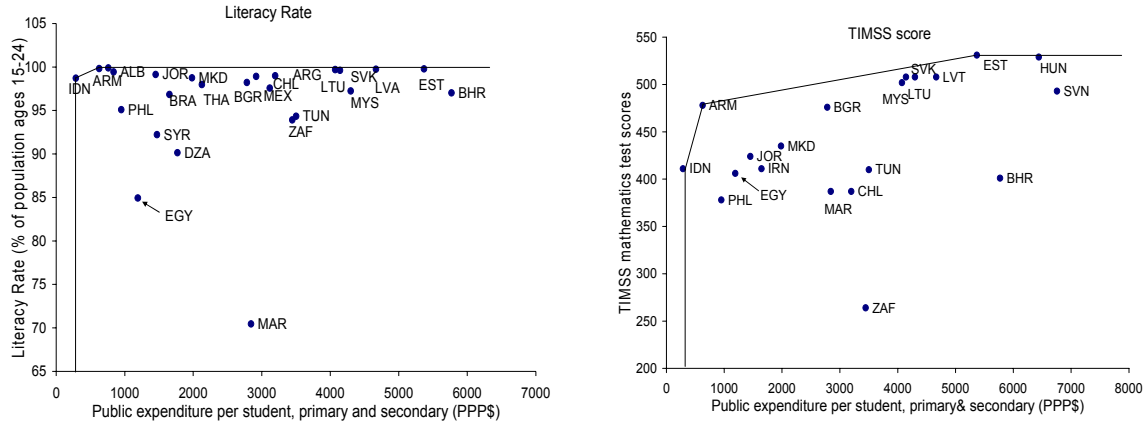
[38] See World Bank (2005b)

Table III.2. Education Spending and Indicators in Selected Countries

	Public education spending per student, primary and secondary (In U.S. dollars, PPP adjusted)	Intermediate Factors			Outcomes	
		Primary student-teacher ratio	Primary completion rate (In percent)	Secondary enrollment rate (In percent)	Literacy rate youth (In percent of people ages 15–24)	TIMSS scores (Math, 2003)
Albania	838	0.0	97	78	99.4	…
Algeria	1,769	0.0	94	81	90.1	…
Argentina	2,919	0.1	100	86	98.9	…
Armenia	628	0.0	107	91	99.8	478
Azerbaijan	761	0.1	96	83	99.9	…
Bahrain	5,770	…	…	…	97.0	401
Brazil	1,653	0.05	108.2	102.0	96.8	…
Bulgaria	2,783	…	…	…	98.2	476
Chile	3,198	0.05	95.4	89.1	99.0	387
Egypt	**1,192**	**0.05**	**94.6**	**87.1**	**84.9**	**406**
Estonia	5,369	…	…	…	99.8	531
Hungary	6,442	…	…	…	…	529
Indonesia	287	0.05	101.5	64.1	98.7	411
Iran	1,644	0.05	94.6	81.9	…	411
Jamaica	1,635	0.04	84.4	88.1	…	…
Jordan	1,452	0.05	96.7	87.4	99.1	424
Latvia	4,667	…	…	…	99.8	508
Lithuania	4,073	…	…	…	99.7	502
Macedonia	1,982	…	…	…	98.7	435
Malaysia	4,299	0.06	91.0	75.8	97.2	508
Mexico	3,118	0.04	98.9	79.7	97.6	…
Morocco	2,845	0.04	75.4	47.6	70.5	387
Philippines	950	0.03	96.6	85.9	95.1	508
Slovak Republic	4,144	…	…	…	99.6	387
Slovenia	6,756	…	…	…	…	378
South Africa	3,445	0.03	95.6	90.5	93.9	508
Syria	1,472	0.06	106.6	63.2	92.2	…
Thailand	2,126	0.05	82.0	77.3	98.0	…
Tunisia	3,501	0.05	97.1	81.3	94.3	493

Source: UNESCO, *WDI, IEA,* and IMF staff calculations.

Figure III.11. Selected DEA Results to Assess Overall Efficiency in Education

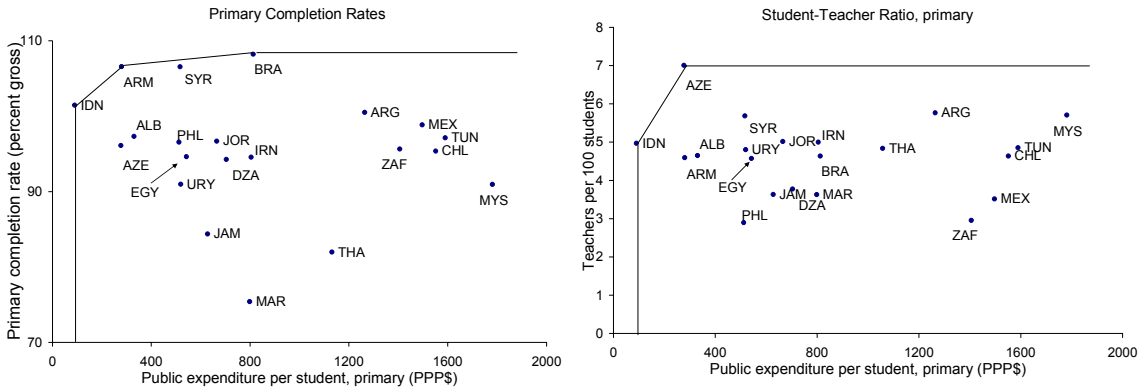


Sources: UNESCO, WDI, IEA, and IMF Staff Calculations

64. **As in health, overall inefficiencies reflect weaknesses in cost-effective service provision and, more so, in system productivity:**

- Cost effectiveness in transforming public education spending into real resources and improved service delivery is somewhat above average in Egypt compared to similar countries. The DEA multiple-output efficiency scores indicate that about half of the current public spending on primary and secondary education could suffice to attain equivalent size classrooms (measured by the pupil-teacher ratio), primary completion rates, and secondary enrollment rates. Although indicators of these "intermediate factors" in education are similar or better than in comparator countries, the higher spending on primary and secondary education accounts for the relative inefficiency (Figure III.12). High costs reflect, among other things, an oversupply of education personnel, relatively high investments in school construction not supported by adequate maintenance, inefficient textbook spending (which accounts for over 60 percent of nonwage current costs), and poor incentives for tuition and other cost recovery initiatives (World Bank, 2005b).

Figure III.12. Selected DEA Results to Assess Cost Effectiveness in Education



Sources: *WDI, IFS;* and IMF staff calculations

- System productivity is particularly weak in Egypt. An equally-weighted index measuring the level of service delivery in education (e.g., the rate of primary completion, secondary enrollment, and the primary pupil-teacher ratio) is used to assess the productivity of transforming real education resources into improved social outcomes. Two target indicators are used to represent the desired outcome in this analysis: the literacy rate for youths ages 15 to 24, and the average TIMSS score. The results indicate that Egypt could attain equivalent outcomes with about 45 percent of the current intermediate factors, placing it in the 16th percentile in terms of transforming the provision of education service delivery into high youth

literacy rates and in the 60th percentile in terms of transforming education services into high standardized test scores.

65. **A major cause of low system productivity in the education sector stem from the high level and poor distribution of staff, suggesting potentially large gains from civil service reform in the education sector.** The World Bank (2005b) found that there is one administrator for every teacher at the primary education level, and one non-teaching staff member for every 8 teachers. As a result, there could be substantial leakage of allocated resources from the service delivery perspective. Moreover, there are shortages of skilled teachers in some rural areas. Non-wage costs, especially textbook production costs, could also be adding to the system's inefficiencies, and their rapid growth would need to be contained. The absence of cost recovery initiatives at the university level combined with declining public funding per student has adversely affected quality as well.

66. **Rigid and centralized budgeting practices for educational institutions could also be affecting efficiency**. Specifically, there appears to be little scope for managers to shift spending across budgetary chapters within a fiscal year, and there is a tradition of incremental budgeting in education. Greater delegation of education-related spending decisions to local officials could enhance accountability and performance.[39] Providing those officials closer to actual points of service delivery with greater authority and accountability for the use of budgetary allocations would help ensure that funds are better directed to the particular needs of a school, such as facility maintenance or additional computers. Such a reform would require complementary steps to strengthen internal controls, accounting, and procurement standards.

67. **Thus, in contrast to the healthcare sector, there appears to be significant scope both to secure fiscal savings and improve social results in education.** However, the rapidly rising school-age population presents a challenge to maintain the quality and equity of its educational system.[40]

F. Social Protection and Safety Nets[41]

68. **Social protection spending in Egypt is high but poorly targeted and falls short of fulfilling its primary function of alleviating poverty** (Table III.3). On a general government basis, Egypt spent about 12 percent of GDP during FY 2007 on subsidies, grants, and social benefits. More than half of this spending consists in subsidies for selected energy and food products. These programs are poorly targeted,

[39] World Bank (2005b)

[40] World Bank (2005b).

[41] This section draws heavily on World Bank (2005c).

result in substantial leakage of resources to high-income households, and incur a high cost of delivering assistance to the poor.[42] For instance, the World Bank estimated that the lowest quintile of the income distribution receives just 16 percent of the resources allocated to the social safety net in Egypt compared to 28 percent consumed by the highest income quintile. Energy subsidies are the most regressive of the in-kind subsidies. Overall, poverty has continued to rise despite higher spending on the social safety net.[43] Almost 45 percent of the population subsists on less than US$2 per day in purchasing-power-parity (PPP) adjusted terms compared to less than 10 percent of the population in Jordan.[44] Similarly, the prevalence of malnutrition in children more than doubles that of Jordan, Tunisia, and Turkey despite the longstanding provision of in-kind food subsidies in Egypt.[45]

Table III.3. Subsidies and Transfers: Spending and Indicators for Selected Countries

	Per capita subsidies and transfers spending (In U.S. dollars, PPP adjusted)	GINI Coefficient	Malnutrition prevalence (weight, percent of children under 5)	Poverty headcount ratio at $2 a day (PPP) (In percent of population)
Albania	366.1	31.1	14.0	10.0
Armenia	18.9	33.8	2.6	31.1
Azerbaijan	6.2	36.5	6.8	33.4
Egypt	**230.4**	**34.4**	**8.6**	**43.9**
Georgia	42.4	40.4	3.1	25.3
Indonesia	270.0	34.3	28.2	52.4
Jamaica	16.8	45.5	3.6	14.4
Jordan	145.4	38.8	4.4	7.0
Mauritania	48.3	39.0	31.8	63.1
Morocco	40.0	39.5	10.2	14.3
Pakistan	21.6	30.6	37.8	73.6
Philippines	167.0	44.5	27.6	43.0
South Africa	783.9	57.8	11.5	34.1
Sri Lanka	189.9	40.2	29.4	41.6
Tunisia	184.1	39.8	4.0	6.6
Ukraine	891.1	28.1	1.0	4.9

Sources: *WDI, UNDP,* and IMF staff calculations.

[42] The World Bank (2005c) report found that the cost of delivering one dollar of resources to the poor costs almost US$500 through gasoline subsidies, US$30 for natural gas subsidies, US$46 for high-quality bread subsidies, and about US$5.50 in other in-kind food subsidies.

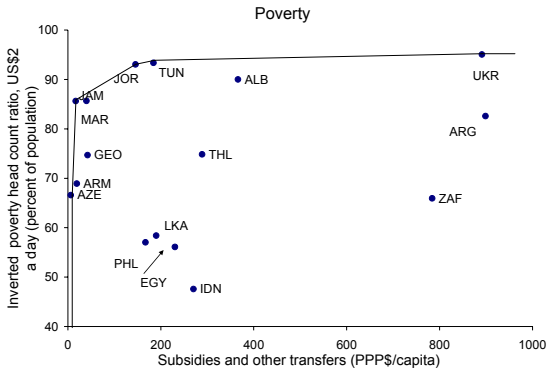
[43] Between 2000 and 2005, the poverty rate has increased from 16.7 percent to 19.6 percent; see World Bank (2007).

[44] The share of populations living on less than US$2 per day in Morocco, Tunisia, and Turkey is well under half the Egyptian rate.

[45] Based on the percentage of children under the age of five who are underweight for their age group.

69. **The analysis suggests that the efficiency of spending in social protection is much lower than in health or education** (Figure III.13). Input-oriented efficiency scores suggest that equivalent social outcomes could be achieved with about 10 percent of current spending (albeit the results are influenced by countries that report very little spending on social protection), placing Egypt 12th out of 16 countries in the sample in terms of transforming social protection spending into higher social outcomes.

Figure III.13. Selected DEA Results to Assess Efficiency of Social Protection Spending



Sources: *WDI* and IMF staff calculations

70. **The challenge for policy makers is to reorient the social protection system toward delivering targeted assistance while creating space for fiscal adjustment**.

- The main focus of the reform should be on phasing out the system of fuel subsidization and in-kind social support. Reductions in subsidies on refined gasoline, which disproportionately benefit rich households, would secure savings for fiscal consolidation. The subsidy on kerosene could be reduced more gradually to insulate the regressive impact on the poor, especially given the relatively modest burden of this subsidy compared to the cost of other fuel subsidies such as natural gas, diesel, and fuel oil. Reforms to the system of food subsidies should focus on better targeting these in-kind transfers to the poor, including by tightening eligibility for ration cards based on geographic and other proxy means-testing criteria.
- Parallel efforts should focus on substantially expanding the cash transfer and conditional cash-transfer components of the social safety net, and strengthening the targeting of social assistance based on geographic and proxy means-testing

criteria.[46] Improving the geographic targeting of the social safety net is essential, as too few of the poor benefit from existing programs, especially those living in rural areas.[47]

G. Conclusions

71. **This paper examined the efficiency of social spending in Egypt at the general government level.** The findings suggest that there is significant scope to improve the efficiency of public social spending, particularly in education and social protection. Spending in these two areas is large relative to countries of similar income levels, offering opportunities both to enhance social outcomes and secure savings for medium-term fiscal consolidation. Health spending, while relatively inefficient, is broadly in line with comparator countries and the focus of reforms should be to strengthen outcomes rather than to identify savings for fiscal consolidation, especially in light of population pressure and regional inequality in healthcare delivery.

72. **Adopting a greater results-oriented focus in the state budget process could contribute to reforms in the education and health sectors.** Policy makers should regularly review the efficiency of budget appropriations in achieving objectives and enhancing desired social outcomes. Greater managerial flexibility combined with greater accountability for results could help enhance the overall efficiency of public spending.

73. **Inefficient and poorly targeted fuel and in-kind food subsidies provide significant scope to secure savings for fiscal consolidation.** The effective resource transfer to the poor provided by food and energy subsidies is limited and highly expensive. Energy subsidies also distort production decisions and entail adverse externalities from excess energy consumption. The government has recently announced plans to phase out gas and electricity subsidies for industrial users; domestic fuel prices should be gradually moved closer to world prices. Social considerations suggest that the pace of price adjustments should be more rapid for products consumed intensively by higher-income households, while products consumed intensively by lower-income households should be adjusted more gradually. Subsidy reform should also be taken as an opportunity to redesign the structure of social safety nets with programs based on proxy means-testing and geographic targeting.

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[46] The World Bank estimates that cash transfers represent less than 5 percent of spending on the social safety net. In-kind subsidies largely account for the remainder of the social safety net.

[47] Three quarters of the poor in Egypt live in rural areas, and more than half live in rural Upper Egypt.

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IV. THE MONETARY TRANSMISSION MECHANISM IN EGYPT[48]

Summary

- The Central Bank of Egypt (CBE) has made important strides to upgrade Egypt's monetary policy framework over the last few years. The development of monetary transmission channels, however, has been slow.
- In line with evidence on countries at a similar stage of economic development, Egypt displays a pronounced exchange rate channel, whereas other channels (working through interest rates, bank lending, and asset prices) do not contribute significantly to the transmission of the monetary stance to macroeconomic variables.
- With the recent introduction of the overnight interbank interest rate corridor, the interest rate channel appears to be strengthening—a development that would bode well for the CBE's intention to adopt inflation targeting over the medium term.

A. Introduction

74. **Conducting successful monetary policy hinges on a firm understanding of the timing and impact on monetary policy shocks on key economic variables.** The monetary transmission mechanism (MTM) describes various channels through which these effects work. Gauging the effectiveness of the MTM is of key importance for any central bank in devising its monetary policy stance, strategy, and operations.

75. **The Central Bank of Egypt (CBE) intends to adopt inflation targeting (IT) as a monetary policy framework over the medium term.** Against this background, the CBE has introduced a number of reforms over the past decade that should strengthen the MTM in Egypt and enhance the macroeconomic impact of monetary policy decisions.

76. **This chapter discusses the channels of monetary transmission in Egypt in light of the experience of the last decade.** In light of rather limited research on the MTM in Egypt, the chapter provides some Egypt-specific background on the transmission channels, highlighting the frequent structural breaks, and provides some

[48] Prepared by Andreas Billmeier (MCD). This chapter is based on the forthcoming IMF working paper by Al-Mashat and Billmeier of the same title (henceforth AMB) which includes a more detailed description of the historical record.

empirical results on the interaction (via selected channels) between the monetary stance and economic variables such as prices and output.

77. **The following are the main findings:**

- The **interest rate channel** provides correct signs, but the significance and amplitude of the results are not satisfactory, in particular, in light of the planned move toward inflation targeting.

- The **exchange rate channel** continues to play an important role in the transmission of the monetary stance and magnifies the impact of policy shocks drastically.

- The role of the **asset price channel** is generally subdued, but explicit modeling of this channel indicates that it intensifies the response of prices to exchange rate shocks.

- The **bank lending channel** points to a stronger transmission of the monetary policy stance on output through credit (loans and securities) to the public sector, with little transmission through private sector lending.

78. **Several policy implications follow from the analysis.** The set of recent reforms (see below) implemented by the CBE should enhance efficiency in the banking sector and contribute to a well-functioning monetary transmission mechanism over time. It will be important to follow through with plans to eliminate the legacy problem on nonperforming loans (NPLs) and enhance banking supervision to prevent it from re-emerging. Moreover, encouraging banking competition should lead to a more accentuated bank-lending channel. Additional exchange rate flexibility is an important precondition for successful IT. Finally, lowering the fiscal deficit over the next few years as planned should also strengthen several transmission mechanisms, especially the bank lending channel and the balance sheet channel (the latter is not explored in the present context due to data constraints).

79. **The rest of the chapter is organized as follows:** The next section summarizes the institutional background information on the MTM in Egypt, including on the different transmission channels at work. Section C provides selected empirical evidence highlighting the key findings in AMB. Section D concludes.

B. Background: Monetary Transmission Channels in Egypt

80. **During much of the past decade, the CBE was concerned with simultaneously achieving multiple objectives, which were conflicting in several instances.** These objectives included attaining high economic growth while maintaining

low inflation and preserving a stable exchange rate. Between 1996 and 2005, the CBE's operational target was excess reserves of banks, and given the strong link between monetary aggregates and inflation, growth in M2 was the intermediate target. In 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.

81. **Linking policy decisions to macroeconomic outcomes has been complicated by the structure of the banking sector.** The dominance of the state in the banking sector until very recently tended to create rigidities in the interest rate structure, especially regarding lending rates. Distortions created by the existence of a substantial amount of NPLs compounded the disconnect between the monetary stance and macroeconomic outcomes.

82. **In the context of the broader reform agenda initiated in 2004, the CBE launched a comprehensive and far-reaching banking sector reform program.** The reform program contained important steps to help overcome the previous shortcomings in the banking sector and fulfill the prerequisites for inflation targeting, including the NPL-related restructuring and the 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.

83. **Against this background and in light of the multiplicity of objectives and instruments over the whole 1996–2005 period, monetary policy making and the various transmission channels underwent a number of structural breaks.** Therefore, for each transmission channel there are very specific constraints related to the identification of the proper transmission instruments as well as data availability issues. This chapter focuses on four transmission channels in Egypt: (i) the interest rate channel; (ii) the exchange rate channel; (iii) the bank lending channel; and (iv) the asset price channel.

The (direct) interest rate channel

84. **This Keynesian view of monetary policy stresses the central bank's capability to have an impact on the real cost of borrowing by changing nominal policy interest rates.** A decrease of nominal interest rates lowers real interest rates due to price rigidities in the short term. This change would be transmitted through the banking system to longer-term lending rates and bolster expenditure on business investment, housing, and consumer goods, strengthening aggregate demand.

85. **During the 1996–2005 period, the Central Bank of Egypt did not control a consistent interest rate-based indicator of the monetary stance.** The overnight domestic currency interbank market was only introduced in 2001, and the overnight

interest rate proved extremely volatile at the beginning, hardly a good measure of the monetary stance. Other interest rates—such as the bank lending rate and the deposit rate—have shown only limited response to business cycle conditions, indicating a similarly weak signaling function.

The exchange rate channel

86. **A rise in domestic interest rates attracts foreign capital inflows and causes the domestic currency to appreciate in nominal and/or real terms.**[49] The nominal appreciation affects the cost of imported goods, potentially lowering overall inflation. A possible real appreciation, on the other hand, reduces competitiveness and can lead to a fall in net exports.

87. **The Egyptian pound has been pegged more or less explicitly to the U.S. dollar during most of the past decade, and one can distinguish four distinct periods:**

- **1997 to 2000** The pound was de jure and de facto pegged to the U.S. dollar. Balance of payments deficits led to a substantial loss of reserves. Cumulative devaluations of the pound by around 8 percent were intended to avert a dry-up of foreign reserves, but could not prevent the emergence of a parallel exchange market.

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

- **2003 to 2004** The authorities decided to adopt a new exchange rate policy in January 2003 under which the exchange rate was allowed to float, entailing an immediate depreciation of 17 percent. However, the lack of credibility in this new system and public expectations of a further drastic depreciation led to the hoarding of foreign exchange receipts and speculative activities in the face of an inoperative interbank market. As a consequence, the pound continued to depreciate another 16 percent through end-2004. Finally, in December 2004, the CBE officially launched a new interbank foreign exchange market that accommodated all foreign exchange transactions between banks with the support

[49] Of course, central banks can also intervene directly on the foreign currency market to steer the exchange rate in a specific direction.

of ample U.S. dollar liquidity related to an improved current account position after the substantial depreciation (32 percent against the U.S. dollar) in early 2003.

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

The asset price channel

88. **This channel is linked to the monetarist view of the MTM and stresses the importance of asset prices for the investment behavior of firms.** Since investment decisions are taken in light of the relative value of the firm's capital to the replacement value (Tobin's *q*), lower asset prices—following a monetary tightening and a substitution of investors from equity into bonds—would reduce investment expenditures. Moreover, Mishkin (1995) underlines the associated wealth effect on household consumption, that also occurs through equity prices.

89. **In Egypt, the stock market is the only well-documented asset market—although the effect may work well through other asset markets, e.g., real estate.** After a period of subdued activity until 2003, the stock market—Cairo and Alexandria Stock Exchanges (CASE)—started to develop rapidly until 2006, when the regional stock market correction lead to a temporary sell-off.[50] The rapid development that came before the correction and the swift recovery that took place since then could have contributed to the impact the monetary policy stance has on real activity and prices via a wealth effect on households and businesses.

The bank lending channel

90. **This channel focuses on changes in the financial environment for a specific class of firms**—small companies that are able (or not) to tap financial markets directly

[50] Between March 2003 and February 2006, the CASE 30 index increased to about 12-fold [12-fold needs an object]; see Billmeier and Massa (2007a) for a more thorough investigation of recent developments on the Egyptian stock market. Billmeier and Massa (2007b) investigate to what extent remittances, the quality of institutions, and hydrocarbon wealth have had an impact on stock market development in a sample of 17 economies in the Middle East and Central Asia.

and the degree to which they depend largely on bank borrowing for investment financing. Contractionary monetary policy will exert a strong impact on this borrower class as they are directly affected by lower bank reserves and hence less loanable funds. Moreover, changes in the amount of credit available resulting from changes in the stance of monetary policy—for example, direct controls on the quantity and allocation of credit through changes in the reserve requirements and credit ceilings—have an impact on economic activity. This channel amplifies and propagates the effects of changes in policy instruments referred to in the (direct) interest rate channel.

91. **In Egypt, the evidence of a relationship between bank lending and economic activity appears mixed.** Total commercial bank lending to the private sector as a share of GDP increased until 2001 and has decreased since then. On the one hand, this boom-bust cycle in bank lending in the late 1990s and early 2000s is mirrored in the business cycle, implying that even in the case of a weak interest rate channel, the bank lending channel affects aggregate demand. On the other hand, the economic expansion since 2004 has not been accompanied (until recently) by a sizeable increase in commercial banks' lending to the private sector. Moreover, low variability in lending rates and government ownership of a large share of bank assets contributed to a disconnect between borrowing decisions and prevailing interest rates.

92. **The bank lending channel has also been hampered by a substantial stock of government debt held by public banks.** Attracted by competitive yields in risk-adjusted terms, the commercial banking sector has, between 2000 and 2006, built up a sizeable position of government securities on its balance sheet, crowding out lending to the private sector. This stable flow of investment income—as opposed to risky lending—has formed the basis for a "quiet" recapitalization of the banking sector, helping banks address the NPL issue.

C. Empirical Evidence on the Monetary Transmission Mechanism in Egypt

Methodology and data

93. **The transmission of monetary policy shocks is examined using a baseline vector autoregression (VAR) with extensions to inspect specific channels.** A large amount of empirical literature has used VARs to investigate MTM issues as they provide a simple dynamic approach to modeling key variables.[51] The VAR approach entails a simple graphical way to present empirical evidence in the form of impulse response functions (IRFs). These IRFs show the dynamic response of the endogenous variables in

[51] See, e.g., Mishkin (1995) and other contributions to the fall 1995 symposium in the Journal of Economic Perspectives.

the system to an unanticipated change (shock) in one of the variables of interest. Additional times series are easily included in the baseline specification to investigate what effect specific channels have (compared to the baseline scenario).

94. **The baseline specification of the VAR uses monthly observations, running from January 1996 to June 2005.**[52] The choice of sample span is driven by the regime change in monetary policy implementation, related to the successful introduction of the overnight interest rate target corridor. The variables contained in the VAR consist of a measure of economic activity, the price level (WPI), a measure of the monetary policy stance and of the nominal effective exchange rate.[53] Most models are estimated with three lags (except for the cases when more lags are needed to satisfy specification tests). Identification is achieved using a Choleski decomposition, with the variables ordered as indicated. Unless noted otherwise, the data are sourced from the CBE, the Egyptian statistical agency (CAPMAS), and the IMF database. Although most of the variables are not stationary, we refrain from exploring long-run cointegrating relationships more thoroughly in light of the rather short time span covered by the data. Consistent with the literature, the analysis is conducted in levels as the transmission mechanism is primarily a short-run phenomenon (Favero, 2001).

Baseline model

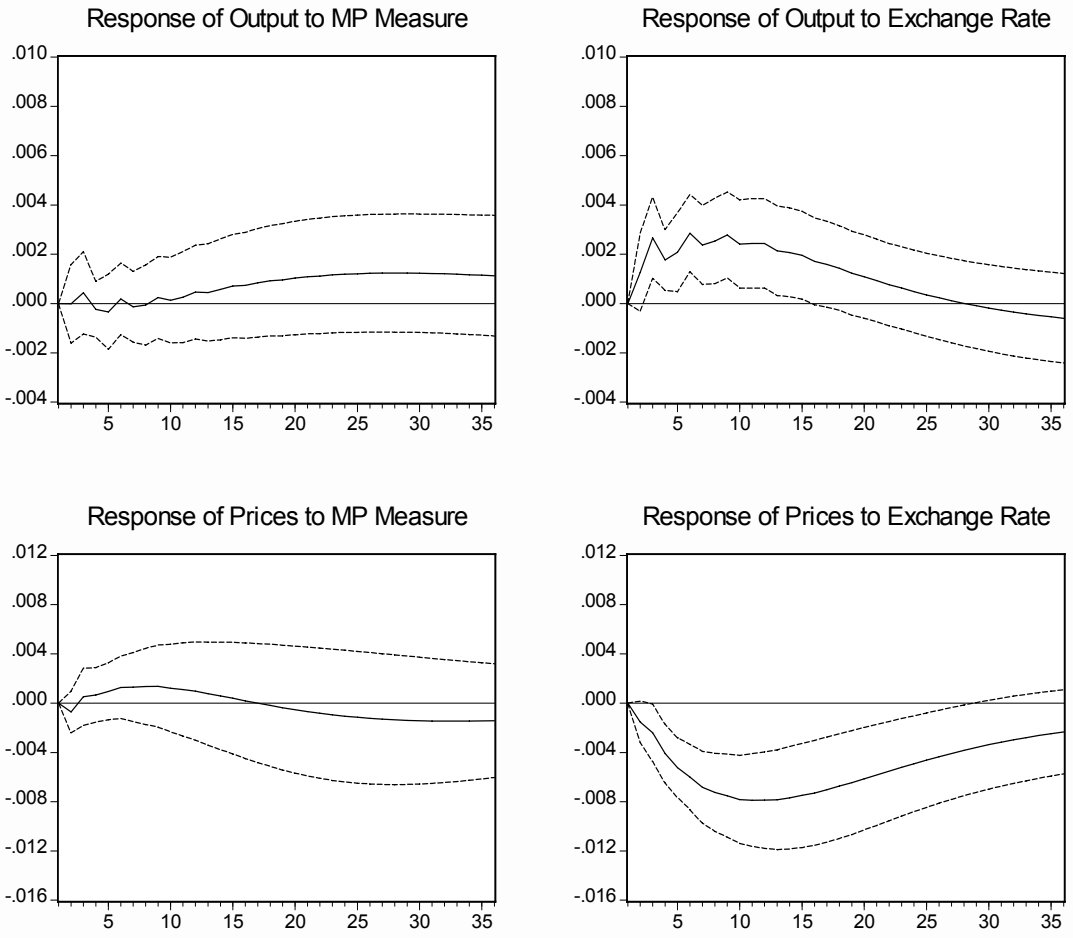
95. **In the baseline model, the price level displays a strongly significant response to exchange rate shocks but not a quite significant response to the monetary stance measure** developed in MMZ (Figure IV.1). The response of prices to an increase in the monetary policy measure (easing) is closer to significance if we extend the sample until end-2005. While not significant, the response of output to shocks to the monetary policy stance is in line with expectations—after about a year or so, output starts rising in response to an easing monetary stance. The significant, positive response of the output to a nominal appreciation shock, however, is somewhat counterintuitive and warrants

[52] The maximum number of observations for any given model is 114, but some of the series start later, reducing the number of observations slightly in selected models.

[53] The measures of economic activity and the monetary stance are taken from Moursi, Mossallamy, and Zakareya (2007)—MMZ henceforth—, who construct the latter measure to overcome the lack of a consistent policy interest rate for the sample period. In a model of bank reserves a la Bernanke and Mihov (1998), the measure of the monetary policy stance corresponds to the unpredictable residual to nonborrowed bank reserves, which are not explained by shocks to total and borrowed reserves. See MMZ (2007) and AMB (2007) for a discussion of alternative measures of the monetary policy stance. The WPI is used instead of the CPI due to the weak statistical properties of the latter; see Rabanal (2005) and AMB (2007) for more details. Two exogenous variables (the federal funds rate and the oil price) are also included to avoid well-known empirical anomalies such as the price puzzle; see Favero (2001).

further attention.[54] The strong deflationary impact of a tightening on the WPI is intuitive and consistent with earlier findings (Rabanal, 2005).

Figure IV.1. Selected Impulse Responses, Baseline VAR
(One standard deviation innovations ± 2 standard errors)



Note: The impulse reponses are shown for a positive shock (corresponding to monetary easing and an appreciation of the nominal effective exchange rate).

96. **The variance decomposition (not shown) for the baseline VAR indicates that most variables are highly idiosyncratic:** even after five years, the variation of three out of four variables is explained by their own innovations. The exception is the WPI, whose

[54] The response to the type of GDP distribution method (Litterman/Chow-Lin), the choice of price level measure (CPI/WPI), and the type of exchange rate (NEER, REER, and bilateral LE-U.S. dollar) is robust.

variation after barely one year is mainly explained by the NEER—consistent with a strong exchange rate pass through to the WPI.

97. **These baseline results are robust** to (i) a different measure of the monetary stance (reserve money); and (ii) a different variable ordering, inverting the positions of the exchange rate and the monetary stance variables. While the former check is driven by the attempt to identify a quantity measure of the monetary stance, the latter check is motivated by the fact that the exchange rate may be considered, at least occasionally, a policy target, and hence exogenous to the monetary stance in the short run. Substituting reserve money for MMZ's monetary policy stance measure does not change the key results from the baseline specification. After expansionary shocks to reserve money, the output continues to respond positively but insignificantly, whereas the WPI no longer shows the initial (insignificant) increase from the baseline scenario. The output has the same unexpectedly positive reaction to an appreciation, and prices respond negatively and significantly to an appreciation. The inversion of the exchange rate variable and the monetary stance variable has no effect on the results, indicating that the baseline specification is rather robust.[55]

The interest rate channel

98. **Without a functioning interest rate channel, the capacity of the central bank to influence real activity is limited.** In the absence of a representative short-term policy on interest rates, pair wise Granger causality tests have been conducted between a number of interest rate series and the monetary policy stance measure included in the baseline VAR to examine the interest rate channel more closely. Table IV.1 shows that interest rates in Egypt are rather unrelated to each other, as the null hypothesis of a non-causal relationship can only be rejected in three cases at the 10-percent level. In particular, the monetary policy stance measure appears to Granger-cause the 3-month deposit rate but not vice versa, and the 3-month deposit rate has some impact on the lending rate in turn.

[55] See AMB for a graphical representation.

Table IV.1. Pair Wise Interest Rate Granger Causality Tests, 1995–2005 1/

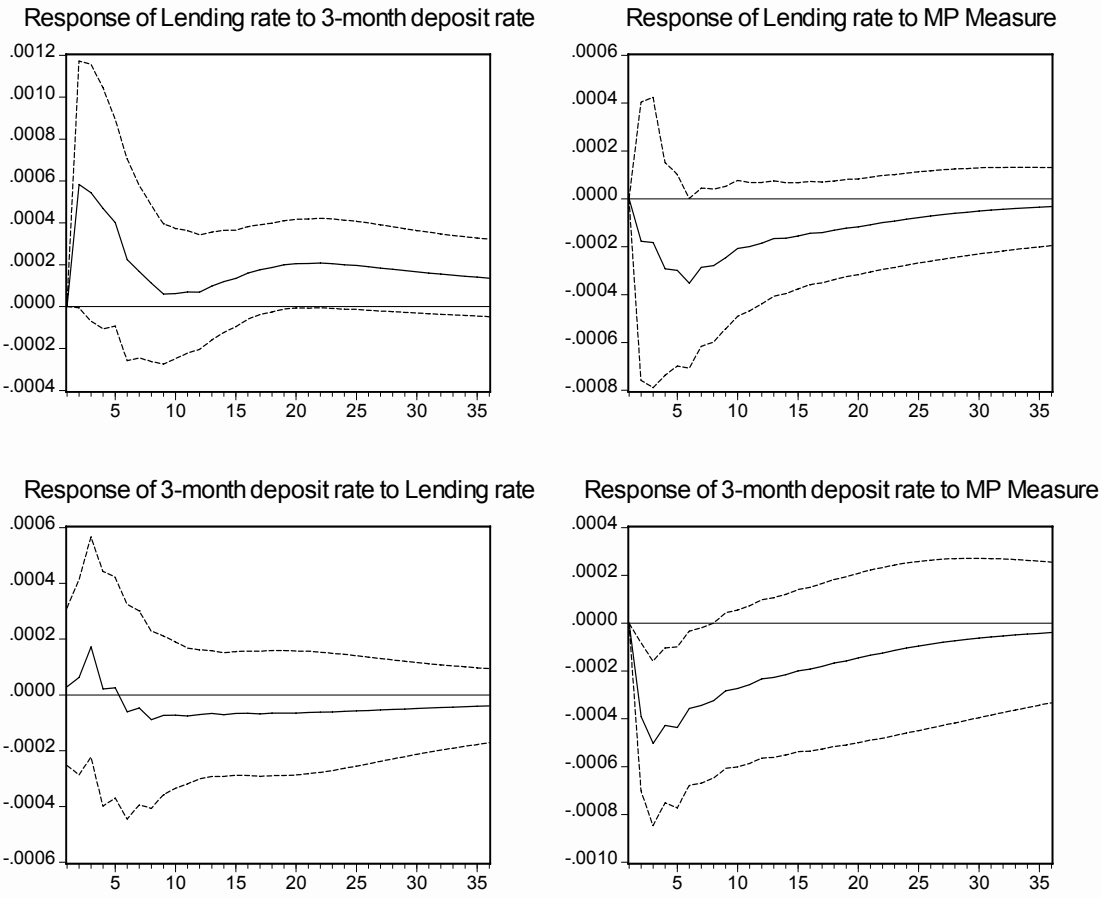
Null Hypothesis	Observations	F-Statistic	Probability
Six-month t-bill rate does not Granger-cause lending rate	123	0.23	0.87
Lending rate does not Granger-cause 6-month t-bill rate		0.35	0.79
Three-month deposit rate does not Granger-cause lending rate	128	3.48	0.02 **
Lending rate does not Granger-cause 3-month deposit rate		1.30	0.28
MP measure does not Granger-cause lending rate	117	0.01	1.00
Lending rate does not Granger-cause MP measure		0.52	0.67
Three-month deposit rate does not Granger-cause 6-month t-bill rate	123	0.69	0.56
Six-month t-bill rate does not Granger-cause 3-month deposit rate		3.62	0.02 **
Mp measure does not Granger-cause 6-month t-bill rate	112	0.29	0.83
Six-month t-bill rate does not Granger-cause MP measure		0.36	0.78
MP measure does not Granger-cause 3-month deposit rate	117	2.38	0.07 *
Three-month deposit rate does not Granger-cause MP measure		0.99	0.40

Source: IMF staff calculations.

1/ *,** Imply signficance at the 10, 5 percent level. Lag length is three.

99. **To corroborate this preliminary evidence, the baseline VAR was re-estimated** with (in this order) the lending rate, the 3-month deposit rate, and the monetary policy stance measure between the price measure and the exchange rate. Figure IV.2 presents selected impulse responses. The significant reduction of the 3-month deposit rate after an expansionary shock to the monetary policy measure is consistent with the Granger causality results above. The almost-significant response of the lending rate to the shock in the policy stance, however, is not mirrored in the Granger test statistics above. The absence of an effective policy interest rate before the introduction of the overnight corridor clearly indicates that the transmission mechanism is hampered at the short end—especially as far as the signaling of the monetary stance is concerned. Nevertheless, the results in Figure IV.2 (left panels) and Table IV.1 provide some limited evidence of an interest rate mechanism beyond the very short end.

Figure IV.2. Impulse Responses, Interest Rate Channel
(One standard deviation innovations ± 2 standard errors)



Note: The impulse reponses are shown for a positive shock (corresponding to higher interest rates (left) and an easing of the monetary policy measure (right)).

The exchange rate channel

100. **In light of Egypt's recent exchange rate experience, this channel warrants particular attention.** A simple way to discern the importance of the exchange rate channel is to shut down the transmission by including the exchange rate in the set of exogenous variables, as opposed to the endogenous ones.[56] By doing so, we avoid the transmission of the initial monetary shock to the exchange rate.[57]

[56] See Baqir (2002).

[57] In addition to the NEER used in the baseline scenario, AMB employs the REER and the bilateral exchange rate against the U.S. dollar.

101. **Figure IV.3 displays the impulse responses for two different monetary shocks—the monetary policy measure and the interest rate on 3-month deposits—with the NEER channel active/inactive.** The responses are consistent in shape—a positive shock in the monetary policy measure corresponds to an easing of the monetary stance.[58] In both cases, the exchange rate channel plays an important role. After a monetary easing, an active exchange rate channel doubles or even triples (in response to a deposit rate shock, bottom left panel) the magnitude of the price response due to the additional effect stemming from the depreciation of the price of imported goods.[59] With regard to the response of output to an unexpected easing in the monetary stance, an active exchange rate channel appears to delay the expansionary reaction for both monetary policy measures stemming from depreciation-induced expenditure switching toward domestic goods (right panels). In our sample, this effect could be driven by the monetary easing in the late 1990s, which coincided with a drop in investment and intermediate imports. This somewhat counterintuitive result could be explained by rising import prices, which—by reducing the availability of imports that are critical inputs for production—hamper productive activity.

The asset price channel

102. **Assessing this channel relies on a good measure of asset prices—in this case the stock market index.** Egypt's official stock exchange offers a stock price index, CASE 30, that covers the 30 major stocks quoted with a minimum free float of 15 percent. As stock market index data is available since January 1998, we have re-estimated the baseline VAR for this limited period, ordering the (log) stock price after the output and the WPI but before the monetary policy stance, assuming that monetary policy could react within the same observations period to movements in the stock market.[60]

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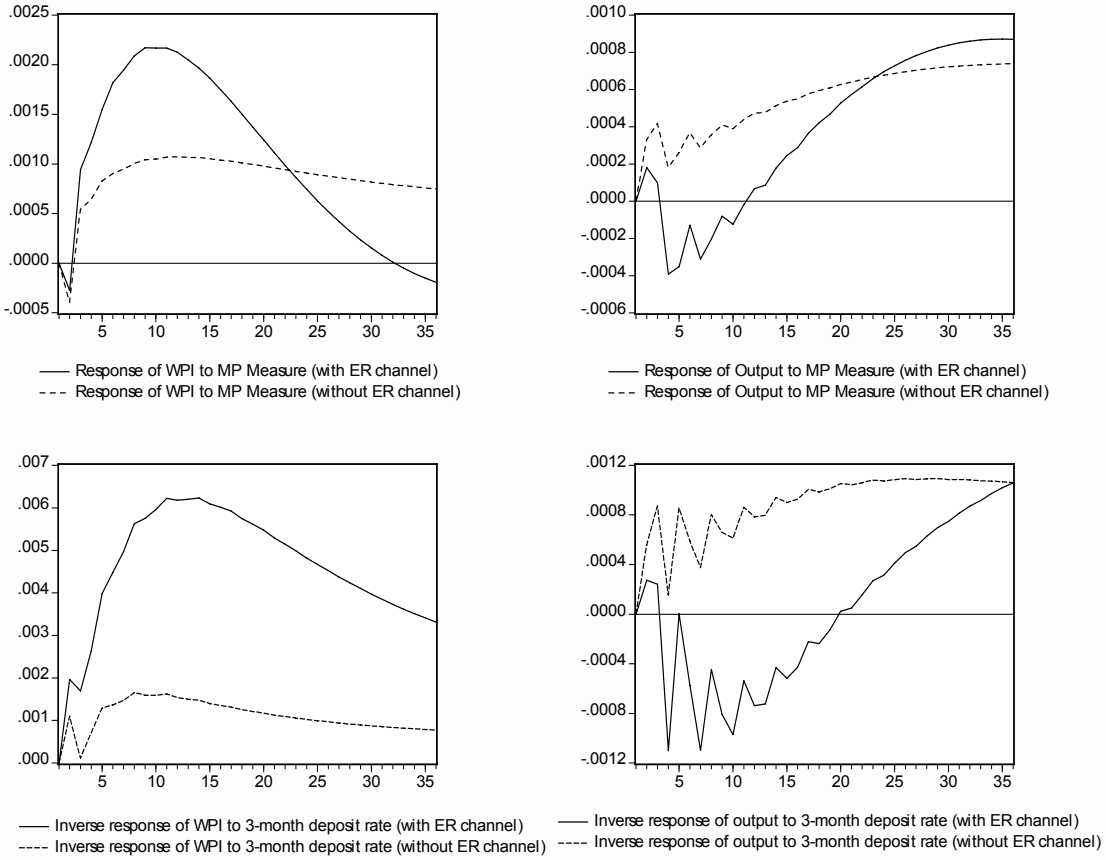
[58] For ease of comparison, the lower charts in Figure IV.3 present the inverse of the impulse response to a regular interest rate shock (which would correspond to a monetary tightening).

[59] See AMB, Appendix I, Baseline VAR, bottom row, third chart. Given the definition of the effective exchange rates, an initially negative impulse response corresponds to a depreciation. The appreciation of the NEER over the medium term in response to a monetary easing displayed in the same chart also explains why the response of the WPI to the MP measure dies out much more quickly when the exchange rate channel is alive (top-left panel in Figure IV.3).

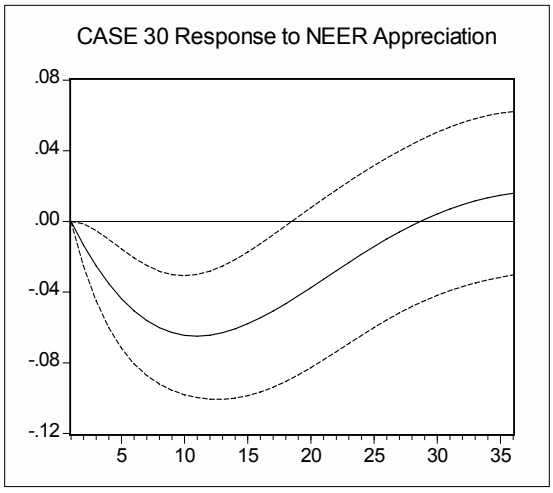
[60] In this specification, we have used one lag as indicated by the Schwarz and Hannan-Quinn information criteria. The results are robust to ordering the stock market index before the monetary policy stance, consistent with the assumption that the CBE considers stock market developments as one factor in making (same period) monetary policy decisions.

Figure IV.3. Impulse Responses With and Without NEER Channel
(Cholesky decomposition, one standard deviation innovations)



Note: In the top part, the impulse reponses are shown for a positive shock to the monetary policy measure (corresponding to a monetary easing). In the lower part the inverse impulse responses to a positive interest rate shock are shown shock (also corresponding to a monetary easing).

103. **A functioning asset price channel intensifies the price response to an exchange rate shock** (not shown)**.** Compared to the baseline, it increases the amplitude but shortens the time during which the response is significant by about one year. This result could be explained in two ways: First, it may be evidence of an additional wealth effect on private consumption. As investments in the pound-based stock market become more expensive with an appreciation, foreign investors are likely to reduce their positions (and local investors would tend to shift their investments abroad),



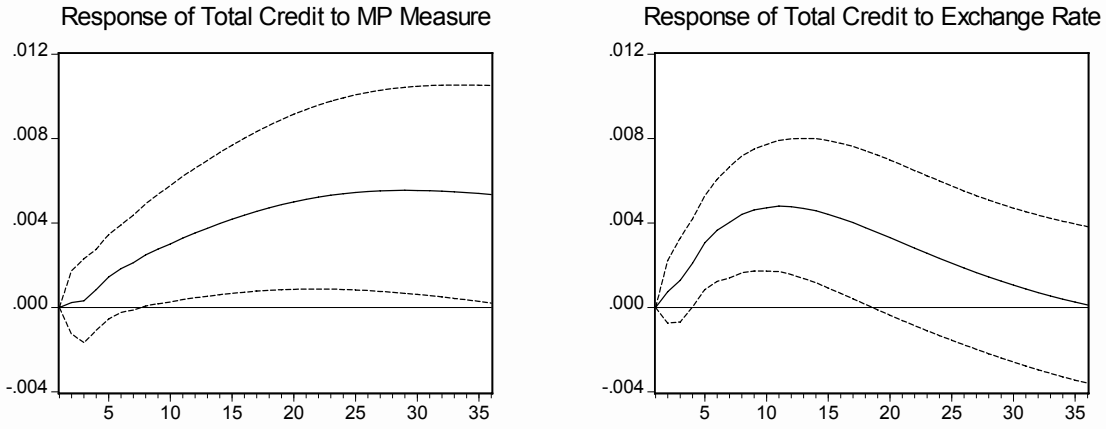
and the stock market index decreases significantly (see text chart). Investors—both retail and institutional—experience a decrease in their net worth and adjust their consumption and investment behavior accordingly. Second, the appreciation could deteriorate the outlook for export-oriented sectors (tourism and non-oil goods exports). Lower profit expectations could exert pressure on stock market quotations, reinforcing the wealth effect.

The bank lending channel

104. **To explore the bank lending channel, a real credit aggregate is included in the baseline VAR.**[61] First, we include total private domestic and public credit—except for the government proper credit, but including state-owned enterprises and public economic authorities—consisting of both lending and securities held by banks. For identification purposes, the variable is ordered between the price index and the monetary policy measure.

105. **Explicitly modeling the credit channel does not change the baseline results.** Although domestic credit expands significantly after shocks from monetary easing and after an appreciation of the nominal effective exchange rate (Figure IV.4), the impulse responses of outputs and prices to these shocks (not shown) are very similar to the baseline scenario.

Figure IV.4. Impulse Responses Baseline VAR and Domestic Credit
(One standard deviation innovations ± 2 standard errors)



Note: The impulse reponses are shown for a positive shock (corresponding to monetary easing and an appreciation of the nominal effective exchange rate).

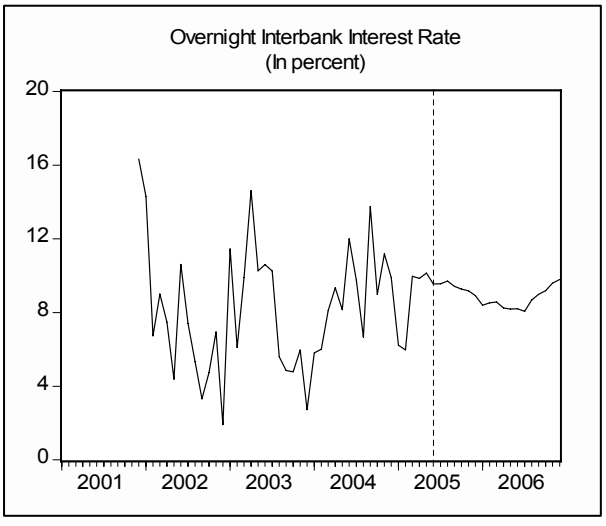
[61] Credit aggregates are deflated with the WPI and seasonally adjusted (X-12 filter).

106. **To discern better the growth impact of various types of credit, total domestic credit was substituted by disaggregate data,** distinguishing first between private and public credit (to state-owned enterprises and public economic authorities) and second between lending to the household sector and the corporate sector.[62] In all cases, an active credit channel increases the positive response of the output to a monetary easing. The bank lending channel points to a stronger transmission of the monetary policy stance on output through credit to the public sector compared to private sector lending. The response of the output is broadly twice as large if we model the transmission via the public sector explicitly compared to the private sector. Similarly, the transmission via corporate lending is quantitatively more important for the output than lending to households.

The Impact of the Target Corridor for the CBE's Overnight Standing Facilities

107. **Within the newly adopted monetary framework, the CBE launched the overnight corridor system in June 2005**, shifting its monetary operations from a quantity-based target (excess reserves of banks) to a price-based one, the overnight interbank rate. The overnight deposit rate and the overnight lending rate are effectively the floor and the ceiling of the corridor, respectively. Steering the domestic currency overnight interbank rate in the middle of the corridor is the CBE's operational target. The CBE manages market liquidity through its open market operations.

108. **Since the introduction of the corridor, the domestic currency overnight interbank interest rate has become substantially less volatile, and potentially a better indicator of the monetary policy stance** (see text chart). To investigate whether this fundamental change has had any effect on the interest rate channel over the last 1½ years, Granger causality tests similar to the ones above (Table IV.1) were carried out with a different set of interest rates for this very short sample (Table IV.2).[63] The results indicate that the overnight interbank 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 new



[62] See AMB for a more detailed discussion including charts.

[63] Causality tests not reproduced here; see AMB. Due to the limited amount of observations, it is not possible to estimate a VAR based on the overnight interest rate.

bank borrowing (the lending rate). This bodes well for the CBE's monetary policy strategy going forward if it maintains the clear signaling function that the overnight rate appears to have assumed in a rather short period of time. Moreover, the banking sector's decreasing spread between cost of funding and investment return on government securities caused by stronger competition for lending opportunities to the private corporate and household sector should reinforce the empirical link going forward

Table IV.2. Pair Wise Interest Rate Granger Causality Tests, 2005–06 1/

Null Hypothesis	Observations	F-Statistic	Probability
Lending rate does not Granger-cause 3-month deposit rate	16	1.19	0.37
Three-month deposit rate does not Granger-cause lending rate		1.28	0.35
Overnight interbank rate does not Granger-cause 3-month deposit rate	16	10.15	0.00 ***
Three-month deposit rate does not Granger-cause Overnight interbank rate		0.97	0.45
Six-month t-bill rate does not Granger-cause 3-month deposit rate	16	2.42	0.14
Three-month deposit rate does not Granger-cause 6-month t-bill rate		1.23	0.36
Overnight interbank rate does not Granger-cause lending rate	16	5.60	0.02 **
Lending rate does not Granger-cause Overnight interbank rate		1.68	0.24
Six-month t-bill rate does not Granger-cause lending rate	16	3.94	0.05 *
Lending rate does not Granger-cause 6-month t-bill rate		1.38	0.32
Six-month t-bill rate does not Granger-cause Overnight interbank rate	16	1.18	0.38
Overnight interbank rate does not Granger-cause 6-month t-bill rate		2.18	0.17

Source: IMF staff calculations.

1/ *,** Imply signficance at the 10, 5 percent level. Lag length is three.

D. Conclusions and Outlook

109. **The CBE has made many important strides to upgrade Egypt's monetary policy framework over the last few years** with a view to adopt inflation targeting as a monetary policy framework once the prerequisites are fulfilled. Summarizing, it appears that some of the preconditions for a successful implementation of IT (not discussed in detail here)—including a competitive banking system and a fully consistent monetary policy framework—are not yet fulfilled. However, certain aspects of the monetary transmission mechanism, another plank of successful IT, appear to work, especially the exchange rate channel. Moreover, since the launch of the corridor in June 2005 for the overnight interbank rate, this rate has been less volatile and—although empirical evidence is slow to emerge—has proven to be a better indicator of the monetary policy stance in the context of the interest rate channel. Finally, not discussed in this chapter is the fact that continuous improvement of the CBE's communication strategy has helped to strengthen the monetary policy framework and enhance the expectations channel.

110. **Despite the shift away from the exchange rate as the nominal anchor and the growing importance of the interest rate channel, the ER channel will continue to play an important role** as a large share of the consumer goods basket used in the CPI is tradable. In fact, several countries have moved toward inflation targeting while paying particular attention to the exchange rate; for example, Turkey and Chile. In the Egyptian

context, however, allowing further exchange rate flexibility is an important precondition for successful IT.

111. **Going forward, other transmission channels should become more significant.** The bank-lending channel should become stronger as competition between banks enhances the sector's effectiveness in intermediating financial flows and translating the central bank's monetary stance into market rates. Especially, the relative strength of transmission via public sector credit should lessen as private sector lending re-emerges as a plank of economic development in Egypt. The role of the asset price channel will be enhanced over time as per capita incomes grow and consumption becomes less dependent on current income.

112. **Two priorities adopted by the government—cleaning up the remaining NPLs in the banking sector and lowering the fiscal deficit over the next few years—should also strengthen several transmission mechanisms**, especially the bank lending channel and the—not explored in the present context—balance sheet channel as financing for smaller corporates becomes more easily available and firms are in a better position to respond to changes in the interest rate, since their balance sheets are no longer burdened by NPLs.

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