PROCYCLICALITY, FISCAL DOMINANCE, AND THE EFFECTIVENESS OF FISCAL POLICY IN EGYPT

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This paper uses Structural Vector Autoregressive (SVAR) models to study the effectiveness of fiscal policy in stabilizing the real GDP. To do so, it first addresses the cyclicality of fiscal policy in Egypt since the early 1980s. Then, it tackles the fiscal dominance. Once the stage is prepared, it moves on to investigate the effectiveness of the fiscal policy. The paper concludes that the relationship between the fiscal policy and the economic activity is very week and it goes from the former to the latter while the relationship between the fiscal policy and the monetary policy is strong and it also goes from the former to the latter. This aggravated the economic instability and made the economy more prone to a boom/bust cycle.

1 Introduction

During the last three decades, the pattern of Egypt's economic performance exhibited considerable fluctuations. Only in the second half of the 1970s, mid-1990s, and mid-2000s did Egypt experience relatively high economic growth rates. This boom/bust cycle has always been associated with significant external shocks. The lack of countercyclical policies that can smooth such shocks made the economy more vulnerable to such a boom/bust cycle.

Some consensus emerged recently against using fiscal policy to smooth out the fluctuations in output. First, a countercyclical fiscal policy might have a much weaker fiscal multiplier effect in practice than mentioned in Keynesian models (Perotti, 2002). Second, the aggressive use of discretionary fiscal policy can contribute to higher volatility in output and lead to lower growth (Fatás and Mihov, 2003).

In addition, there is strong evidence that fiscal policy is procyclical in many developing economies (Gavin and Perotti, 1997, among others). This procyclical fiscal policy can aggravate macroeconomic instability, especially under fiscal dominance.

The objective of this study is threefold. The first is to document the procyclicality of fiscal policy in Egypt since the early 1980s. The second is to tackle the fiscal dominance issue that characterized the relationship between fiscal and

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monetary policies. The third is to quantitatively study the effectiveness of fiscal policy under fiscal procyclicality and fiscal dominance.

The paper proceeds as follows: In Section 2, we present an overview of fiscal accounts. In Section 3, we address the cyclicality of fiscal policy. Section 4 tackles the fiscal dominance. Section 5 studies the effectiveness of fiscal policy using structural VAR model. Section 6 concludes.

2 Overview of fiscal accounts

Table 1 presents the simple average of the main fiscal aggregates, as shares of GDP, during the whole period 1980/81-2004/05 and the three sub-periods 1980/81-1990/91, 1991/92-1997/98 and 1998/99-2004/05.[1]

The results show that the overall and primary deficits reached about 19 and 15 per cent respectively during the first sub-period. These deficits decreased dramatically in the second sub-period reaching about 8 and 1 per cent respectively[2].

In the third sub-period, the overall and primary deficits increased but remained far less than their levels in the first period. The average deficits over the entire period exceeded considerably those of the industrial and Latin American countries. On the other hand, the whole period witnessed a monotonic decrease in total revenues, total expenditures and primary expenditures, as shares of GDP.

2.1 The volatility of fiscal aggregates

Table 2 displays the average standard deviation of the rate of growth of total revenues, total expenditures and primary expenditures, deflated by the GDP deflator. For the overall and primary deficits, the table presents the average standard deviation of the first differences of the GDP shares.

The table displays two important stylized facts. First, the volatility of fiscal aggregates was dramatically high in the 1980s. It decreased considerably in the third sub-period. Second, the volatility of the change in overall and primary deficits was always lower than that of the other fiscal aggregates.

One cannot argue that the higher volatility of fiscal aggregates was mainly due to the adjustment to the underlying economic environment. In fact, we will show in Section 3 that most of this volatility can be attributed to the discretionary changes implemented by the policy maker.

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1 See also Figure 4 in the Appendix.

2 The second period witnessed the economic reform program with the International Monetary Fund. The program aimed to increase the competitiveness of the economy, and bring fiscal and current account deficits under control.

Table 1

Overview of Fiscal Aggregates in Egypt
(simple average, percent)

	Overall Deficit/GDP	Primary Deficit/GDP	Total Revenue/GDP	Total Expenditure /GDP	Primary Expenditure /GDP
1980/81-1990/91	18.71	15.02	36.47	55.18	51.48
1991/92-1997/98	8.13	1.23	31.97	40.1	33.2
1998/99-2004/05	10.37	4.72	23.49	33.86	28.21
1980/81-2004/05	13.41	8.27	31.57	44.99	39.85

Table 2

The Volatility of Fiscal Aggregates
(average standard deviation, percent)

	Overall Δ Deficit/GDP	Primary Δ Deficit/GDP	Total Revenue Growth	Total Expenditure Growth	Primary Expenditure Growth
1980/81-1990/91	6.49	6.65	15.57	16.78	17.52
1991/92-1997/98	1.96	2.72	15.65	11.60	12.19
1998/99-2004/05	1.12	1.06	0.58	3.43	3.94
1980/81-2004/05	4.26	4.44	11.58	12.12	12.80

3 Cyclicality of fiscal policy

In this section, we quantify the relationship between fiscal aggregates and economic growth to characterize the cyclicality of fiscal policy.

We begin by regressing each of the change in overall deficit and primary deficit, as a percentage of GDP, on an intercept and real GDP growth. We also regress each of the rate of change of total revenues and total expenditures, deflated by GDP deflator, on the same regressors. Table 3 displays the results of these regressions that we refer to as model 1.

Table 3

The Cyclicality of Fiscal Policy

	OLS Coefficients							
	Overall Deficit		**Primary Deficit**		**Government Expenditure**		**Government Revenue**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Real GDP Growth	0.76		0.90**		1.07		–0.46	
	(–1.55)		*(–1.79)*		*(–0.74)*		*(–0.33)*	
Low Growth		0.07		–0.89		4.27		5.16
		(–0.04)		*(–0.54)*		*(–0.74)*		*(–0.85)*
High Growth		–1.74		–1.98		0.29		3.92
		(–1.07)		*(–1.12)*		*(–0.05)*		*(–0.6)*
Lagged Dependent Variable		–0.42***		–0.38**		–0.22		–0.07
		(–2.76)		*(–2.41)*		*(–1.08)*		*(–0.29)*
$\overline{R}^2$	0.06	0.21	0.09	0.16	–0.02	–0.07	–0.04	–0.11
DW	2.56	1.82	2.52	1.59	2.31	2.28	2.1	1.94
Degrees of Freedom	22	19	22	19	22	19	22	19

Notes: *t*-statistics are given in parentheses.

***, **, * indicate significance at 1, 5 and 10 per cent level respectively.

We interpret the coefficient on real GDP growth as the response of the fiscal instrument to changes in real GDP. This response includes the adjustment of these instruments to the changes in real GDP (*i.e.* due to the automatic stabilizer) and any discretionary policy measures taken by the policy maker (Gavin and Perotti, 1997).

The table shows that the coefficient is not statistically significantly different from zero, except for the change in primary deficit. A one per cent increase in the real GDP growth is associated with an increase in the primary deficit, as a percentage of GDP, of 0.9 per cent. Nevertheless, the adjusted R^2 is very low (0.09).

These results suggest that the fiscal policy is procyclical and mainly discretionary. Therefore, Egypt is not different from many of the other developing countries in this aspect (Gravin and Perotti, 1997).

To distinguish between the responses of the fiscal instruments during periods of low and high economic growth, we regress each of the dependent variables –

mentioned above – on two dummies and an intercept. The average economic growth over the entire period is 4.7 per cent. The dummy that represents low economic growth takes one when the economic growth is less than 3 per cent, and zero otherwise. The other dummy takes one when the economic growth is higher than or equal to 5.5 per cent. Furthermore, we examine the persistence of the fiscal instrument by adding the lagged values of the dependent variable to the regressors.[3] The results of these regressions, that we refer to as model 2 in Table 3, show that the coefficients of the two dummies are not statistically significantly different from zero. This suggests no asymmetry in the cyclical behavior of the fiscal policy during low and high growth periods.

3.1 Why is fiscal policy procyclical in Egypt?

Two important explanations can be provided. First, non-tax revenues, indirect taxes, and trade taxes, which are often procyclical and outside the control of the government, constitute the largest share of the total revenues (Panizza, 2001). On the other hand, the composition of total expenditures highlights the important role played by social polarization in explaining the procyclicality of fiscal policy. The wages and interest payments comprise about 18 and 13 per cent of the total expenditures respectively. The share of explicit subsidies is much lower (about 8 per cent). Nevertheless, the implicit subsidy, that artificially reduces the domestic fuel prices, represents a considerable share of total expenditures. The explicit and implicit subsidies reached about 35 per cent of total expenditure in 2005/06.[4] Again, the large share of wages, explicit and implicit subsidies, and interest payments limits the ability of conducting a countercyclical fiscal policy.

Second, the positive association between fiscal policy and the GDP growth could in fact reflect the effect of changes in fiscal policy on economic growth rather than the opposite. This explanation is supported by the results of the structural VAR model presented in Section 5. The SVAR results show that the structural coefficient that measures the effect of fiscal policy on economic growth is statistically significant, but relatively small while the structural coefficient that measures the effect of economic growth on fiscal policy is not statistically significantly different from zero.

4 Fiscal dominance

When the fiscal policy is procyclical, it can aggravate the macroeconomic instability. Under fiscal dominance, the fiscal policy can further paralyze the

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[3] The coefficient that measures this persistence is statistically significantly different from zero and negative implying no persistence.

[4] See Table 8 in the Appendix.

monetary policy. The reliance on seigniorage can be considered the simplest and most common manifestation of fiscal dominance (Masson *et al.*, 1997).

There has been a positive association between the overall deficit and the domestic credit going to the government, as shares of GDP, over the entire period 1980/81-2004/05.[5]

To obtain a measure of fiscal dominance, we estimate the following regression:

$$d\log DCG_t = \alpha + \beta dOVDEF_t + \varepsilon_t$$

where *d*log*DCG* denotes the rate of growth of real domestic credit going to government, deflated by the GDP deflator, and *dOVDEF* refers to the change in overall deficit, as a share of GDP. We correct for first order autocorrelation in the residuals.

$$d\log DCG_t = 3.33 + 1.026 dOVDEF_t$$

$$(0.75) \quad (2.97)$$

$$N=23 \qquad R^2 = 0.42 \qquad DW=1.92$$

The results show that the coefficient *ß* is statistically significant. A one percentage point increase in the overall deficit is associated with a one percentage point increase in the growth of real domestic credit going to the government.[6] Under these circumstances, the fiscal and monetary policies are reduced to just one policy.

5 The effectiveness of fiscal policy

This section studies the effectiveness of fiscal policy in stabilizing the real GDP. We use Structural Vector Autoregressive (SVAR) models to measure the effect of fiscal policy on the economic activity. The SVAR model also sheds lights on the relationship between fiscal and monetary policies, and how this relationship weakens the effect of the later on the economic activity.

5.1 Data, methodology, and research design

This sub-section discusses data sources, variable definitions, methodology, and research design.

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5 See Figure 5 in the Appendix.

6 Going forward, the fiscal dominance is no longer a critical issue. The unified banking law issued in 2003 explicitly stated that the monetary policy objective is "achieving price stability". The law also grants the Central Bank of Egypt (CBE) more independence. Moreover, the law restrains the government access to Central Bank financing. The Ministry of Finance is currently executing a fiscal consolidation plan that aims to bring the deficit down by one per cent of GDP annually to the range of 3-4 per cent of GDP over the next three years.

Table 4

Unit Root Tests

Constant Variables	**Numb. of Lags**	***t*-statistics**	**CV (5%)**	**CV (1%)**
OVDEF	0	–1.7	–3	–3.7
LRGDP	0	–2	–3	–3.7
LRESERM	0	–0.8	–3	–3.7
Constant and Trend Variables	**Numb. of Lags**	***t*–statistics**	**CV (5%)**	**CV (1%)**
OVDEF	0	–2.6	–3.6	–4.4
LRGDP	2	–2.9	–3.6	–4.4
LRESERM	0	–1.2	–3.6	–4.4

5.1.1 Data and variable definitions

We used annual data for the period 1980/81 through 2004/05.[7] We obtained the data from Ministry of Finance, Central Bank of Egypt, World Development Indicators, and International Financial Statistics.[8]

The transformed variables used in the VAR are: Δ*LRGDP*, Δlog of real GDP; Δ*OVDEF*, Δ of overall deficit (measured as a percentage of GDP); Δ*LRESERM*, Δlog of real monetary base, Δlog (M_0/P), where P is the GDP deflator. For convenience, all transformed variables are measured in units of percentage change.[9]

Unit roots test results are reported in Table 4. The test results indicate a failure to reject the unit root null hypothesis of the augmented Dickey-Fuller (ADF) test for all variables. Unit roots test results for the first difference of the variables unanimously reject the unit root null hypothesis. Hence, all VAR variables are considered $I(1)$.

Johansen (1991) tests for the number of cointegration vectors in the system (*LRGDP*, *OVDEF*, *LRESERM*) are presented in Table 5. Likelihood ratio tests suggest looking at lag length of 1. According to the maximum-eigen value test, there are no cointegration vectors. The results suggest estimating the VARs in first differences.

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7 We have been constrained by the availability of data.

8 The data on real GDP and GDP deflator have been obtained from the World Development Indicators; the fiscal data from Ministry of Finance; and the monetary data from International Financial Statistics and the Central Bank of Egypt.

9 When using the primary deficit first difference, as a percentage of GDP, instead of overall deficit first difference, as a share of GDP, we arrived at almost the same results. Therefore, we report only the results of the model that uses the overall deficit as the fiscal instrument.

Table 5

Cointegration Tests
(OVDEF, LRGDP, and LRESERM)

r	*λ*-Max Statistic	5% Critical Value	1% Critical Value
0	16.21	20.97	25.52
1	8.45	14.07	18.63
2	0.16	3.76	6.65

5.1.2 Methodology

We use structural VAR framework. The SVAR model allows us to identify the structural shocks that hit the system.

We can express the VAR system as a reduced form:

$$X_t = B(L)X_{t-1} + \mu + \upsilon_t \tag{1}$$

where $X = [\Delta LRGDP, \Delta OVDEF, \Delta LRESERM]$ is a vector of the endogenous variables, $B(L)$ is a lag operator of the order L, μ is a vector of constants, and υ is a vector of reduced-form residuals.

The structural form is given by:

$$A(0)X_t = A(L)X_{t-1} + A(0)\mu + \varepsilon_t \tag{2}$$

where $A(0)$ is the matrix of contemporaneous interactions, and ε_t is a vector of Niid structural errors.

The reduced-form residuals depend on the structural innovations and the contemporaneous relationships among the endogenous variables.

$$\upsilon_t = A(0)^{-1}\varepsilon_t = C(0)\varepsilon_t \tag{3}$$

If X contains n elements, identification requires imposing $n(n-1)/2$ restrictions on the $C(0)$ matrix. We impose the following restrictions. We assume that real GDP growth contemporaneously depends on the change in overall deficit and its own shock. The reason for the lack of a contemporaneous response of real GDP growth to reserve money growth is the fact that monetary policy affects the economic activity with a lag.

The change in the overall deficit is allowed to contemporaneously respond to the innovation in real GDP growth and its own shock. This is motivated by the procyclicality of fiscal policy.

Finally, we assume that reserve money growth reacts contemporaneously to the change in the overall deficit and its own shock. This is justified under the fiscal dominance.

$$C(0) = \begin{bmatrix} 1 & c_{12} & 0 \\ c_{21} & 1 & 0 \\ 0 & c_{32} & 1 \end{bmatrix} \tag{4}$$

5.1.3 Research design

We use the two dummies that have been created to differentiate between the low growth and high growth periods.

VAR specifications are selected by a sequential search using likelihood ratio tests modified by the small-sample correction of Sims (1980). Each of the reduced-form equations includes a constant as stated in (1). We test the null hypothesis of one lag versus two. We choose the VAR with one lag if we arrive at the test of one lag versus two and fail to reject the null. The number of lags selected is one.

We tested the hypothesis that the two dummies belong in the model using likelihood ratio test. The test indicated that the two dummies belong in the model.

We estimated the just identified structural model. Table 6 shows that the coefficient c_{21} is not statistically significantly different from zero. Hence, we estimated the overidentified model that further restricts c_{21} to be zero. Table 7 shows that the overidentified restriction is not rejected. Consequently we decided to use the overidentified model.

Table 6

The Structural Coefficients of the Just Identified Model

Variable	Coefficient	*t*-statistics	Significance
C_{12}	–0.107	–1.890	0.059
C_{21}	0.006	0.006	0.995
C_{32}	–1.196	–2.168	0.030

Table 7

The Structural Coefficients of the Overidentified Model

Variable	Coefficient	*t*-statistics	Significance
C_{12}	–0.107	–2.744	0.006
C_{32}	–1.196	–2.159	0.031
Number of Observations			23
Log Likelihood			–47.94
Log Likelihood Unrestricted			–47.26
Chi-Squared (1)			1.37
Significance Level			0.24

$$C(0) = \begin{bmatrix} 1 & c_{12} & 0 \\ 0 & 1 & 0 \\ 0 & c_{32} & 1 \end{bmatrix} \qquad (4')$$

5.2 The results and interpretations

The identification restrictions given in (4') are used to retrieve the structural dynamic system. Once the structural model is retrieved, variance decompositions and impulse responses, the hallmark of VAR analysis, are computed. The variance decompositions present the percentage of the error variance at various forecast horizons that attributed to each of the individual structural shocks. The impulse responses present the dynamic responses of the variables to one standard deviation shocks to the structural innovations. The variance decompositions for real GDP growth and real reserve money growth are presented in Table 10 in the Appendix.

5.2.1 The effect of fiscal policy on economic growth

Table 10 shows that the overall deficit changes account for about 29 per cent of the annual forecast error variance of GDP growth at 2-year time horizon. Figure 1 shows that a one standard deviation shock to the overall deficit (equal to 2.5 per cent) induces a contemporaneous increase in GDP growth of 0.27 per cent. This effect is quite small compared to the Keynesian models' prediction.

On the other hand, real reserve money growth explains less than 1 per cent of the movements in the economic growth at all time horizons (see Table 10). Figure 2

Figure 1

Response of GDP Growth to a Fiscal Policy Shock

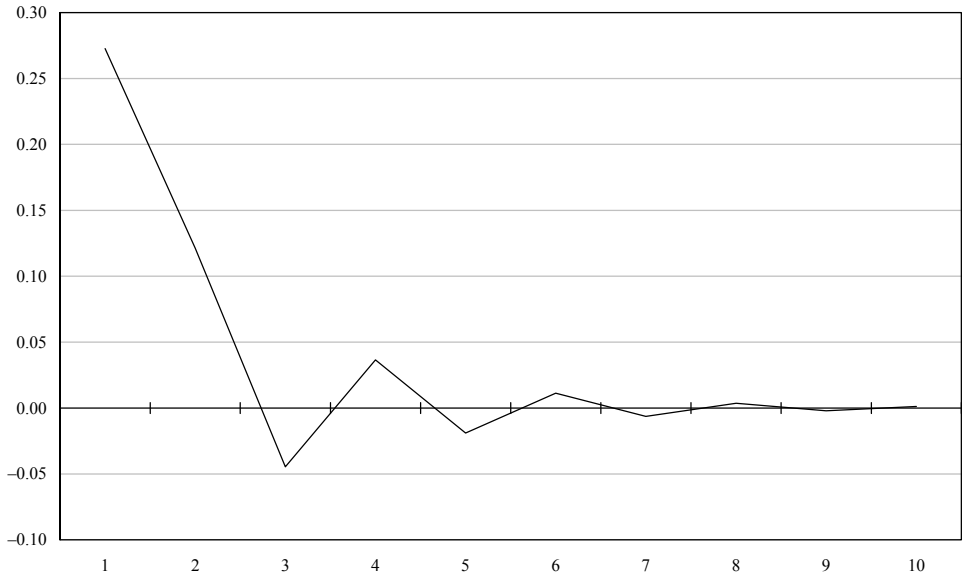


Figure 2

Response of GDP Growth to a Shock to Reserve Money Growth

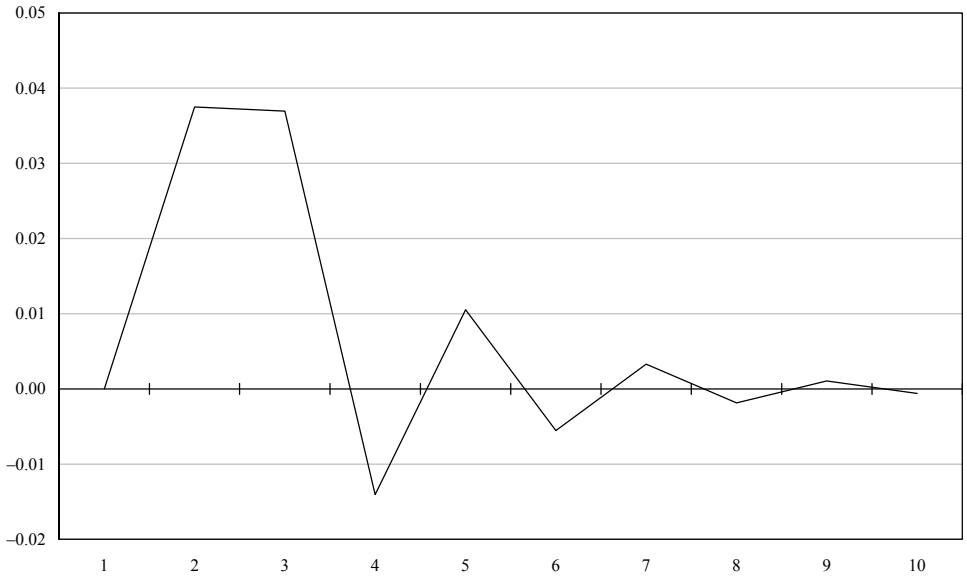
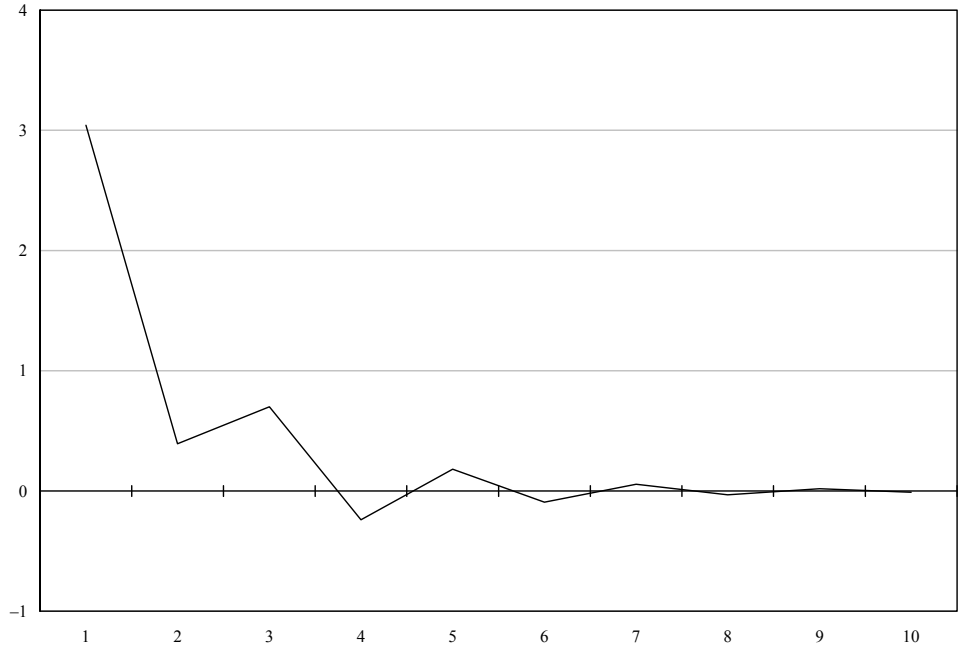


Figure 3

Response of Reserve Money Growth to a Fiscal Policy Shock



shows that a one standard deviation shock to real reserve money growth (about 7 per cent) causes economic growth to increase by less than 0.04 per cent at 2-year time horizon.

5.2.2 The effect of fiscal policy on reserve money growth

Do the overall deficit changes explain the movements in the real reserve money growth? Table 10 shows that overall deficit changes explain about 18 per cent of the annual forecast error variance of real reserve money growth at 2-year time horizon. Figure 3 shows that a one standard deviation shock to the overall deficit induces an increase in real reserve money growth of 3 per cent. This implies a slightly more than one to one relationship between fiscal and monetary instruments.

Overall, while the relationship between fiscal policy and the economic activity is very week and it goes from the former to the later, the relationship between fiscal policy and monetary policy is strong and it also goes from the former to the later.

6 Conclusions

The paper concludes that the relationship between fiscal policy and the economic activity is very week and it goes from the former to the later. The paper has also demonstrated how the fiscal dominance paralyzed the monetary policy. Consequently, the economic instability was aggravated and the economy was more prone to the boom/bust cycle.

The paper provides another evidence against using fiscal policy to stabilize the output fluctuations. In addition, it highlights the fact that without achieving a fiscal consolidation, the *de jure* independence of any central bank is most likely to be jeopardized.

APPENDIX

Table 8

Composition of Total Expenditure

Period	Wages	Subsidies*	Interest Payments	Others
1980/81	13.8	15	4.4	66.9
1981/82	13.7	20.1	3.5	62.7
1982/83	13.1	12.2	5.3	69.5
1983/84	15.1	11.4	6.4	67.1
1984/85	15.9	10.1	6.3	67.6
1985/86	14.2	12	6.3	67.5
1986/87	15	6.7	7.5	70.7
1987/88	13.7	9.5	6.9	69.9
1988/89	15.6	7.7	9	67.6
1989/90	17.7	5.7	10.7	65.9
1990/91	15.3	7.1	12.4	65.2
1991/92	12.8	6.8	13.2	67.1
1992/93	14.4	5.9	19.1	60.6
1993/94	13.8	4	18.4	63.7
1994/95	16.6	4.8	17.8	60.7
1995/96	19.3	5.8	18.8	56.1
1996/97	20.7	5.1	18	56.1
1997/98	21.7	4.9	15.2	58.1
1998/99	22.3	4.5	16.2	57
1999/00	22.4	4.5	16.6	56.5
2000/01	23.5	4.1	13.9	58.4
2002 Jan	22.7	4.4	16.1	56.8
2003 Feb	22.6	4.6	17.2	55.5
2004 Mar	22.6	6.3	18.5	52.6
2005 Apr	23.1	7.7	18.2	51.1

* Implicit subsidies are not included. The implicit subsidies (fuel subsidies) have been explicitly considered in the budget since 2005/06; they accounted for more than 60 per cent of total subsidies in this year.

Table 9

The Inputs of the Structural Model

Period	Δ Overall Deficit	Reserve Money Growth	GDP Growth
1981/82	11.92	41.65	9.45
1982/83	–6.19	9.77	7.14
1983/84	0.31	2.46	5.91
1984/85	0.12	8.69	6.39
1985/86	4.59	4.05	2.61
1986/87	–7.91	–18.51	2.49
1987/88	5.79	–11.97	5.17
1988/89	–7.6	–8.41	4.85
1989/90	–4.63	–4.2	5.55
1990/91	–2.55	13.4	1.07
1991/92	1.49	–9.49	4.34
1992/93	–3.4	8.45	2.84
1993/94	2.03	1.14	3.87
1994/95	0.03	6.02	4.56
1995/96	–1.1	0.29	4.89
1996/97	0.69	2.02	5.35
1997/98	–1.85	2.82	6.06
1998/99	1.17	11.75	5.92
1999/00	0.4	0.83	5.26
2000/01	1.42	18.98	3.44
2002 Jan	2.45	10.18	3.15
2003 Feb	0.52	19.59	3.05
2004 Mar	–1.07	1.93	4.11
2005 Apr	0	3.96	4.44

Table10

Variance Decompositions

Step	Standard Error	GDP Growth	Overall Deficit Change	Reserve Money Growth
Decomposition of Variance for GDP Growth				
1	0.54	74.87	25.13	0
2	0.56	71.01	28.54	0.45
3	0.56	70.26	28.86	0.88
4	0.56	69.93	29.14	0.94
5	0.56	69.82	29.21	0.97
6	0.56	69.79	29.23	0.98
7	0.56	69.78	29.24	0.98
8	0.56	69.77	29.24	0.98
9	0.56	69.77	29.25	0.98
10	0.56	69.77	29.25	0.98
Decomposition of Variance for Overall Deficit Change				
1	2.54	0	100	0
2	2.91	0.16	92.84	7.01
3	3.04	0.18	92.03	7.79
4	3.08	0.18	91.65	8.17
5	3.1	0.18	91.55	8.27
6	3.1	0.18	91.51	8.31
7	3.1	0.18	91.5	8.32
8	3.1	0.18	91.5	8.32
9	3.1	0.18	91.49	8.32
10	3.1	0.18	91.49	8.32
Decomposition of Variance for Reserve Money Growth				
1	7.38	0	17	83
2	7.55	2.35	16.51	81.13
3	7.58	2.37	17.22	80.41
4	7.59	2.37	17.29	80.34
5	7.59	2.37	17.34	80.3
6	7.59	2.37	17.35	80.28
7	7.59	2.37	17.35	80.28
8	7.59	2.37	17.35	80.28
9	7.59	2.37	17.35	80.28
10	7.59	2.37	17.35	80.28

Figure 4

Overall Deficit, Primary Deficit, Expenditure and Revenue
(percent of GDP)

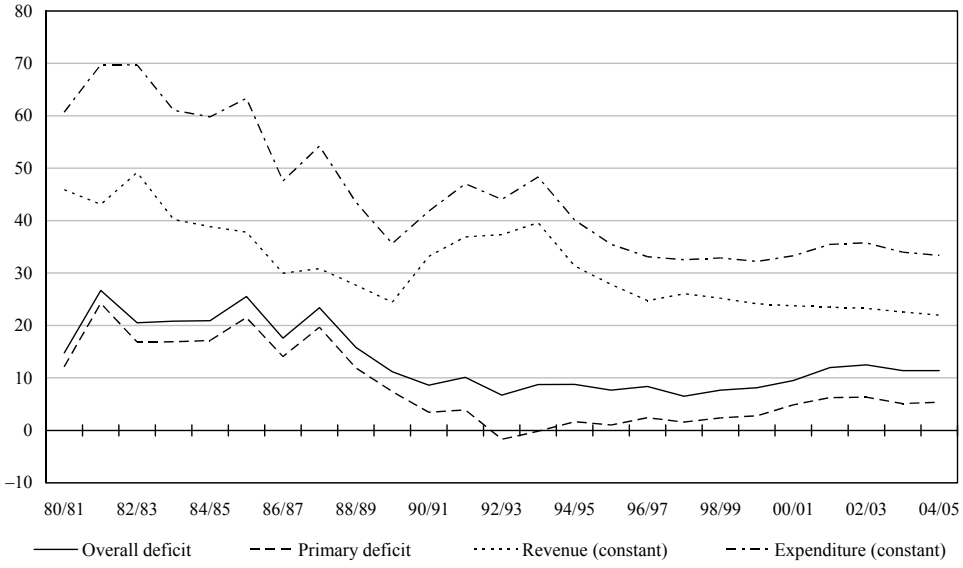
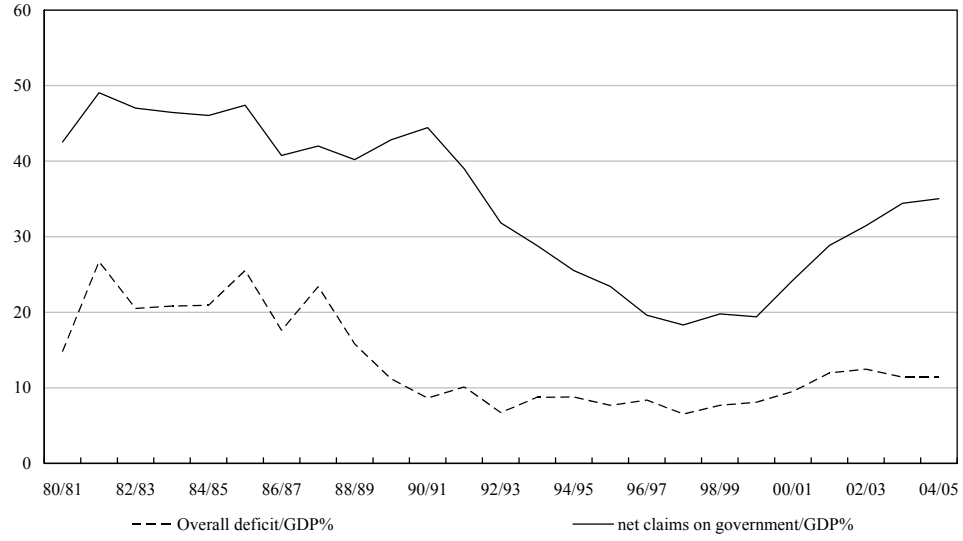


Figure 5

Overall Deficit vs. Government Domestic Credit
(percent of GDP)



REFERENCES

Fatás, A. and I. Mihov (2003), "The Case for Restricting Fiscal Policy Discretion", *Quarterly Journal of Economics*, Vol. CXVIII, pp. 1419-48.

Gavin, M. and R. Perotti (1997), "Fiscal Policy in Latin America", in B. Bernanke and J.J. Rotemberg (eds.), *NBER Macroeconomic Annual*, University of Chicago Press, Chicago.

Johansen, S. (1991), "Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models", *Econometrica*, No. 159, pp. 1551-80.

Masson, P.R., M.A. Savastano and S. Sharma (1997), "The Scope for Inflation Targeting in Developing Countries", International Monetary Fund, Working Paper, No. WP/97/130.

Panizza, U. (2001), "Macroeconomic Policies in Egypt: An Interpretation of the Past and Options for the Future", ECES, Working Paper, No. 61.

Perotti, R. (2002), "Estimating the Effects of Fiscal Policy in OECD Countries", European Network of Economic Policy Research Institutes, Working Paper, No. 15.

Sims, C. (1980), Macroeconomics and Reality, *Econometrica*, No. 48, pp. 1-49.