

THE ROLE OF PERSONAL INCOME TAX REFORMS IN THE TRANSITION TO A DEMOCRATIC AND EGALITARIAN EGYPT

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Abstract

The efficacy of the 2005-Personal Income Tax (PIT) reform in enhancing the macroeconomic performance in Egypt is tested using a structural vector autoregressive model. The results reveal that PIT reforms have successfully generated jobs and accelerated GDP growth. The reforms may cause mild inflation in the short-run, but their long-term effects are non-inflationary. This is the first effort to assess the PIT reforms in Egypt, with the aim of helping the new government to assess preceding policies and pursue the successful ones. The research is also an important lesson for the leaders of emerging economies encountering similar circumstances to enact reforms and to perpetuate economic growth and sociopolitical stability.

Keywords: Egypt, Personal Income Tax Reforms, Fiscal Policy, SVAR Model

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1. Introduction

As the incessant uprisings of Egyptians kept amplifying since the turn of the millennium, the *ancien régime* passed a number of reforms that were apparently belated. Unable to quell the public's rage, Mubarak's tyrannical government found no alternative but to censure all sorts of criticism and shut down the vocal rioters. But the true disgrace of the ousted regime is the conversion of the heart of the Arab World into a police state whose prime aim was to protect the regime. Its true disgrace is not forging elections and killing protestors to ensure the transition of Mubarak's son to power in a middle-age caliph-like fashion. Its true disgrace is not the high level of corruption and cronyism that had blemished and infiltrated all facets of the Egyptian political and bureaucratic architecture. Indeed, the true disgrace of the toppled regime is its oblivion to the ordeal of the tens of thousands of street children and child labourers who plague the streets of the intellectual hub of the Middle East. The true disgrace of the ousted autocratic regime is the deprivation of 40 percent of the population of basic food, housing and health necessities at a time when the economy was flourishing and growing at an annual rate of 7 percent. The true disgrace of the egotistical dictatorial regime is the illiteracy of 35 percent of the

inhabitants of the homeland of the most advanced ancient civilisation (Breisinger *et al.*, 2011). The Egyptian Revolution was inevitable.

But Mubarak's foreign policy has also been an important trigger of the popular revolution. He and his cabal were adept and dexterous in conjuring up images of a militant Islam and spuriously used this claim to sustain, justify and perpetuate themselves in power. Mubarak sanctimoniously won for himself the epithet of "guarantor of peace" in the Middle East and a bulwark against Iranian ascendancy and Islamist supremacy in the Region. Consequently, foreign investments and massive financial aid from his Western backers were squandered to bankroll the regime and its cronies instead of being poured into beneficial development projects.

In reaction to these convoluted and mortifying conditions, a religious façade has developed in Egypt. As more Egyptians found Islam the only safe haven, the meaning of Islam was gradually effaced by extremism and superficial physical appearances. The state's contravention of the social contract and its delegation of the social welfare tasks to the civil society, made it easy for the endowed and well-resourced Muslim Brotherhood to garner support among the vast majority of the urban and rural poor (Wright, 2008). Thus, community-based politics exercised by the long-suppressed and well-

established Muslim Brotherhood and faith-based politics by the newly-founded Salafis won Islamists a 72 per cent majority vote in the 2012 parliamentary elections (Khorshid, 2012).

The results of the elections came as a complete shock and disappointment to the young middle-class revolutionaries, activists and intellectuals who impressed the entire world with their ability to convert Tahrir Square into a victorious carnival of liberty and freedom. But being hailed by the Egyptians as the true conscience of the Revolution, the secular activists are already transforming themselves from anarchic and leaderless individuals to organized political groups and future election-fighting machines. The second watchdogs over the Islamists during the fraught and bumpy transition stage are the 85 civil society groups and the 150 trade unions that were founded since the eruption of the Revolution. Even more optimistically, the Muslim Brotherhood is endeavouring to form alliances with some minority secular political parties as a means of gaining the trust of a wide range of seculars and Christians. Hence, a new all-embracing social contract is already in the making.

The first item on the agenda of the elected leaders is to tackle the most pressing issues of child labour, illiteracy, food security, housing and staggering unemployment. Otherwise, the mushrooming Egyptian population will find no alternative but to take its grievances to the streets. The incessant uprisings, the slow process of transition and the slowdown in private investment have cost Egypt more than 60 percent of its foreign reserves, slowed down GDP to 0.2 percent, increased public debt to 76.2 percent of GDP and raised unemployment to 11.8 percent in 2011 (CBE, 2012). The new government is in a dilemma trying to simultaneously meet the accumulated legitimate human development demands whilst reducing the fiscal budget deficit from the current level of 11 percent to the previous levels of 7-8 percent of GDP.

There are two approaches to solve such a predicament. The short-term solution is the issuance of domestic debt, which could encourage an artificial perception of wealth and thus bolster consumer spending. However, if taken to the extreme, this comes at the cost of a fiscal crunch in the long-run. The other solution is a well-designed tax-subsidy system to act as an immediate tool of income redistribution as well as an instrument of boosting GDP growth and creating jobs. In fact, the previous government took the second approach, albeit a bit too late. Tackling fiscal reforms in a timely way can surely reduce their potential cost. More important than introducing new policies and totally disbanding those of preceding regimes, is the need to pursue policies that had previously proved successful (Breisinger et al., 2011).

While indirect taxes aim to rein in fiscal deficit, direct taxes are basically concerned with balanced

investment and consumer expenditure levels. But whenever the concept of equality is discussed, attention usually turns to personal income tax (PIT) rates. PIT reforms need to address the issues of enhancing equality and creating a buoyant economy. Most certainly, creating a virtuous cycle by enhancing tax revenues and lowering the fiscal deficit as well as establishing equality are the prime requests of the Egyptian populace. Hence, the new government and the majority Islamist parties should carefully assess preceding policies, to press ahead with the previously successful reforms and to immediately discontinue and reverse the destructive ones that do not meet the aspirations and norms of Egyptians.

As such, our aim in this paper is to study the efficacy of the PIT Reform that was enacted by the previous government in enhancing macroeconomic performance. The rest of the paper is organized as follows. Section 2 details the personal income tax reform in Egypt. Then, the structural vector autoregressive (SVAR) model is constructed in Section 3. The study extends from 1997:01 till 2010:04, which is the period during which Egypt was exposed to contagion effects from the Asian Financial Crisis and the Triple-F – food, finance and fuel – Crisis. Section 4 evaluates the impact of tax reform shocks on inflation, employment and output. Section 5 concludes with policy implications.

2. Personal Income Tax Reforms and Fiscal Illusion in Revolutionary Contexts

The conviction that people's purchasing power would improve if taxes were cut is no longer asserted as an article of faith. Empirical studies show that high-tax countries have been more successful in achieving their social objectives than low-tax countries (Brooks and Hwong, 2006). Contrary to popular belief, social polarization is lower in high-tax nations, probably due to the fact that taxes remain the main source of public revenue needed to for fiscal discipline and for the provision of vital public goods and services (Perry, 2007). Higher taxes are also necessary for sustainable human development, macroeconomic growth and stability, and higher purchasing power (Debrun et al., 2007). In order to effectively pursue the economic and social agendas of any nation, a number of requisites are essential for enacting an efficient and equitable tax system. Firstly and most importantly, especially for nations grappling with a transformation from totalitarianism and corruption towards an all-inclusive and egalitarian political system, the tax system needs to be equitable (Tanzi and Zee, 2001). In other words, the marginal and average tax levels should not be exceedingly high in order not to lead to unemployment and poverty traps (Azariadis and Stachurski, 2005). Equally important, the tax system must be broad-based to give the fiscal authorities enough flexibility to reduce the incidence

and severity of economic and financial crises (Auerbach, 1996). Thirdly, the tax system must be designed in a manner to make taxes easily monitored and enforceable at a minimal cost (Ardagna, 2004).

But as much as the literature agrees on the factors imperative for tax efficiency, there are heated disputes on tax levels and structure. On the one hand, proponents of the tax-spend hypothesis believe that the government will spend whatever revenue is made available (Friedman, 1978). Hence, this school strongly recommends tax cuts during inflationary pressures (Mack et al., 1943). On the other hand, Amilcare Puviani (1903), the precursor of fiscal illusion, stipulates that tax levels are not as important as enhancing government efficiency. Fiscal illusionists advocate prudence at all times (Niskanen, 2006). In other words, taxes should be increased specifically during fiscal deficit episodes as a means of alerting the public of the high government costs and pressurizing the government for more prudence (Young, 2009). These costs emanate from the "dynamic common-pool problem", whereby the decentralized process of deciding on the level of public spending by different members of coalition parties and the executive system often leads to exaggerated and excessive spending (Persson, 2001).

2.1 Personal income tax and fiscal illusion in Emerging Market Economies

But fiscal inefficacy is primarily the product of political delusion and tax opacity (Mauro, 2007). The fact that government programs are in many cases unrecognized by the electorate, while the taxes to support government spending are directly experienced and understood, is another major source of fiscal illusion (Downs, 1960). Especially in fiscally decentralized systems, suffering from low levels of intergovernmental coordination, taxpayers are unconscious of the high costs of government programs (Weingast, 1995). The risk with such multiple layers of governments exhausting the same tax base is that the fierce competition could lead to either costly public programmes or an under-provision of public goods and services (Allsopp and Vines, 2005).

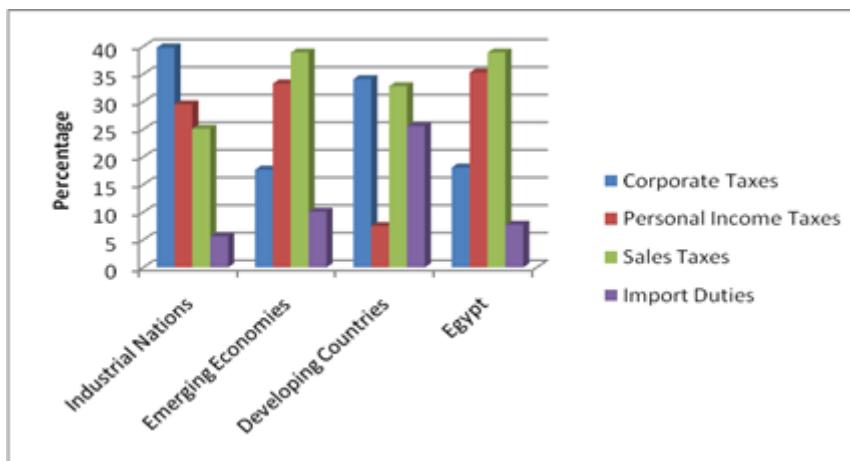
But in emerging economies problems are more multifaceted. The first and most intrinsic problem facing emerging and developing nations is the narrow tax base, when the need is to expand the tax revenue targets beyond projected economic growth (Galal and Haque, 2006). The highly centralised revenue-raising tax authorities and the greater decentralisation of expenditure to regional and/or sub-national governments create a vertical fiscal imbalance (Gelb et al., 2007). The reliance of national and municipal governments on debt and government grants has

clouded the full costs of public spending to taxpayers (Ajam, 2007). In such decentralized systems the only way to achieve fiscal consolidation is to adopt a strict no-bail-out approach to help curb waste and control provincial spending (Bird and Ebel, 2007). Some other intangible sources of fiscal illusion in many emerging market economies are the inefficiency, capacity constraints and poor quality of public service delivery that raise the cost of government programs (Ponzano, 2007). In many instances, the scarcity of fiscal resources are apt to pass on the costs of national policies to local governments, leading to an increase in other taxes – the most perceptible threat of the state's unsustainable fiscal path (ACOSS, 2009). This implies that budget preparation and execution must be constrained, except that under undemocratic systems, political corruption gives birth to a weak legislative system that does not properly exercise its supervisory and lawmaking roles (Wyplosz, 2011).

Even more significant elements of the tax system in emerging economies are largely hidden and under-perceived by the public due to the opaque and multi-layered fiscal budgets (Thornton and Adedeji, 2010). The serious impact of this murkiness is low tax compliance by the distrustful taxpayers (Mirrlees, 1994). In response to high tax evasion and low direct tax revenue, governments might find no alternative but to issue government bonds (Barro, 1974) or to raise taxes (Majsterek and Welfe, 2012). In the absence of adequate producer incentives, higher corporate taxes would negatively impact private investment causing a slowdown in the economy (d'Andria, 2011).

PIT and sales taxes have a highly tangible negative impact on the purchasing power of individuals, but it is generally argued that producer incentives have a longer term effect on the economy through job creation and GDP growth in emerging markets that possess immense resources and huge markets (Brooks and Hwong, 2006). Figure 1 reveals that this is specifically true for emerging economies like Egypt, where most tax proceeds are imposed on individual households. But these governments should be prepared for periods of initial hostility (Jha, 2007), which might develop into sociopolitical tensions if the electorate does not feel an immediate upgrading of public services (Buchanan and Musgrave, 1999). In other words, emerging economies are exposed to their own version of fiscal illusion due to the unawareness of the public of the expected long-term benefits accruing from tax reform since the prime concern of the population is the immediate impact (Blanchard and Perotti, 2002). The rest of the paper tries to unveil the obscurity by assessing the efficacy of PIT reforms in Egypt.

Figure 1. Comparison of tax revenue in 2010



Source: World Bank Database

2.2 PIT Administrative Reforms in Egypt

The very first strikes that erupted at the dawn of the 2005-Presidential and Parliamentary Elections were emblematic of a series of incessant protests. To ensure the peaceful transition of Mubark's son, people's anger had to be quelled. The Egyptian Ministry of Finance took belated steps to improve income distribution and raise living standards by amending the Income Tax Law in 2005. As shown in Table 1, 40 percent of Egyptians who lie below the national poverty line – equivalent to EGP Pounds 5,000 or USD 850 per annum – are totally exempted of income tax. At the other extreme, the new law ensured that the richest 2,000 Egyptian taxpayers –

earning more than EGP 10 million per annum – are to contribute 70 percent of the total PIT bill. Appendix 1 details the reform efforts, whereby the main philosophy behind the Egyptian reforms is to make the higher income groups bear most of the burden and to re-channel tax revenue to low-income individuals through subsidies and more expenditure on public utilities. Moreover, the reformed tax policy provided relief to compensate for inflation. This was especially important at the outbreak of the Triple-F Crisis – Food, Fuel and Finance – since Egyptians were galvanized around the potent issues of skyrocketing prices, escalating youth unemployment, appalling levels of crony capitalism and excessive inequality.

Table 1. Personal Income Tax

Income Bracket	Percentage of Personal Income
< EGP 5,000*	Tax exemption
EGP 5,000 - EGP 20,000	10%
EGP 20,000 - EGP 40,000	15%
EGP 40,000 - EGP 10 million	20%
> EGP 10 million	25%

* The threshold of tax exemption was raised in June 2011 to EGP 5,000 from EGP 4,000 to account for inflation.

Source: Egyptian Ministry of Finance (2011), *The Financial Monthly*, MoF, Cairo, December.

In order to achieve these goals, tax revenue needed to be enhanced. But this was challenging for a nation that has 8.2 million people or 37 percent of the

labour force employed in the informal sector, making tax evasion the norm in the country (Ramalho, 2007).

Table 2. Sources of Financing Public Debt

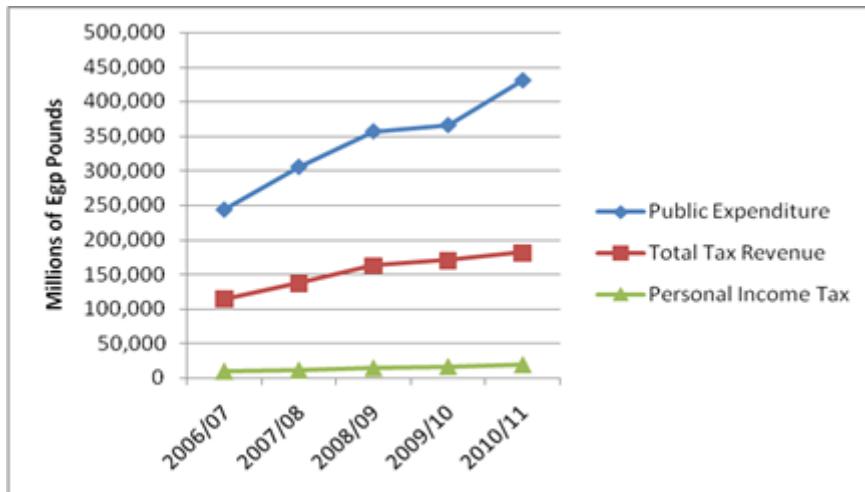
	2009/10	2010/11	2011/12(Forecast)
Tax Revenue	EGP 170.5 billion (14.1% of GDP)	EGP 199.8 billion (14.5% of GDP)	EGP 232.2 billion (14.8% of GDP)
Grants	EGP 4.3 billion (0.4% of GDP)	EGP 5 billion (0.4% of GDP)	EGP 10 billion (0.6% of GDP)
Borrowings	EGP 93.3 billion (7.7% of GDP)	EGP 89.8 billion (6.5% of GDP)	EGP 107.4 billion (6.8% of GDP)
Total	EGP 93.3 billion (22.2% of GDP)	EGP 89.8 billion (21.4% of GDP)	EGP 349.6 billion (22.3% of GDP)

Source: Egyptian Ministry of Finance (2011), *Economic Monitor*, MoF, Cairo.

As the economic slowdown failed to raise public revenue at the same pace of expenditure, the government relied on raising the tobacco tax by 40 percent on July 1, 2010. The real estate tax was reformed in 2008 with the aim of increasing public

revenue by EGP 2 billion per annum, mostly contributed by upper income groups. The more equitable income distribution in Egypt was achieved through the over-reliance on public debt (IMF, 2005) as detailed by Figure 2 and Table 2.

Figure 2. Public Expenditure and Revenue in Egypt (2006-2011)



Source: Central Bank of Egypt (2012), *Monthly Statistical Bulletin – December 2011*, CBE, Cairo.

Yet, the road to broad-based and inclusive economic development is not only contingent on public policy and state action, but also on responsible citizenship. Therefore, a compliance model was an integral ingredient of the tax reform that drove service delivery and efficiency in the quest for cost efficiency. The Egyptian Tax Authority able to achieve this by enhancing enforcement, improving communication initiatives to broaden the tax base, and entrenching values in taxpayers (Egyptian Ministry of Finance, 2010). Furthermore, a system of internal control has successfully provided cost-effective assurance that resources are efficiently managed.

3. The Empirical Model

The general norm has been to habitually use simultaneous-equation structural models for

economy-wide forecasting. Since the Vector Autoregressive (VAR) model can be envisioned as an estimate of reduced-form structural models, it has been excessively used for both forecasting and policy evaluation purposes. In response to the criticisms of the inability of the VAR model to show how responsive agents' behaviour is to anticipated policy rules, Ingram and Whiteman (1994) developed the Bayesian Vector Autoregressive (BVAR) model. In order to account for the contemporaneous impact of variables on others, Blanchard and Perotti (2002) use Structural Vector Autoregressive (SVAR) techniques to estimate fiscal multipliers on the tax and on the spending side of the government. Their results reveal that the VAR model is more suited to study fiscal rather than monetary policy since there is little or no discretionary response of fiscal policy to unexpected movements in activity within the quarterly periods. Thus, with enough information about the tax and

transfer systems and the timing of tax collections, one can obtain estimates of fiscal policy shocks. Having identified these shocks, one can then trace their dynamic effects on macroeconomic data. Badinger (2006) enhances the previous methodology by estimating autoregressive conditional heteroskedasticity models for output growth and inflation with the fiscal shocks to show evidence of a destabilizing role of discretionary fiscal policy. The model that has been widely used to simulate policies is the dynamic stochastic general equilibrium (DSGE) model. Majcen *et al.* (2009) link the DSGE model to a micro-simulation BVAR model for Slovenia, and the results of the study reveal that a flat tax rate will not help in adequately attaining economic and human development.

The VAR model has also been successfully employed for the purpose of applying simulated policy and macroeconomic shocks to real-time data. Márquez *et al.* (2010) demonstrate the spillover effects of fiscal spending on the entire economy and its efficacy in bridging regional gaps. The vector autoregressive model is not only efficient in forecasting the effect of future policies, but it has been put to further use for assessing fiscal reforms. Alesina *et al.* (2002) empirically reveal that increases in government spending fail to enhance consumption and that tax cuts are the most effective way to stimulate the economy. Romer and Romer (2007) challenge this assertion and prove that consumption declines if government spending is financed through tax increases. Again, using the SVAR model, Mertens and Ravn (2010) clarify that the very fact that consumers anticipate the fiscal agent's behavior renders fiscal policy ineffectual in boosting economic growth.

As much as the literature is generous in using econometric modeling to examine the macroeconomic effects of tax reforms, the Egyptian case has been sparsely broached. Using Ordinary Least Squares and regression analysis, Alba *et al.* (2004) conclude that the relatively high debt-output ratio in Egypt inhibits long-term growth. Kia and Gardner (2009) as well as Buiter (2004) prove that the fiscal budgeting process in Egypt is not sustainable due to its feeble tax base. In a country

report by the International Monetary Fund (2005), the VAR model proved effectual in measuring the pass-through of interest rates to inflation. Thus, this paper fills an apparent literature gap since the macroeconomic impact of the recently enacted personal income tax reforms has not been studied yet.

3.1 The SVAR Model

We utilize the structural autoregressive model to examine how tax revenue affects the levels of employment, inflation and GDP growth. The study extends over 1997:01-2010:04 in order to cover the periods of the economic distresses of the 1997 Asian Crisis, the global financial crisis, and the tax reforms. Given the high seasonal variation in employment, consumption, investment and growth in Egypt, we seasonally adjust the data. Seasonal data is used since fiscal policy in Egypt is highly pro-cyclical and is found to be highly expansionary during periods of low tourism receipts and expatriates' remittances (Ben Slimane and Tahar, 2010). Then it is indexed to the price level of the year 2000, which is a relatively stable year for the Egyptian economy. Due to the high seasonal variation in our time series, it becomes challenging to pinpoint turns in economic trends. Hence, we use the Tramo/Seats function from EVIEWS since it is capable of observing outliers before the time series returns to its starting level.

The specification of the SVAR model includes seven variables. Appendix 2 details the descriptive statistics for the model. The following is the reduced form VAR, where all variables are in logs except for inflation and the interest rate.

$$X_t = \mu_0 + \mu_1 t + B(L)X_{t-1} + U_t \quad (1)$$

X_t is the vector of variables, μ_0 is a constant, $B(L)$ is an autoregressive lag polynomial, and U_t is the corresponding vector of reduced form residuals, with non-zero cross correlations. After performing the Augmented Dickey-Fuller test, all the variables were found to be integrated of order one as shown in Table 3.

Table 3. Stationary Variables

PIT					
ADF Test – 4 difference lags			ADF Test – 3 difference lags		
-3,31101	-4,3382*		-3,4911	-3,6413*	I (1)*
	-3,8123**			-2,9752**	
	-3,3184***			-1,9987***	
NIT					
ADF Test – 4 difference lags			ADF Test – 3 difference lags		
-3,96181	-4,4482*		-3, 9101	-3,1194*	I (1)*
	-4,1189**			-2,9985**	
	-3,9144***			-2,9007***	

G

ADF Test – 4 difference lags

3,8415	-3,1936*
	-2,8837**
	-2,5549***

ADF Test – 0 difference lags

3,2739	-2,7189*
	-1,9985**
	-1,8892***

I (1)*

*,**,*** 1,5, 10% critical values respectively

$$AU_t = BV_t \quad (2)$$

The efficacy of the tax reform can be executed through estimating the structural personal income tax shocks v_t^{pit} , the structural shock imposed by all other taxes v_t^{nit} , and government spending shocks v_t^g . Then

$$u_t^{pit} = \alpha_y^{pit} u_t^y + \alpha_\pi^{pit} u_t^\pi + \alpha_r^{pit} u_t^r + \alpha_e^{pit} u_t^e + \beta_g^{pit} v_t^g + \beta_{nit}^{pit} v_t^{nit} + v_t^{pit} \quad (3)$$

$$u_t^{nit} = \alpha_y^{nit} u_t^y + \alpha_\pi^{nit} u_t^\pi + \alpha_r^{nit} u_t^r + \alpha_e^{nit} u_t^e + \beta_g^{nit} v_t^g + \beta_{pit}^{nit} v_t^{pit} + v_t^{nit} \quad (4)$$

$$u_t^g = \alpha_y^g u_t^y + \alpha_\pi^g u_t^\pi + \alpha_r^g u_t^r + \alpha_e^g u_t^e + \beta_{pit}^g v_t^{pit} + \beta_{nit}^g v_t^{nit} + v_t^g \quad (5)$$

The identification of the model is achieved *à la* Blanchard and Perotti (2002) where decision and implementation lags in fiscal policy are assumed to consume more than one quarter. Moreover, previous studies using a higher lag order did not reap different results (Mountford and Uhlig, 2005). The following identifies the relationship between the reduced-form residuals U_t and the structural shocks V_t .

$$u_{t(CA)}^{pit} \equiv u_t^{pit} - (\alpha_y^{pit} u_t^y + \alpha_\pi^{pit} u_t^\pi + \alpha_r^{pit} u_t^r + \alpha_e^{pit} u_t^e) \equiv \beta_g^{pit} v_t^g + \beta_{nit}^{pit} v_t^{nit} + v_t^{pit} \quad (6)$$

$$u_{t(CA)}^{nit} \equiv u_t^{nit} - (\alpha_y^{nit} u_t^y + \alpha_\pi^{nit} u_t^\pi + \alpha_r^{nit} u_t^r + \alpha_e^{nit} u_t^e) \equiv \beta_g^{nit} v_t^g + \beta_{pit}^{nit} v_t^{pit} + v_t^{nit} \quad (7)$$

$$u_{t(CA)}^g \equiv u_t^g - (\alpha_y^g u_t^y + \alpha_\pi^g u_t^\pi + \alpha_r^g u_t^r + \alpha_e^g u_t^e) \equiv \beta_{pit}^g v_t^{pit} + \beta_{nit}^g v_t^{nit} + v_t^g \quad (8)$$

To identify the β -coefficients, the fiscal shocks need to be ordered to study which fiscal variable reacts to the others contemporaneously. Except for the amounts periodically withheld from salaries and wages, and automatically fed into government spending, the Egyptian Tax Authority collects personal income taxes in the first quarter of each year. Hence, it is assumed that PIT chronologically comes first followed by government spending. β_g^{pit} and β_{nit}^{pit} are assumed to be equal to zero, reaping the following equation:

$$u_{t(CA)}^{pit} \equiv v_t^{pit} \quad (9)$$

the responses of the macroeconomic variables to these shocks are studied. Equations (3) through (5) express the reduced-form equations as linear combinations of the structural fiscal shocks.

To estimate structural shocks and to identify the system, the automatic contemporaneous elasticities (α) need to be externally estimated on the basis of institutional information. The cyclically-adjusted reduced form residuals are detailed in Equations (6) to (8) where the contemporaneous, discretionary change in each of the fiscal policy variables in response to changes in the other four macroeconomic variables is zero.

Since government purchases are assumed to be decided before non-income taxes, then $\beta_{nit}^g = 0$.

$$u_{t(CA)}^g \equiv \beta_{pit}^g v_t^{pit} + v_t^g \quad (10)$$

and,

$$u_{t(CA)}^{nit} \equiv \beta_g^{nit} v_t^g + \beta_{pit}^{nit} v_t^{pit} + v_t^{nit} \quad (11)$$

All of the relevant β -coefficients can be estimated by a simple Ordinary Least Square (OLS) regression of (u) on the structural shocks. The coefficients of the equations for macroeconomic variables are recursively estimated by means of instrumental variable regressions. With respect to GDP the following set of equations are employed:

$$u_t^y = \alpha_{pit}^y u_t^{pit} + \alpha_{nit}^y u_t^{nit} + \alpha_g^y u_t^g + v_t^y \quad (12)$$

$$u_t^\pi = \alpha_{pit}^\pi u_t^{pit} + \alpha_{nit}^\pi u_t^{nit} + \alpha_g^\pi u_t^g + v_t^\pi \quad (13)$$

$$u_t^r = \alpha_{pit}^r u_t^{pit} + \alpha_{nit}^r u_t^{nit} + \alpha_g^r u_t^g + v_t^r \quad (14)$$

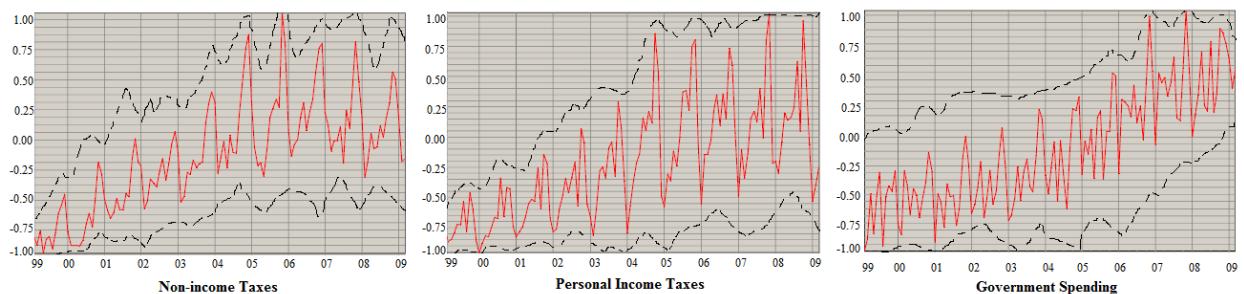
$$u_t^e = \alpha_{pit}^e u_t^{pit} + \alpha_{nit}^e u_t^{nit} + \alpha_g^e u_t^g + v_t^e \quad (15)$$

Then, the estimated series for the fiscal shocks (\hat{v}_t^{pit} , \hat{v}_t^{nit} , \hat{v}_t^g) are used as instruments for the reduced form u_t^{pit} , u_t^{nit} , u_t^g respectively. The same is followed for the other equations.

3.2 Fiscal Policy Shocks

Once the reduced-form of the SVAR and all α and β -coefficients are estimated, the policy shocks are computed. To solve for non-fundamentalness in using the structural moving-average representation of the SVAR, the process by which the variables fluctuate about their time-invariant means is determined by the parameters, the past history of the exogenous variables and the independent and identically distributed (i.i.d.) shocks or innovations (Alessi et al., 2008).

Figure 3. Fiscal Policy Shock Historical Decomposition (percentage values)



Following the methodology of Stock and Watson (2001), error bands are computed by Monte Carlo simulations based on 1000 replications. The results displayed by Figure 3 show that all three shocks are in line with government actions. In general, taxes show an increasing impact in Egypt especially since the reform period of 2005. This is specifically evident for the PIT and the most momentous effect takes place during the last quarter of each year. The government appears to be relentlessly imposing positive expenditure shocks, with the highest increase occurring in the wake of the GFC due to the LE 15.5 billion (USD 3 billion) fiscal stimulus package, whose effects faded away after less than one quarter. This renders the stimulus package highly costly and futile. The maximum impact of government spending occurs during the third quarter of each year, which is the highest period of consumption expenditure due to the start of the school year in Egypt (Egyptian Ministry of Finance,

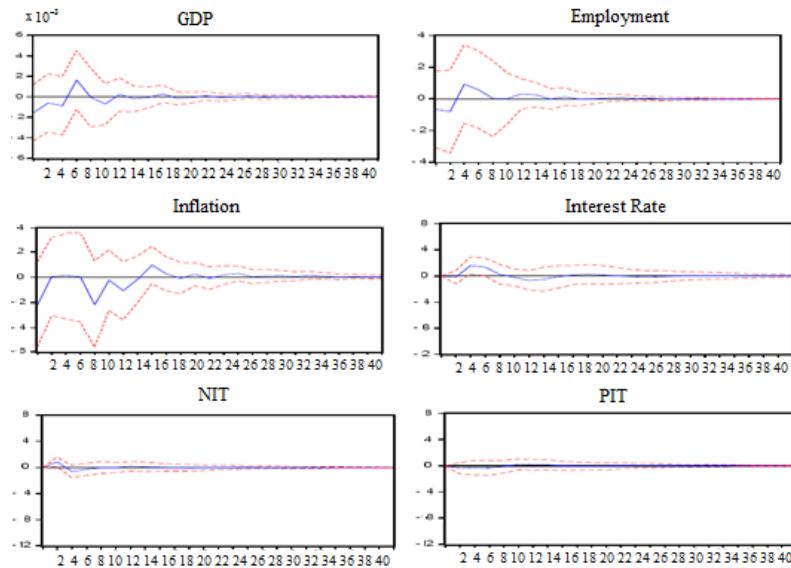
2010). This finding has significant implications for the timing of government expenditure.

4. Results

4.1 Impulse Responses to Government Spending

The effects of a direct government spending shock are examined using a six-variable VAR, comprising: GDP, employment, CPI, interest rates, non-income taxes and personal income taxes. Figures 4 displays the impulse response functions of annual growth rates associated with one standard deviation shocks. The vertical axes measure the percentage deviation of the variable from its long-run value in response to shocks. The horizontal axes measure the number of years along which the adjustment to any shock takes place. The solid line gives point estimates, while the broken lines plot 16th and 84th percentile bands of the posterior distribution of the impulse responses as per Blanchard-Perotti (2002) identification approach.

Figure 4. Impulse Responses to Positive Government Spending Shock



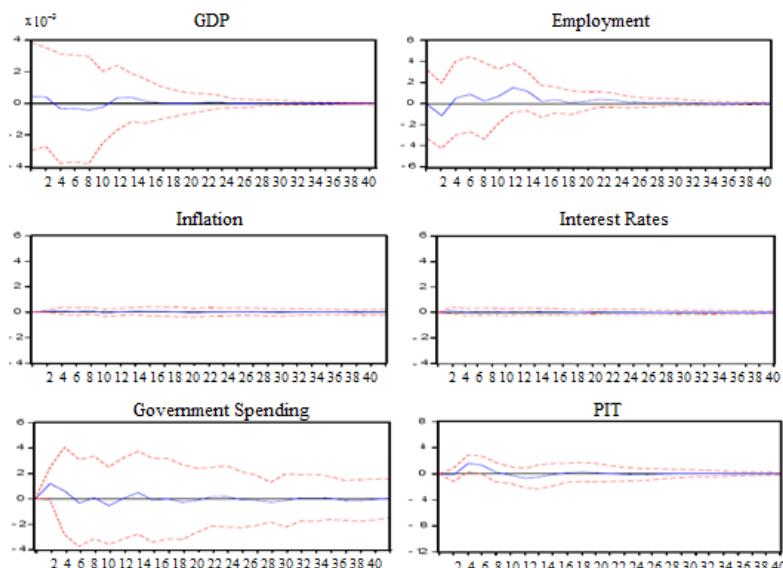
The responses of GDP and job creation to expansionary fiscal expenditure last for only a few months and then gradually fade away. The impact on inflation is more substantial, which should act as a warning signal to the fiscal agents not to excessively rely on this tool especially at times of impending inflation. A small rise in the interest rate is observed, stemming from the inclination of the government to finance its expenditure through borrowing. This finding may motivate more studies to measure the extent of the crowding-out effect. Finally, a very small negative impact is detected for both income and non-income taxes. The overall conclusion is that the effects of fiscal policy are favourable, albeit that they

have to be used with discretion when high inflation persists.

4.2 Impulse Responses to Non-income Tax Cuts

Figure 5 traces out the dynamic effects of non-income tax shocks. The Egyptian government has reduced the threshold for corporate taxes in 2005 as an incentive to boost investment. To increase the overall tax proceeds, the government depended on levying higher property and real estate taxes on the uppermost income groups, whilst exempting poorer individuals whose housing units have market value of less than LE 500,000 (USD85,000) (Egyptian Ministry of Finance, 2010).

Figure 5. Impulse Responses to Non-income Tax Shock

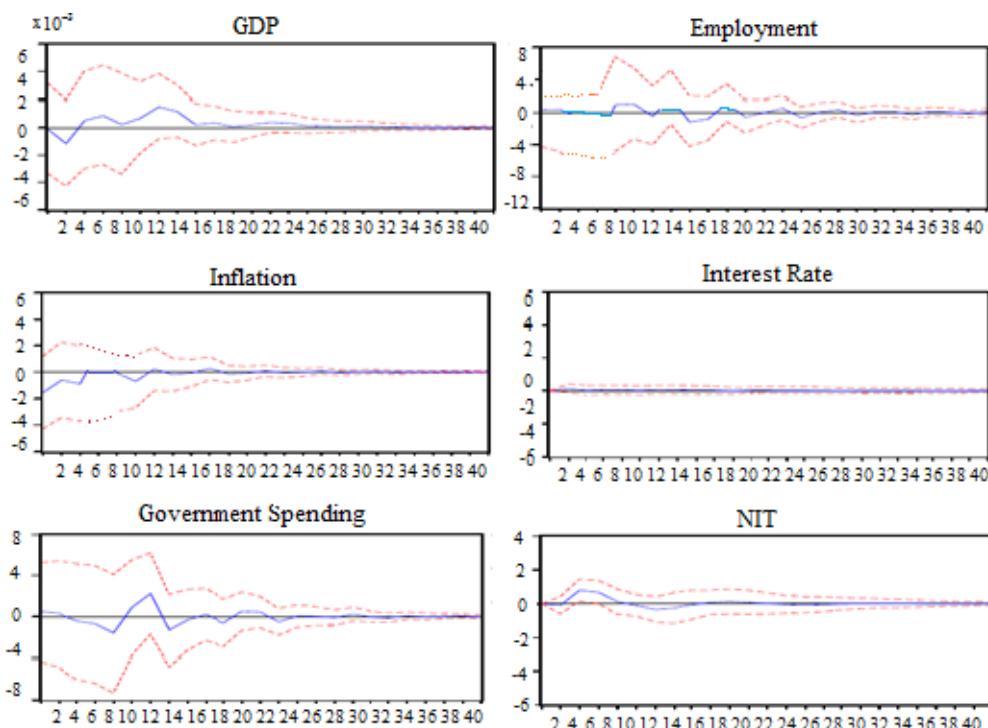


The impulse responses capture well the fact that the effect of this tax decrease is temporary, where GDP is back to normal after two quarters. With regards to employment, the response is rather slow, but lasts considerably long. This is plausibly explained by higher levels of job creation by the private sector in Egypt that benefits from the substantial reduction in corporate taxes from 30 percent to 20 percent. Suffice it to say that the private sector in Egypt contributed more than 75 percent to the GDP growth rate since the turn of the century (Central Bank of Egypt, 2010). The effects on both interest rates and inflation are negligible, which renders this fiscal tool slightly distortive. Finally, it is quite obvious that the expansionary effects of government spending lead to a higher purchasing power and more disposable income, which in turn have a small and positive impact on income tax receipts.

4.3 Impulse Responses to Personal Income Tax Cuts

The impacts of PIT reforms are quite substantial as detailed by Figures 6. After a brief slowdown for two quarters, GDP starts to grow at a rigorous rate in response to the PIT shock, but dies out in three years in Egypt. This may be due to the fact that more taxes are collected from the upper income groups, while 3 million households, making up 18.8 percent of the population are totally exempted from PIT (Egyptian Ministry of Finance, 2010). With the rise in disposable income, consumption expenditure is apt to increase, and is therefore reflected with the slight rise in other tax revenues. Accordingly, a slight inflationary effect is expected, but dies out after 3-4 quarters. An exogenous 1 percent PIT shock raises GDP after 6-8 quarters. This response goes to zero after two years, reflecting the relatively low persistence of the shock with a lag. Minimal effects are recorded for interest rates, other types of taxes and employment.

Figure 6. Impulse Responses to Personal Income Tax Shock

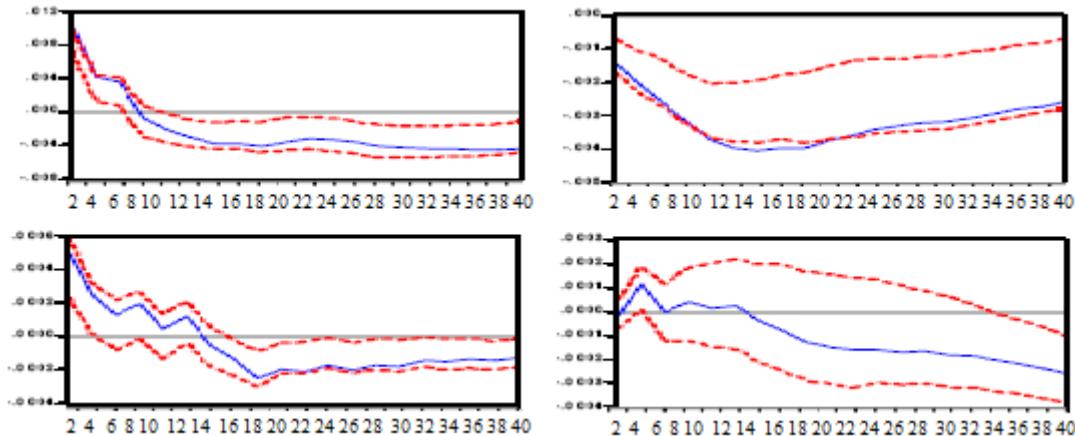


4.4 Robustness Tests

In order to ensure the robustness of results, the exercise is repeated where the three fiscal policy tools

are lumped together. The impulses reported in Figure 7 are quite similar to the benchmark model and well within the 84th and 16th percentile bands.

Figure 7. Impulse Responses to the Three Fiscal Tools



Effects of the three fiscal tools (lumped together) on GDP, employment, inflation and interest rates.

5. Concluding Remarks and Policy Implications

The Egyptian Revolution is the inevitable result of the escalating pervasiveness of socioeconomic and political grievances. The political triggers are largely reflected in the main demands of the protestors to put an immediate end to corruption and to install freedom, social justice and human dignity. On the socio-economic front, the revolution is largely attributed to mounting unemployment, skyrocketing consumer prices, crony capitalism, concentration of wealth and concomitant income inequality. Despite high levels of economic growth in the recent past, living conditions for the average Egyptian remained poor. The rise of powerful business people in the ruling party, government and the People's Assembly increased perceptions of corruption and widened the conceptual rift and the economic gap between social classes.

The corruption that the *ancien régime* had implanted is overly deep-rooted and makes the transition to democracy a most taxing task. Demonic plots by the allies of the previous regime and the deplorable living conditions have left the new government overwhelmed with designing short-term measures for a safe transition to democracy, meeting the immediate needs of the impoverished members of the population, and battling with domestic and foreign debt. The real peril is that the rebels are disillusioned with the motivations of the previous tyrannical regime and are requesting for dismantling all previously enacted policies on the premise that they might have been blemished with the vested interests of those with ties to Mubarak and his cabal. Undoubtedly some of these concerns might be well-motivated, but a word of caution has to be interjected. It is true that the ousted government was habitually used to passing hasty and superficial reforms, but some of the reforms previously enacted were functional and should be pursued. The problem is that instead of promptly addressing social grievances the

delayed responses of the fatigued Mubarak regime, which had divorced itself from public opinion for many years, were unable to dispel people's anger and gloom. Even amidst the Revolution, the belated minor concessions offered by Mubarak fueled the protestors' anger.

Policy Implications

This research shows that the previously enacted extensive tax reform and more efficient tax collection have expanded revenue, reducing the income tax burden on the lower most impoverished population, albeit that the reforms were introduced a bit too late. Fiscal consolidation improved the budget deficit and had created a lower and more sustainable debt burden. Given the rising welfare expenditure needed to cater to the demands of a mushrooming population, the new Egyptian government should pursue this programme that makes the uppermost income groups shoulder the tax burden. A number of policy implications could be extracted from this research.

- The personal income tax shows a delayed reaction equal to two quarters, but the full impact is felt during the fourth quarter of each year. PIT tax reforms are very much translated into higher GDP growth, possibly due to an enhanced level of consumption expenditure. This policy tool may cause mild inflation in the short-run, but the long-term effects are non-inflationary. PITs prove to be an adequate source of government spending, and hence it is the most effective of all three alternatives.
- Non-income tax cuts may lead to higher purchasing power and more disposable income, but they have a small and positive impact on income tax receipts. Perhaps the only expansionary effect of this fiscal tool is the high impact on government spending. This implies that tax proceeds are utilized by the government to finance fiscal expenditure.

- The responses of GDP and job creation to expansionary fiscal expenditure last for only a few months, while the inflationary effect signals that this fiscal policy tool should be used with caution at times of high inflation. Additionally, government spending does not substantially affect tax revenue, which may be explained by the fact that most of the beneficiaries of fiscal spending are the poor who lie within the tax exemption threshold. The results of the impact analysis reveal that the positive impacts of this tool are most profoundly felt in the fourth quarter in Egypt. Hence, it is advisable to use aggressive expansionary fiscal expenditure during the months of April, May and June.
- The effects of the stimulus package are initially well pronounced, but fade away within one quarter, which renders it unduly costly and ineffectual.

In short, timely reforms have to be enacted in order to reduce the burden on the vast majority of the poor and to warrant an equitable income distribution. To ensure an enhanced and successful implementation of these long-term policies, the marginal tax rate needs to be lowered in order to raise the equilibrium employment rate. Thus, once the economy enjoys an upsurge, it will not lead to inflationary pressures. In this case, contractive monetary policy could be avoided so that the economic boom is long-lived.

There is unprecedented potential under any new government that is accountable to its people. But a number of caveats need to be entered. First, much of the debates over tax reforms focus on serving the functions of equity. The choice of the range of activities that are taxed is equally important for both equity and efficiency. It is likewise important to tax fringe benefits, commonly earned by higher income recipients, or else high income earners could end up paying a lower overall rate of tax. Successful reforms also require good communication and a transparent leadership so that the new government is not alienated from its citizens. Broader participation in decision-making and a governance system are the avenues to achieve the societal aspirations of an all-inclusive reform system. Most importantly, in order to ensure that the main demands of the protestors – democracy, freedom and social justice – are consummated, the decision-making machinery should be visionary, evidence-based, transparent, and based on the collaboration between different constituents of the society.

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Appendix 1. Personal Income Tax System in Egypt

Tax Authority	Egyptian Tax Authority
Vision	To raise the rate of sustainable growth to promote employment opportunities, standards of living and quality of life for all Egyptians.
Governance	Annual auditing by the <i>Egyptian General Authority for Auditing</i>
Applicable Law	Income Tax Law No. 187/93 of 1993
Amendments	Income Tax Law No. 91/2005 of 2005
Type of tax	Progressive (4 income brackets)
Tax range	10% - 40% of total income and profit
Coverage	Levied on income & profit received by residents (defined as individuals spending 181 days in Egypt within 12 months) N.B. Egypt exempts capital gains from any sort of taxation
Period of assessment	March 31 - April 1 of every year
Threshold exemption	- US\$730 (LE4000) \geq 31% of GDP per capita - 18.8% of the population is totally relieved of PIT - Total relief \geq LE 15.5b (US\$2.8b)
Auditing taxpayers	A random sample is selected such that a file is inspected every 5 years
Tax Evasion & Noncompliance Penalties	- 10% -100% of tax payment legally due if incorrect information is submitted - 6 months to 5 years prison + 100% of amount legally due
Compliance Incentives	- Voluntary disclosure - Tax deductions in case of advance payments equal to discount rate + 2% - PIT rebates within 45 days after submitting tax statement
Administrative reforms	- Introduction of Compliance model - e-payments - Inquiry call centres - Modernization & introduction of two prototype exemplary tax units - <i>Large Taxpayers Center</i> handles taxes for the 2,000 largest taxpayers - One stop-shop for taxpayers to pay PIT and NIT
Training	- Income Tax Training Institute - Computer Training Center - Mass media campaign to educate taxpayers of self assessment
Governance	- Egyptian Accounting Standards
Strengthening compliance	- Smart tax card for each taxpayer - Training to improve selection of audited cases rather than random selection
Results of reforms	- Increase in number of taxpayers by one million individuals

Source: *Egyptian Ministry of Finance*

Appendix 2. Descriptive Statistics

Variable	Description	Source
y_t	GDP	CAPMAS
π_t	Consumer price index	Central Bank of Egypt
e_t	Level of employment	CAPMAS
r_t	Nominal interest rate	Central Bank of Egypt
g_t	Government expenditure	Ministry of Finance
nit_t	Non-income taxes: Corporate Profits Tax Receipts, Indirect Tax receipts, Social Insurance Contributions, less Net Transfer Payments and subsidies.	
pit_t	Personal income taxes	
α	Coefficients capturing both the automatic elasticity of the 3 fiscal variables (pit , nit , g) to the macroeconomic variables (y , π , r and e) and the unrestricted policy changes in the fiscal variables enacted in response to changes in these macro variables.	
β	Coefficients measuring how the structural shocks to the fiscal variables contemporaneously affect those variables.	
U_t	Vector of reduced-form residuals	
V_b	Vector of structural shocks	