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# On the Cyclical Behavior of Fiscal Policy in Egypt

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## ABSTRACT

Optimal fiscal policy is expected to behave in a countercyclical manner to stabilize economies during business cycles. In particular, the public expenditure-to-GDP ratio should go up during recessions and down during expansions, while the public revenues-to-GDP ratio should move in the opposite direction. As a result, the budget deficit-to-GDP ratio should rise during recessions and decline during expansions. While this behavior of fiscal policy is common in most developed countries, the situation is different in developing nations where, due to several financial and institutional factors, a procyclical policy is more common. Using a time series dataset for the Egyptian economy during the period (1981/1982-2013/2014), this study provides empirical evidence that Egypt has not been able to conduct a countercyclical fiscal policy. In addition, the analysis provided by this study indicates that while several financial and credit factors might contribute to this behavior of fiscal policy in Egypt, the institutional and political economy factors seem to have the dominant role in this regard.

**KEY WORDS:** fiscal policy, cyclical properties, business cycles, output gap, Egypt state's general budget

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## 1. Introduction

It is widely accepted as a normative prescription that fiscal policy should be used to stabilize the economy during business cycles, aiming at keeping the output close to its potential. This implies that optimal fiscal policy ought to be 'countercyclical'. Namely, during a boom, (i) government spending as a share of GDP should go down; (ii) government revenues as a share of GDP should go up; and (iii) as a result, budget deficit (surplus) as a share of GDP should decrease (increase).

The opposite should be true in recession times. Never-

theless, in practice, governments in many developing countries tend to run procyclical, rather than countercyclical, fiscal policies. This suboptimal fiscal policy that might add to macroeconomic instability is usually attributed to two groups of factors, namely, limited access to domestic or external funds and poor institutions associated with widespread corruption.

The main goal of this study is to empirically test the cyclical properties of the main fiscal aggregates in Egypt. While many studies have addressed the cyclical behavior of fiscal policy empirically using panel data techniques applied to different samples of both developing and industrial countries, poor data availability (especially in developing countries) has constrained the ability to use time series datasets to investigate this issue. Accordingly, this study is expected to fill a gap

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in the relevant literature by utilizing time series data for the Egyptian economy during the time period (1981/1982-2013/2014).

The study is organized as follows: section 2 focuses on reviewing theoretical and empirical literature on the cyclical behavior of fiscal policy and its determinants. Section 3 analyzes the stance and composition of Egypt's fiscal policy during the time period from fiscal year 1981/1982 to fiscal year 2013/2014. Section 4 discusses the methodology and findings of the empirical analysis of the study. Finally, section 5 concludes with some relevant policy implications.

## 2. Cyclicity of fiscal policy: Theoretical arguments and empirical evidence

Fiscal policy has always been one of the most important tools for combating business cycles. Given that national income shocks associated with international markets are much more severe in developing countries than in wealthy countries, studying the cyclicity of fiscal policy would have a special relevance for developing countries, which are characterized by relatively high poverty rates, low accessibility to international capital markets, narrow tax bases and weak institutions. Such factors together might lower the capacity of governments in such countries to use fiscal policy countercyclically. Instead, governments in those countries might be forced to spend and tax procyclically in a way that would exacerbate the fluctuations induced by business cycles (Wibbels, 2006). The relatively weak quality of data and their frequency, however, has limited the research on the cyclical behavior of fiscal aggregates in developing countries (Agenor, McDermott, & Prasad, 2000).

In light of the conventional wisdom, most economists agree with the normative Keynesian prescription that optimal fiscal policy is countercyclical, aiming at keeping output close to its potential (Calderón, Duncan, & Schmidt-Hebbel, 2004; Talvi & Végh, 2005). This would require tax rates and discretionary spending to remain constant over the business cycle. As a result, during bad times (recessions), i) government spending as a share of GDP should go up because of automatic stabilizers; ii) government revenues as a share of GDP should go down since tax rates are assumed to remain constant and exhibit some degree of progressivity (the

effects would be reinforced by tax cuts during recessions and tax increases in booms); and iii) as a result, budget surplus as a share of GDP should decrease. The opposite should occur during a boom (Alesina & Tabellini, 2005). This behavior would give the fiscal policy a very important stabilizing role since it would dampen business cycle fluctuations and the excessive cyclical unemployment and inflationary pressure (Alberola, Montero, Braun, & Cordella, 2006; Manasse, 2006).

Even if the Keynesian notion of demand management was rejected, one should not reject the neoclassical notion of tax smoothing, according to which tax policy should be used to smooth expenditure and tax distortions over business cycles, given that shocks to tax bases or spending are temporary (Manasse, 2006). Moreover, according to the *permanent income hypothesis*, the government would set its consumption levels according to long-term income expectations rather than according to the current fluctuating levels, which would minimize the distortions associated with frequent changes in taxation and expenditure (Wibbels, 2006).

A large body of literature has argued that governments in wealthy countries, whatever their motivations, behave in this optimal fashion by borrowing and spending on social programs in bad times and saving in good times to smooth the short-term shocks of the business cycles. The evidence for developing countries, however, is different (Ben Slimane & Ben Tahar, 2009).

Developing countries encounter many problems in seeking to manage their economies. Their increased exposure to international markets makes them more vulnerable to external shocks and exacerbates swings in the business cycle through either trade or finance channels. More specifically, fluctuations in the terms of trade and/or the international price of capital can introduce an additional source of output volatility in developing countries compared to the situation in industrial nations (Wibbels, 2006). As a result, the governments in many – though not all – emerging and developing economies tend to run procyclical fiscal policies, according to which the budget deficit goes up during expansions and down during recessions (Alesina & Tabellini, 2005; Ben Slimane & Ben Tahar, 2009; Calderón et al., 2004). This situation hurts social policy and introduces an additional source of volatil-

ity into the economy, which in turn reduces investment and growth (Alberola et al., 2006).

In fact, income smoothing (through countercyclical fiscal policy) would require either significant borrowing during economic downturns or large surpluses during good times. However, this is usually not the case in the real world. Governments in developing countries might face strong political pressures to increase public spending or decrease tax rates in a way that makes budget surpluses unlikely to exist during good times. At the same time, heavy borrowing during bad times might also be problematic given that developing nations would have limited access to financial markets. Moreover, the automatic stabilizers that explain countercyclical spending in the developed countries are impossible in most developing nations (Wibbels, 2006). Accordingly, the procyclical nature of fiscal policies in developing countries is usually attributed to two broad groups of potential factors, namely, 'financial or credit' factors and 'political economy and institutional' factors (Ben Slimane & Ben Tahar, 2009; Calderón et al., 2004).

According to the financial or credit arguments, procyclical behavior of fiscal policy in developing countries can be explained by the procyclical nature of their capital inflows and the cost of capital. In contrast to OECD countries, developing countries would have limited access to domestic or international financial markets during downturns compared to the access during periods of expansion. Accordingly, many developing countries cannot borrow in bad times, or they can do so only at relatively higher interest rates. As a result, they are forced to cut spending instead of expanding it as might be suggested. In booms, however, governments in developing countries can borrow more easily with relatively lower cost, and thus, they tend to increase public spending and fiscal deficit, as well (Alesina & Tabellini, 2005; Ben Slimane & Ben Tahar, 2009; Wibbels, 2006).

Although such arguments have their own merits in explaining fiscal procyclicality in developing countries, many economists note that they are incomplete and problematic. More specifically, such arguments provide no answers to the following two questions. First, why would a government not self-insure by accumulating reserves in good times to prevent the borrowing (credit) constraints from being binding in bad

times? Second, why would lenders not provide funds to countries in recessions if they know that the borrowing would smooth out the cycle? In addition, the fact that procyclical fiscal policy is also present in some OECD countries that have full access to capital markets suggests that financial or credit factors do not represent the whole story (Alesina & Tabellini, 2005; Talvi & Végh, 2005).

The institutional and political economy factors are concerned with the role of voters in shaping fiscal policy decision making through their demand for a greater level of public spending, especially in good times. This situation might result from weak institutions as represented in the widespread corruption and lack of fiscal transparency (Ben Slimane & Ben Tahar, 2009). According to this view, the ability to run large budget surpluses is severely hampered by political pressures, which are always present but are exacerbated in good times (Alberola et al., 2006; Talvi & Végh, 2005).

One such political pressure can be best represented by the *voracity effect*. This was first introduced by Tornell and Lane (1998) to explain the overspending of transitory increases in fiscal revenues. This effect arises in the presence of various powerful groups involved in the fiscal system working in a weak institutional framework and treating the country's revenues as a common pool<sup>1</sup>. Thus, during good times, when there is a positive shock to the country's resources, each group knows that if it moderates its claims on the increased resources, other groups will appropriate them. This leads fiscal resources to be wasted rather than saved for bad times or even used for debt repayment (Alberola et al., 2006; Alesina & Tabellini, 2005; Ben Slimane & Ben Tahar, 2009; Talvi & Végh, 2005).

Another potential political explanation for the fiscal policy procyclicality can be represented by what is called the *political agency problem*. Alesina and Tabellini (2005) and Alesina, Tabellini, and Campante (2008) argue that in countries with corrupt governments that can appropriate part of tax revenues for unproductive public activities, voters demand higher utility for themselves during booms in the form of lower taxes or higher productive public spending. Given that voters do not trust their governments and do not have complete information about their actions, they demand (through a re-election mechanism) a level of government debt that forces the government to use re-

sources to pay interest rather than to steal them. In this context, Talvi and Végh (2005) argue that procyclical behavior of fiscal policy during good times is mainly derived from tax reductions that the governments in developing countries might be forced to introduce to avoid pressures of the demands for higher public spending. Based on this model, however, procyclical fiscal policy is expected to be less observed in countries where the government is unaccountable to the voters, as in a stable dictatorship, even if corruption is high (Alesina & Tabellini, 2005).

Woo (2009) developed a simple model that links social polarization of preferences to the procyclicality of fiscal policy. According to the author's intuition, a high degree of polarization of preferences may make it hard for heterogeneous policymakers to agree on ideal government policies. Accordingly, policymakers may have greater incentives to insist on their individual preferred policies which might be inefficient for the whole economy. Such incentives may become stronger during good times with the rising government revenues and resources especially when institutional constraints are insufficient or absent. As a result, procyclical fiscal policies would arise.

Applying the previous theoretical arguments of fiscal procyclicality to the Egyptian case, it can be argued that if Egypt could not conduct a countercyclical fiscal policy (a hypothesis that will be tested in the empirical section), both the 'financial/credit' factors and the 'political economy/institutional' factors are expected to have their own significance in this regard.

On one hand, during recession times, the Egyptian economy might be unable to access international capital markets (borrow from abroad) due to its weakened creditworthiness. This limited access to capital markets is expected to hinder the government's ability to respond countercyclically to the recession through increasing its spending. However, if this is the case with the external capital markets, the situation seems different with regard to the domestic capital market, where the Egyptian government has a relatively easy access through the issuance of treasury bills, bonds, and similar financing tools (domestic borrowing). Such tools represent an attractive investment option for both individuals and institutions in Egypt because they are fully guaranteed by the government and at the same time offer relatively higher interest rates. The fact that

Egypt's public debt is approaching 100% of GDP, approximately 90% of which is represented by domestic borrowing, indicates that the 'financial/credit' factors (in the form of the limited access to capital markets and/or the relatively high cost of borrowing) are not expected to act as the main contributor to the non-optimal behavior of fiscal policy in Egypt. However, as long as fiscal sustainability has been taken into consideration by the government (given the recent deterioration in the fiscal stance of the Egyptian economy within the last few years starting from 2011/2012), financial/credit factors might be a significant parameter in the Egyptian fiscal decision making.

During expansion times, on the other hand, there is a strong reason to expect that the Egyptian economy will be unable to accumulate surpluses due to its poor budgetary institutions that govern the whole budget cycle and thus distribute the power among the key relevant players involved in the process. El Husseiny (2016a) has provided theoretical insights on how poor budget institutions in Egypt may contribute to the country's weak fiscal performance.

For example, during the budget 'formulation' phase, the absence of numerical fiscal rules and budget ceilings are expected to reinforce the incentives of the key players to act according to the 'common pool' phenomenon. This means that during a boom, there will always be incentives for the various budget authorities to compete for extracting more resources for projects that might be useful for their own constituencies, neglecting the true social costs that might result from such behavior. Moreover, no group will be willing to reduce its share in the increased resources since it knows that the saved resources will be exploited in one way or another. This behavior is expected to be reinforced by the lack of fiscal transparency that may lead to the 'political agency' problem, according to which people are expected to have incentives to ask for more spending and/or lower tax levels to avoid the waste of public resources in unproductive activities by the corrupt government and politicians.

During the 'approval' and 'implementation' phases of the budget cycle, poor budgetary institutions in Egypt are represented by the absence of a top-down procedure for the approval of the budget by the legislature; the lack of discussion or dissemination of budget documents outside the legislature; the lack of effective

systems for financial controls, internal audit, and external audit; the poor credibility and sustainability of the budget due to the lack of data on expenditure arrears, quasi-fiscal activities, and contingent liabilities; and the lack of public accessibility to external audit reports.

Egypt's weak budgetary institutions as presented above are expected not only to lead to higher levels of public expenditure and budget deficit but also to constrain the government's ability to utilize its fiscal policy effectively in a countercyclical manner.

It can then be argued that although the 'political economy/institutional' arguments seem to be more significant in explaining how Egypt's fiscal decision making has always been taken, 'credit/financial' factors are expected to be much more significant during the current period compared to the situation previously. This is because the current deterioration of Egypt's fiscal stance as measured by the unprecedented ratios of budget deficit and public debt to GDP should limit the government's ability to use its fiscal policy countercyclically in the future. This should be a valid expectation as long as the government values the long-term fiscal sustainability more than the short-term macroeconomic stability.

At the empirical level, many researchers have been interested in improving the comprehension of the abovementioned theoretical arguments through assessing the cyclicity of the main fiscal indicators. Alberola et al. (2006) found strong evidence confirming that fiscal policy is procyclical in a sample of Latin American countries during the time period (1981-2004). In a similar context, Alesina and Tabellini (2005) confirmed the previous evidence on the widespread fiscal procyclicality in developing countries and presented some suggestive evidence that corruption and political agency problem in democracies, rather than credit market imperfections, are what explain fiscal procyclicality. Such findings were supported by Talvi and Végh (2005), who explained fiscal procyclicality behavior in developing countries by a political distortion that makes it costly to run budget surpluses due to the pressures that abundant fiscal resources create to increase public spending. While Sabir and Zahid (2012) provided empirical evidence that poor institutions are the main determinant of fiscal procyclicality in developing countries, Woo (2009) presented strong

econometric evidence in support of the theoretical prediction that social polarization (as measured by inequality in income and education distribution across the population) is robustly and positively associated with procyclicality of fiscal policy in a large sample of countries for the period (1960-2003).

According to Gali and Perotti (2003), while the adoption of the fiscal rules might constrain the ability of policymakers to run discretionary policy, the countercyclical fiscal policy became stronger after the adoption of the Maastricht Treaty and the Stability and Growth Pact by the EU members. This seems to be logical since such fiscal rules ensure that the fiscal decision making will no longer be based on the preferences of the various interest groups and relevant players who are seeking to maximize their own benefit at the expense of the country's fiscal stance. This ensures that fiscal surpluses can be accumulated during good times to finance the expansionary fiscal policy during recessions without the fear of exceeding the official limits of budget deficit and public debt-to-GDP ratios. Moreover, Lane (2003) provided empirical support for political economy factors as determinants of fiscal policy stance in OECD countries.

Aghion, Marinescu, Caballero and Kashyap (2007) found evidence that the budget deficit has become increasingly countercyclical in most OECD countries and that the countercyclical behavior of budgetary policy is positively associated with a higher level of financial development, a lower level of openness, and the adoption of an inflation-targeting regime. Using a sample of emerging and industrial countries for the period (1970-2004), Manasse (2006) found that fiscal rules and fiscal responsibility laws tend to enhance countercyclical policy and that the effects of fiscal institutions on procyclicality are different in good and bad times. Kaminsky, Reinhart, and Végh (2004) recognized that net capital inflows are procyclical in most OECD and developing countries and that fiscal policy is procyclical for the majority of developing countries during the period (1960-2003). Using a panel dataset for eleven emerging countries over the period (1996-2002) and an annual time series sample for Chile covering the period (1991-2003), Calderón et al. (2004) provided empirical support to the hypothesis that countries exhibiting higher policy credibility levels (as reflected in a lower country risk spread on

sovereign debt) are able to conduct countercyclical macroeconomic policies. Lee and Sung (2007) provided empirical evidence that government's recurrent expenditures and subsidies move countercyclically, while capital expenditures move procyclically in a sample of industrial and developing countries. This sounds logical since most of the automatic stabilizers (such as subsidies) are related to the recurrent component of government expenditure, which by nature tends to act countercyclically. In this case, the overall behavior of the government expenditure in response to business cycles is expected to depend on the relative individual responses of the recurrent and the capital components of government expenditure.

Contrasting with the results from most empirical studies on emerging markets and developing economies, Thornton (2007) concluded that public spending and budget deficit in South Africa were countercyclical during the period (1972-2001). Moreover, Jaimovich and Panizza (2007) suggested that there is no statistical difference between the cyclicity of fiscal policy in developing and industrial countries over the period (1970-2003). Ben Slimane and Ben Tahar (2009) found that, while budget balance in the MENA region is countercyclical, both total expenditure and total revenues are procyclical. This study, however, did not provide any justification for the contradiction observed in the behavior of total expenditure and total revenues, which proved to act in a procyclical manner, on one hand, and the behavior of the overall fiscal balance (the difference between total revenues and total expenditures), which proved to act countercyclically, from the other hand. More specifically, the study showed that during expansion times, total expenditure increases, while total revenues decrease. While this should result into a decrease in the overall fiscal balance indicating a procyclical behavior, the study's findings have indicated the opposite.

### 3. Stance and composition of Egypt's fiscal policy (1981/1982-2013/2014)

This section is devoted to analysis of the stance of Egypt's fiscal policy and its composition during the period from fiscal year 1981/1982 to fiscal year 2013/2014. The main objective of such analysis is to provide a deep understanding of the structural features of the fiscal policy in Egypt and to determine whether

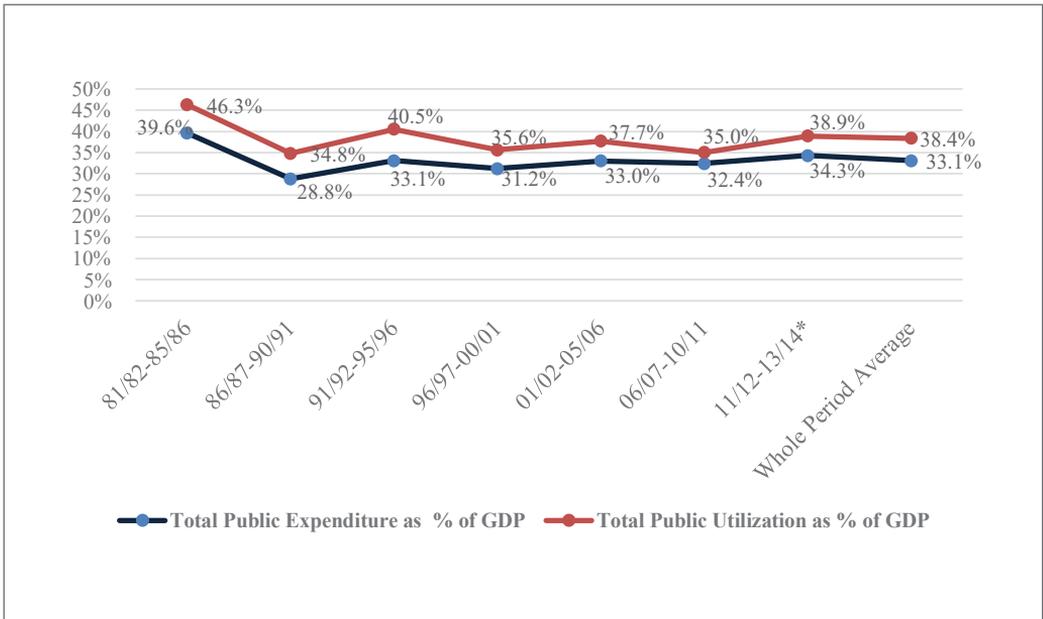
such features would enable or hinder the government's optimal use of the fiscal policy in stabilizing the economy and combating business cycle fluctuations. The analysis of this section covers the three pillars of the fiscal policy, namely, public expenditure, public revenues and taxation, and budget deficit.

It is worth mentioning that the classification of the state's general budget has changed since fiscal year 2005/2006. Starting from this year, the Ministry of Finance adopted the IMF Government Finance Statistics Manual (GFSM) for preparation and presentation of the government's budget. The adoption of the new classification system resulted in different classification of the budget chapters and different concepts of the budget deficit, as well. Accordingly, some amendments were introduced to the fiscal data by the author to ensure consistency over the time series under study (*see* appendix 1).

#### *Public expenditure in Egypt (1981/1982-2013/2014)*

Figure 1 presents data on average ratios of total public expenditure and total public utilization to GDP. Total public expenditure is defined as the sum of the first six chapters on the expenditure side of the state's general budget, namely, wages and salaries; goods and services; interest payments; subsidies, grants and social benefits; other expenditures; and investments. Total public utilization includes total public expenditure in addition to the 7th chapter 'acquisition of financial assets' and the 8th chapter 'loans repayment'. The data show that total public expenditure as a share of GDP reached its maximum, approximately 40% on average, during the time period (1981/1982-1985/1986). This reflects the major role that the government used to play in the Egyptian economy during this period before shifting to a more market-based and private sector-oriented economy with the implementation of the Economic Reform and Structural Adjustment Program (ERSAP) in 1991. As indicated by Figure 1, the ratio of total public utilization to GDP exceeded the ratio of total public expenditure to GDP by approximately five percentage points on average during the whole period of analysis. This approximately reflects the relative share of loans repayment in GDP.

As for the structure of public expenditure, the data in table 1 and figure 2 show that recurrent public ex-



**Figure 1.** Public Expenditure-to-GDP Ratios in Egypt: Five-Year Averages for the Period (1981/1982-2013/2014)  
 Source: Made by the author based on the final accounts of the state’s general budget provided by the Ministry of Finance and data on GDP at market prices provided by the Ministry of Planning.

\*Represents three-year average.

penditure (the first five chapters) constituted almost 85% of total public expenditure, on average, during the whole period of analysis, compared to an average share of 15% for investments. In fact, this pattern is very common in most developing countries, where the recurrent expenditure (mainly dominated by relatively high wages, interest payments and subsidies) constitutes the major part of the budget.

As a share of total public expenditure, figure 2 indicates that the first chapter ‘wages and salaries’ came first, with an average share of 23.8% during the whole period of analysis. The fourth chapter ‘subsidies, grants and social benefits’ and the third chapter ‘interest payments’ accounted for 20.5% and 18.9% , respectively, on average.

The relatively high share of wages and salaries in Egypt’s budget is expected to hinder the fiscal authority from using fiscal policy optimally (countercyclical-ly) in stabilizing the economy during business cycles. Since wages and salaries result from previous hiring decisions, the expenditure on this chapter is not ex-

pected to be reduced in response to positive economic shocks as would be recommended by full tax smoothing theory. The political pressures that exist in Egypt will make it difficult to behave in the optimum way during booms.

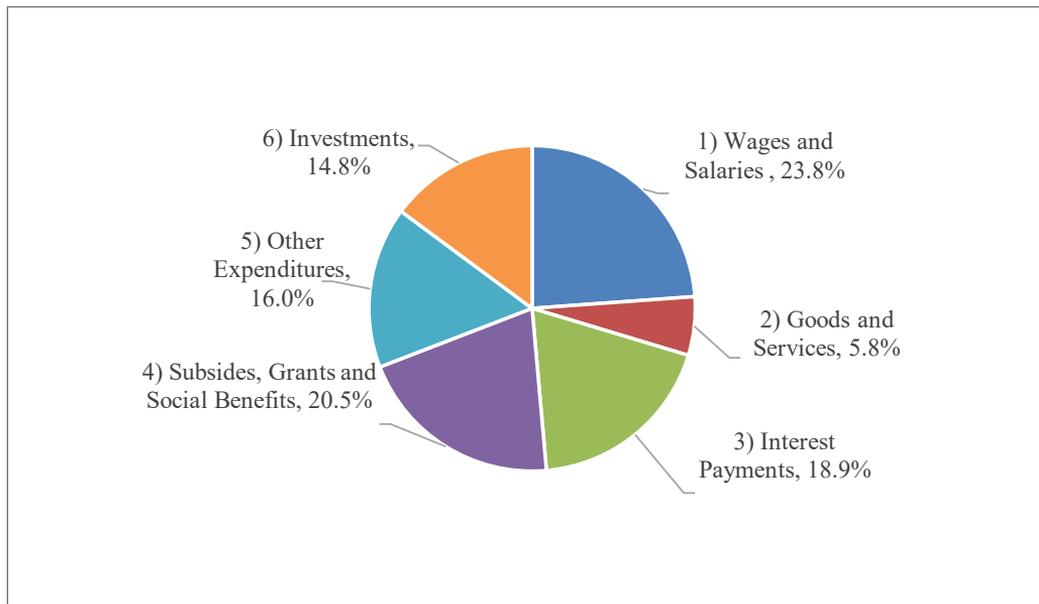
On the other side, social spending on subsidies should at least theoretically enable the government to conduct a countercyclical fiscal policy since this kind of expenditure, especially when linked to unemployment and income levels, is often assumed to act as an automatic stabilizer by expanding during recessions and shrinking during booms. At the practical level, however, this kind of expenditure in Egypt has always been disconnected from the economic activity. More specifically, public expenditure on ‘subsidies, grants and social benefits’ in Egypt has been dominated mainly by energy and food subsidies, which represented on average almost 60% and 20%, respectively, during the fiscal years from 2008/2009 to 2012/2013. The share of public expenditure on social benefits (including social security benefits, social pensions

**Table 1.** Structure of Public Expenditure in Egypt: Five-Year Averages for the Period (1981/1982-2013/2014)

Five-Year Averages	81/82-85/86	86/87-90/91	91/92-95/96	96/97-00/01	01/02-05/06	06/07-10/11	11/12-13/14*	Whole Period Average
1) Wages and Salaries	22.3%	24.7%	21.1%	25.3%	25.3%	22.9%	25.3%	<b>23.8%</b>
2) Goods and Services	5.4%	5.0%	5.5%	7.1%	6.9%	5.8%	4.0%	<b>5.8%</b>
3) Interest Payments	9.2%	15.4%	24.1%	18.3%	19.5%	19.0%	23.9%	<b>18.9%</b>
4) Subsidies, Grants and Social Benefits	23.1%	17.3%	14.5%	11.9%	18.5%	30.7%	32.6%	<b>20.5%</b>
5) Other Expenditures	28.3%	21.7%	16.2%	16.6%	15.1%	9.8%	6.9%	<b>16.0%</b>
6) Investments	12.1%	15.4%	18.6%	21%	14.7%	11.8%	7.3%	<b>14.8%</b>
<b>Total Public Expenditure as % of Total Public Utilization</b>	<b>85.4%</b>	<b>82.9%</b>	<b>82.3%</b>	<b>87.6%</b>	<b>87.5%</b>	<b>92.6%</b>	<b>88.5%</b>	<b>86.6%</b>

Source: Made by the author based on the final accounts of the state's general budget provided by the Ministry of Finance.

\*Represents three-year average.

**Figure 2.** Structure of Public Expenditure in Egypt: Average for the Period (1981/1982-2013/2014)

Source: Made by the author based on the final accounts of the state's general budget provided by the Ministry of Finance.

and social aids), however, did not exceed 10% during the same period, on average. This pattern is expected to constraint the government's power to use subsidies countercyclically to stabilize the economy, especially during boom times. The reason is that people in Egypt have become accustomed to benefiting from such subsidies whatever their income levels or the status of the economy, and thus, subsidy reductions have not been politically welcomed. It should be noted, however, that the government of Egypt has started recently (in year 2015) to reform its subsidy system. Such reforms included the replacement of in-kind subsidies by cash subsidies as well as the gradual reduction of the energy subsidy as reflected in higher prices of oil, gas, electricity, etc. Such reforms are expected to bring social and economic benefits in terms of achieving more social justice and freeing more budget resources to be spent on those items that are expected to contribute to sustainable development including social services (health and education), transportation, infrastructure, and environment protection.

The fact that Egypt's total expenditure is mainly dominated by wages and subsidies indicates that the government will have a very limited fiscal space that would allow it to respond countercyclically to the business cycle. Moreover, the political and institutional constraints described in the previous section can be easily applied to the Egyptian case, especially during expansion times. More specifically, since people do not trust their government due to the presence of corruption and lack of transparency, and given that there exist a large number of interest groups that may compete in the budgeting process to maximize their own benefits, wages and subsidies are not expected to decline during booms. In recessions, however, there is good reason to predict that the same factors may lead to pressure to raise such expenditure items, causing countercyclical behavior.

The interest payments, which represent the third major chapter in Egypt's budget, are expected to act countercyclically as a result of the countercyclical behavior of interest rates, which tend to increase during recessions (reflecting a higher cost of capital) and decrease during booms.<sup>2</sup>

Given the structure of Egypt's total expenditure as described above, one would expect that the cycli-

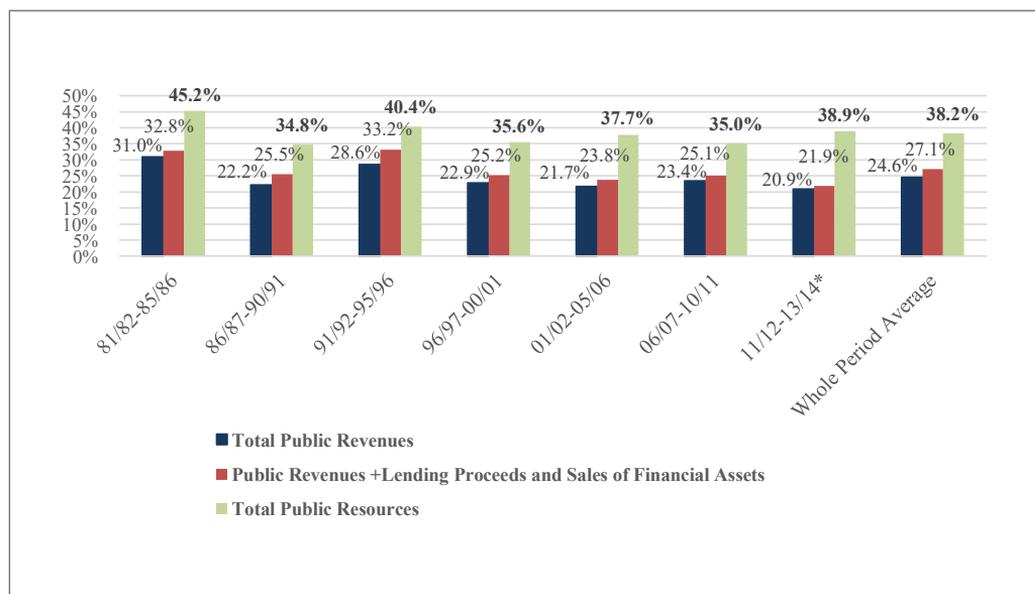
cal behavior of public expenditure would depend on the individual cyclical responses to business cycles of wages and subsidies, on one hand, and interest payments, on the other hand. Furthermore, it is expected that the optimal behavior of public expenditure, if any, may tend to prevail during recessions rather than during expansions. During expansions, the government might find it difficult to cut its public spending due to either the lack of automatic stabilizers and the limited fiscal space that it can freely manage or the political pressures to increase public spending to avoid the case of wasting public resources through corrupt government practices. During recessions, however, there might be greater opportunity for the government to increase public spending as long as it can easily access the capital markets through public borrowing.

#### *Public revenues in Egypt (1981/1982-2013/2014)*

Figure 3 provides data on the ratios of total public revenues and total public resources to GDP. Total public revenues are defined as the sum of the first three chapters in the revenue side of the state's general budget, namely, taxes, grants, and other non-tax revenues. Total public resources include total public revenues in addition to the 4th revenue chapter 'lending proceeds and sales of financial assets' and the 5th revenue chapter 'borrowing'<sup>3</sup>.

As indicated by figure 3, total public revenues represented approximately 25% of GDP during the whole period under analysis, while the share of total public resources averaged approximately 38%. Moreover, the data indicate the declining trend of both public revenues and public resources as shares of GDP during the analyzed period.

As for the structure of public revenues, table 2 indicates that the share of tax revenues has been increasing from 62% during the first sub-period to 67% during the last sub-period, on average. This was at the expense of the other revenues including grants and other non-tax revenues. This has important implications for the cyclicity of fiscal policy since non-tax revenues are often outside the control of the government, and thus, high reliance on non-tax revenues is usually expected to limit the government's ability to implement countercyclical fiscal policy.



**Figure 3.** Public Revenues-to-GDP Ratios: Five-Year Averages for the Period (1981/1982-2013/2014)

Source: Made by the author based on the final accounts of the state's general budget provided by the Ministry of Finance and data on GDP at market prices provided by the Ministry of Planning.

\*Represents three-year average.

**Table 2.** Structure of Public Revenues in Egypt: Five-Year Averages for the Period (1981/1982-2013/2014)

Five-Year Averages	81/82-85/86	86/87-90/91	91/92-95/96	96/97-00/01	01/02-05/06	06/07-10/11	11/12-13/14*	Whole Period Average
1) Taxes (% of Total Public Revenues)	62.2%	63.9%	66.3%	71.8%	70.5%	67.1%	67.0%	<b>67.1%</b>
2) Grants + 3) Other Non-Tax Revenues (% of Total Public Revenues)	37.8%	36.1%	33.7%	28.2%	29.5%	32.9%	33.0%	<b>32.9%</b>
<b>Total Public Revenues (% of Total Public Resources)</b>	<b>68.1%</b>	<b>64.1%</b>	<b>70.9%</b>	<b>64.3%</b>	<b>57.6%</b>	<b>66.8%</b>	<b>53.6%</b>	<b>64.3%</b>
4) Lending Proceeds and Sales of Financial Assets (% of Total Public Resources)	4.2%	9.4%	10.9%	6.5%	5.5%	4.8%	2.6%	<b>6.5%</b>
5) Borrowing (% of Total Public Resources)	27.7%	26.6%	18.2%	29.2%	36.8%	28.4%	43.8%	<b>29.2%</b>

Source: Made by the author based on the final accounts of the state's general budget provided by the Ministry of Finance.

\*Represents three-year average.

According to the capital or financial constraints that were introduced in the previous section, the inability of an economy to access domestic or external capital markets during recessions, or the ability to do so only at relatively higher cost of borrowing, represent the main impediments on the government to act countercyclically by raising public spending and/or reducing taxes. The data shown in table 2 indicate that the average relative share of government borrowing in total public resources has been increasing from 28% in the first sub-period to 44% during the last sub-period, on average. This relatively high reliance on borrowing, compared to other public resources, may indicate that credit constraints are not binding for the Egyptian government. In fact, the government of Egypt has always relied on borrowing to finance its budget deficit, and this has been reflected in the increasing ratio of public debt to GDP that approximately approaches 100%. Moreover, it can be concluded from the presented data measures that the government could expand its borrowing during the period that followed the economic downturn resulting from the 25th of January Revolution in 2011. In this context, it should be noted that the majority of the government borrowing is derived from domestic rather than external sources. According to the official data of the Ministry of Finance, domestic debt represented approximately 84% of the total public debt, on average, during the time period from June 2009 to June 2015. Regarding the composition of the government debt service, data for the period from fiscal year 2008/2009 to fiscal year 2014/2015 show that domestic interest payments represented approximately 96.3% of the total interest payments on the government debt, while principal payments of domestic debt constituted approximately 73.2% of the total principal payments of government debt, on average.

Since different types of tax revenues might behave differently following shocks to economic activity, the issue of tax structure should be considered. Tax revenues result from both tax rates and tax bases. Thus, it is not only the tax base response to business cycle that matters, but the changes in tax rates are also important in explaining the cyclicity of tax revenues. Taxes whose rates are more progressive (usually direct personal and corporate income taxes) are expected to act countercyclically, as automatic stabilizers, since their

revenues would be more elastic with respect to income changes induced by the business cycles compared to those whose rates are flat (constant). Taxes on goods and services, as they depend on the volume of sales, which tends to fall during recessions and expand during booms, are expected to behave in the same manner to dampen fluctuations in real GDP. Other forms of taxation, however, might not exhibit such effects if they bear no relation to income (e.g., poll taxes, export tariffs or property taxes).

As for the tax structure in Egypt, data presented in table 3 confirm one of the major features of tax policies in developing countries, namely, the relatively high dependence on indirect taxes as the main source of public revenues<sup>4</sup>. This pattern is usually derived by the narrow income tax bases and widespread tax evasion and tax avoidance practices in most developing countries (Alm, Bahl, & Murray, 1991). Indirect taxes, on the other side, are characterized by relatively low administrative costs, which makes them more attractive. The relative importance of direct taxes in Egypt, however, has been increasing from 38% to approximately 45% between the first and last sub-periods, on average.

In particular, within the direct taxes, personal income tax revenues represented approximately 20% compared to approximately 80% for taxes on corporate profits during the period (2005/2006-2010/2011), on average<sup>5</sup>. For the structure of indirect taxes, data indicate that the relative share of international trade tax revenues has been decreasing during the time period of analysis due to several trade liberalization measures and the implementation of revenue-neutral reforms that reduced the customs tariffs<sup>6</sup>.

Given that Egypt's tax structure is biased towards indirect rather than direct taxes, on one hand, and that the direct taxes are mainly dominated by corporate income taxes rather than by personal income taxes which proved to be more progressive<sup>7</sup>, on the other hand, one may expect that the tax system in Egypt lacks the sufficient automatic stabilizers that would allow the economy to respond countercyclically to the business cycles.

Since the budget deficit represents the difference between public expenditure and public revenues, the expected cyclical behavior of budget deficit should be derived from the expectations regarding the cyclical behavior of public expenditure and of public revenues.

**Table 3.** Structure of Tax Revenues in Egypt: Five-Year Averages for the Period (1981/1982-2013/2014)

Five-Year Averages	81/82- 85/86	86/87- 90/91	91/92- 95/96	96/97- 00/01	01/02- 05/06	06/07- 10/11	11/12- 13/14*	Whole Period Average
<b>Direct Taxes</b>								
Taxes on Incomes, Profits, and Capital Gains	37.7%	42.8%	45.0%	42.3%	46.1%	47.2%	44.7%	<b>44.1%</b>
<b>Indirect Taxes</b>								
Taxes on International Trade	31.9%	24.9%	19.9%	19.7%	14.7%	8.8%	6.9%	<b>17.7%</b>
Taxes on Goods and Services	23.0%	23.1%	25.8%	30.4%	31.1%	31.1%	32.5%	<b>28.4%</b>
<b>Other Taxes**</b>	7.3%	9.1%	9.4%	7.7%	8.1%	12.9%	16%	<b>9.9%</b>

Source: Made by the author based on the final accounts of the state's general budget provided by the Ministry of Finance.

\*Represents three-year average.

\*\*Property tax revenues are included within this group.

In other words, the budget deficit is expected to act countercyclically (procyclically) if both public expenditure and public revenues behave in a countercyclical (procyclical) manner, while it is expected to act a-cyclically if the behavior of public expenditure and public revenues leads to no change in the budget deficit.

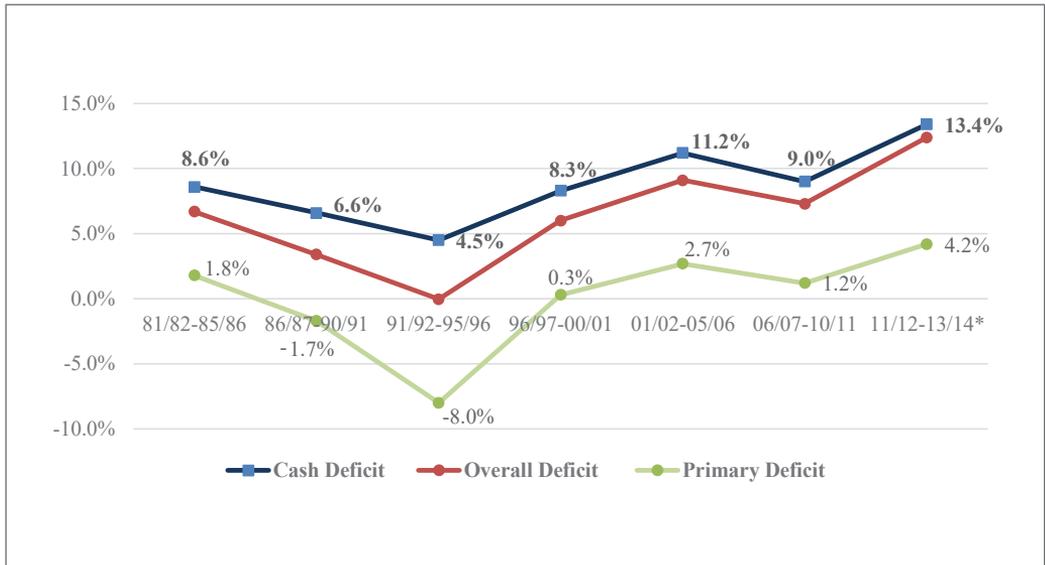
#### ***Budget deficit in Egypt (1981/1982-2013/2014)***

Based on the GFS classification system, two concepts of budget deficit emerge, namely, cash deficit and overall deficit. While cash deficit measures the difference between total public expenditure and total public revenues, overall deficit adds to the cash deficit the value of net acquisition of financial assets. In addition, primary deficit that excludes interest payments from the deficit measure can be used to reflect the ability of government revenues to cover expenditure items that result from current rather than previous decisions.

As indicated by figure 4, the three measures of fiscal deficit had their lowest average ratios to GDP during the five-year period (1991/1992-1995/1996)<sup>8</sup>. This came as a result of implementing the ERSAP starting from 1991. By contrast, budget deficit measures had their highest average ratios to GDP during the last sub-period (2011/2012-2013/2014), which was mainly derived by the expansionary fiscal policy that the government had to adopt in response to the economic

downturn that followed the Egyptian revolution in 2011. Since Egypt's overall budget deficit is mainly financed by net borrowing (the difference between borrowing and loans repayment), the trend of the budget deficit measures as shown by figure 4 is consistent with that of the public borrowing as indicated by figure 3 (the difference between the second and third bars for each sub-period). More specifically, public borrowing had its lowest average ratio to GDP of approximately 7.2% during the sub-period (1991/1992-1995/1996), while it had its greatest average ratio of approximately 17% during the last sub-period of the entire sample.

Before concluding this section, it should be emphasized that although the analysis provided above does not show significant changes in terms of the structure of Egypt's fiscal policy during the whole period under analysis, this does not imply that the Egyptian economy has been stable during that relatively long period or that there have not been major shocks that could affect the overall macroeconomic policy in general and the fiscal policy in particular. In fact, three main shocks that have affected the Egyptian economy during the analyzed period can be mentioned, namely, the implementation of the ERSAP at the beginnings of the 1990s, the global financial and economic crisis in 2008, and the political uprisings in 2011 that led to the 25th of January Revolution. Each of these three shocks



**Figure 4.** Budget Deficit Measures as Ratios of GDP: Five-Year Averages for the Period (1981/1982-2013/2014)

Source: Made by the author based on the final accounts of the state's general budget provided by the Ministry of Finance and data on GDP at market prices provided by the Ministry of Planning.

\*Represents three-year average.

had its own social, economic, and fiscal impact on the country. It seems, however, that such impact was not strong enough to derive significant changes in the structure of Egypt's state budget or its fiscal policy.

#### 4. The cyclical behavior of fiscal policy in Egypt: An empirical investigation

This section empirically tests the cyclical properties of Egypt's fiscal policy during the time period (1981/1982-2013/2014). For this aim, a regression is estimated to assess the response of each of the key fiscal aggregates (public expenditure, public revenues, and budget deficit) to economic business cycles as measured by the output gap. As far as the available literature is concerned, this issue has not been examined for the Egyptian economy in a similar manner. Two relevant studies can be referred to in this regard, namely, Ben Slimane and Ben Tahar (2009), and Panizza (2001). While the former discussed the fiscal cyclicity in a sample of 16 countries in the MENA region during the period (1975-2008) using a panel data set, the latter focused on the cyclicity of the fiscal policy

(as one of the macroeconomic policies) in Egypt using the real GDP growth rate as a measure of the business cycle. Accordingly, the current study contributes to the existing literature as it focuses thoroughly on the Egyptian economy using time series data sets. This focus as reflected by the qualitative analysis (section 3) and the empirical analysis (section 4) is expected to allow for a better understanding of the particularities of Egypt's fiscal policy and how it behaves in response to business cycles. Moreover, the current study uses the 'output gap' instead of the real GDP growth rate as a measure of the business cycle. This is expected to lead to more precise conclusions regarding the question under study. The reason is that the growth rate of real GDP can fluctuate within the same period of recession or expansion making it a relatively poor measure for the business cycle.

#### *Model specification, data sources and estimation methodology*

The cyclical properties of fiscal aggregates in Egypt during the period under analysis are examined using the following equation:

$$\begin{aligned}
 F_t = & \alpha_0 + \alpha_1 F_{t-1} + \alpha_2 output\_gap_t + \\
 & + \alpha_3 (output\_gap_t * institut_t) + \alpha_4 (output\_gap_t * cycle_t) + \\
 & + \alpha_5 (output\_gap_t * credit\_gdp_t) + \\
 & + \alpha_6 (output\_gap_t * exchange_t) + e_t
 \end{aligned} \quad (1)$$

where  $F_t$  is the ratio of the fiscal variable (public expenditure, public revenues, tax revenues, or budget deficit) to GDP at year  $t$ ;  $F_{t-1}$  is the lagged value of the dependent variable;  $output\_gap_t$  is a measure of the business cycle at year  $t$ ;  $institut_t$  is a dummy variable for the budgetary institutions' reforms that were introduced since fiscal year 2005/2006;  $cycle_t$  is a dummy variable for the business cycle (expansion versus recession);  $credit\_gdp_t$  is the domestic credit to private sector as a ratio of GDP at year  $t$ ;  $exchange_t$  is the official exchange rate (local currency per one US dollar) at year  $t$ ; and  $e_t$  is the error term at year  $t$ .

This specification follows the empirical literature on the cyclical properties of fiscal policy, in which the fiscal variable (usually measured as a percentage of GDP) is regressed on its lagged value, some measure of the business cycle (or the output gap), and a group of control variables (usually dummies) that account for different institutional, economic and political factors within a country (Alesina & Tabellini, 2005; Ben Slimane & Ben Tahar, 2009; Calderón et al., 2004; Jaimovich & Panizza, 2007; Manasse, 2006; Wibbels, 2006).

Economic fluctuations induced by business cycles are usually measured using the concept of output gap as the deviation of actual output from its potential level<sup>9</sup>. Measuring the output gap, however, is not an easy task. Different sets of assumptions can be used in combination with various econometric techniques to provide different measures of the output gap. One common assumption is that the output gap is some part of the transitory (cyclical) component of real output (St-Amant & van Norden, 1997). More specifically, the definition of the output gap is mainly derived from an assumption of pure statistical methods that GDP time series can be decomposed into two parts: *trend* (potential or long-run) component and *cyclical* component. That is,

$$Y_t = Trend_t + Cyclical_t \quad (2)$$

where  $Y_t$  is the actual level of output at time  $t$ ;  $Trend_t$  is the trend component of the output at time  $t$ ; and  $Cy-$

*clical*, is the cyclical component of the output at time  $t$ . The trend component reflects a broad long-term output around which actual levels of output fluctuate. It is often regarded as a measure of the potential output. Accordingly, the cyclical component of the GDP series (*Cyclical*) can be simply viewed as the output gap since it measures the difference between actual level of output ( $Y_t$ ) and its trend (or potential) level in the long-term (*Trend*).

Two main methods have been used in the literature to estimate the trend (or potential) component of a time series, namely, statistical approaches (including polynomial trend extrapolation and Hodrick-Prescott filters) and the estimation of production function usually using the Cobb-Douglas specification. Following the approach used in the relevant literature (Alberola et al., 2006; Alesina & Tabellini, 2005; Calderón et al., 2004), trend (or potential) output in this study is calculated by applying a Hodrick Prescott (HP) filter to the real GDP time series<sup>10</sup>. Then, the output gap is estimated as follows:

$$output\ gap = \frac{y - y^*}{y^*} \quad (3)$$

where  $y$  is the actual output (real GDP), and  $y^*$  is the trend output. Thus, positive output gaps are expected to occur in good times (economic expansions), while negative ones are associated with recessions.

In addition to the output gap measure, four interaction terms are added to the model specification to provide clues to the relationship under study. 1) The interaction term  $output\_gap * institut$  is added to test whether the cyclical behavior of fiscal aggregates has changed starting from fiscal year 2005/2006, in which the government of Egypt introduced significant institutional reforms regarding its budgetary system. The most important of such reforms were the creation of the Treasury Single Account (TSA) at the Central Bank of Egypt that replaced the large number of different bank accounts used previously by the government entities, as well as the adoption of the IMF's GFS manual for the economic and functional classifications of the state's budget<sup>11</sup>. 2) The interaction term  $output\_gap * cycle$  is included to test whether the cyclical behavior of Egypt's fiscal aggregates depends on the nature of the business cycle itself (expansions vs. recessions). 3) The interaction term  $output\_gap * credit\_gdp$  is pro-

**Table 4.** ADF Test Results of the Variables' Time Series

Variable Name/ Symbol	Test Statistic	AIC Automatic Specified Lag Length
Output Gap (output_gap)	-3.615**	(2)
Public Expenditure-to-GDP Ratio (exp_gdp)	-4.645***	(8)
Public Revenues-to-GDP Ratio (rev_gdp)	-3.646**	(3)
Taxes-to-GDP Ratio (tax_gdp)	-4.010**	(7)
Primary Cash Deficit-to-GDP Ratio (pri_cash_def_gdp)	-4.949***	(8)
Primary Deficit-to-GDP Ratio (pri_def_gdp)	-3.436*	(7)
Credit-to-GDP Ratio (credit_gdp)	-4.017**	(4)
Official Exchange Rate (exchange)	-3.731**	(7)

(\*), (\*\*) and (\*\*\*) indicate the rejection of the null hypothesis of the ADF test at the 10%, 5% and 1% levels of significance, respectively.

posed to measure the change in the cyclical behavior of fiscal policy associated with changes in the credit-to-GDP ratio as a proxy for the financial depth<sup>12</sup>. 4) Finally, the interaction term  $output\_gap * exchange$  is included to capture whether there would be any effect of the official exchange rate on the cyclical behavior of the fiscal variables<sup>13</sup>.

Appendix 2 provides a description of the variables used in this study, the way each was measured, and the source of the collected data.

According to the model specification, a countercyclical policy would imply a negative coefficient for the output gap variable ( $\alpha_2$ ) in both public expenditure and budget deficit models and a positive coefficient in the public revenues model. The opposite should be expected in case of procyclical behavior. A non-significant coefficient of the output gap represents the case of a-cyclical behavior of the relevant fiscal variable. Given the structure of Egypt's state budget (characterized by a narrow fiscal space and the absence of real automatic stabilizers on both the expenditure and revenue sides) as discussed in the previous section and in light of understanding the nature of the financial and institutional constraints that exist in Egypt, one has no reason to expect that Egypt's fiscal policy acts in a countercyclical manner in response to business cycles. The procyclical behavior or the a-cyclical behavior are much more ex-

pected to be preserved in Egypt. Moreover, since the structure of Egypt's public expenditure is dominated by wages, subsidies, and interest payments, which are not expected to decrease in response to expansionary business cycles, one can argue that the role of fiscal policy in stabilizing the economy in Egypt would be much weaker during expansion times than during recessions. In other words, the political and institutional setup of the Egyptian economy would make it relatively hard for the government to cut the major expenditure items in the state's budget during boom times, while it would allow it to raise such items easily during recessions.

The stationarity of the variables' time series is tested using the Augmented Dickey-Fuller (ADF) test (with an intercept and trend specification) to ensure that the estimation results are not derived from a spurious regression. The test results, as shown in table 4, indicate that all variables used in estimation are stationary at the five percent significance level except for the primary deficit-to-GDP ratio which is stationary at the ten percent level of significance only. Accordingly, OLS could be used to estimate the relationship under analysis.

### *Model findings and discussion*

The specified model is estimated separately for each of public expenditure, public revenues and taxes, and

budget deficit. The estimation results are presented in table 5 with the standard errors in parentheses.

*The cyclical behavior of public expenditure:* In model (1), total public expenditure as a ratio of GDP is regressed on its lagged value, the output gap, and the four interaction terms mentioned above. The results show that the explanatory variables explain approximately 70% of total variation of the dependent variable and that the whole model is significant at the 1% level. The coefficient of the business cycle measure 'output gap' is negative and significant at the one percent level. An increase in the percentage deviation of real GDP from its HP filter is associated with a decline in the public expenditure-to-GDP ratio, holding other things equal<sup>14</sup>. This may indicate that public expenditure behaves in a countercyclical manner; that is, it increases during recessions or when output gaps are smaller and shrinks during expansions or when output gaps are larger. However, as mentioned earlier, public expenditure in Egypt lacks the automatic stabilizers in the form of subsidies and social transfers since such expenditure is mainly dominated by energy and food subsidies, which do not respond to income changes. Thus, the countercyclical behavior of public expenditure that is inferred from the negative coefficient of the output gap variable should be questionable. According to Kaminsky et al. (2004), for example, a negative correlation between the output gap and the public expenditure-to-GDP ratio might simply result from the fact that GDP expands during expansions and shrinks in recessions; thus, even if public expenditure is kept constant over business cycles, its ratio to GDP should move in the opposite direction of the cycle.

The coefficient of the lagged value of public expenditure-to-GDP ratio 'exp\_gdp(-1)' is positive and significant. This is mainly derived from the incremental approach adopted in the formulation of Egypt's state budget, according to which the public expenditure level for a given year is largely estimated based on the previous year's level plus incremental adjustments at the margin.

The coefficient of the interaction term 'output\_gap\*cycle' is positive and significant at the 1% level. This might indicate that the cyclical behavior of public expenditure differs between expansion and recession times. More specifically, since the coefficient of this interaction term is positive, while the coefficient of the

output gap is negative, one would expect that public expenditure becomes less countercyclical during expansion periods than during recessions. A one percentage point increase in the output gap is associated with a decrease of 4.3 percentage points in the public expenditure ratio during recessions (when the cycle dummy = 0) compared to a 1.3 percentage point decrease during expansions (when the cycle dummy = 1). This finding, in fact, is consistent with what has been expected from the structure of Egypt's public expenditure, which limits the government's ability to reduce public spending during periods of expansion.

There is also empirical evidence that supports the idea that the cyclical behavior of public expenditure in Egypt has been significantly improving since the introduction of the budget reforms in fiscal year 2005/2006. This is reflected by the negative and significant coefficient of the interaction term 'output\_gap\*institut', which implies that the countercyclical behavior of public expenditure has been stronger for the years since 2005/2006 compared to the preceding period.

The coefficient of the interaction term 'output\_gap\*exchange' is positive and significant at the 10% level. Given that the 'output\_gap' coefficient is negative, this indicates that the higher the official exchange rate is (as measured by the value of one US dollar in terms of local currency), the lower the countercyclical response of public expenditure to business cycles. This seems logical in the sense that higher exchange rates (which reflect the deterioration of the value of the local currency versus the US dollar) indicate a deteriorated macroeconomic and fiscal environment of the economy. On one hand, the deterioration of the value of local currency reflects structural economic imbalances and institutional factors that might weaken the overall economic performance of the country. On the other hand, the decreasing value of the local currency against the US dollar means that the cost of external borrowing (as represented by the debt service paid in the foreign currency) becomes higher. This is expected to constrain the government's ability to conduct a countercyclical expenditure policy.

Finally, the coefficient of the interaction term 'output\_gap\*credit\_gdp' tends to be insignificant. This indicates that the cyclicity of public expenditure in Egypt might not significantly differ with different levels of financial depth, measured by domestic credit

**Table 5.** Results of Estimated Models (Basic Specification)

	Dependent Variables				
	Model (1)	Model (2)		Model (3)	
	exp_gdp	rev_gdp	tax_gdp	pri_cash_def_gdp	pri_def_gdp
C	11.25*** (3.01)	7.73** (3.74)	6.10*** (1.92)	0.20 (0.81)	-0.08 (1.01)
exp_gdp(-1)	0.61*** (0.09)	-	-	-	-
rev_gdp (-1)	-	0.67*** (0.13)	-	-	-
tax_gdp (-1)	-	-	0.61*** (0.11)	-	-
pri_cash_def_gdp (-1)	-	-	-	0.78*** (0.14)	-
pri_def_gdp (-1)	-	-	-	-	0.83*** (0.15)
output_gap	-4.32*** (1.07)	-4.45** (1.83)	-1.39* (0.72)	0.46 (1.31)	0.35 (1.76)
output_gap*institut	-1.82** (0.86)	-2.43 (1.46)	-0.20 (0.53)	0.69 (1.01)	1.23 (1.39)
output_gap*cycle	2.99*** (1.02)	2.91* (1.69)	0.34 (0.63)	-0.06 (1.13)	-0.54 (1.54)
output_gap*credit_gdp	0.03 (0.03)	0.03 (0.05)	0.02 (0.02)	0.005 (0.04)	0.02 (0.05)
output_gap*exchange	0.41* (0.23)	0.51 (0.40)	0.08 (0.15)	-0.16 (0.27)	-0.26 (0.38)
Adjusted R-squared	0.70	0.59	0.65	0.61	0.60
F-statistic prob.	0.000	0.000	0.000	0.000	0.000
Durbin-Watson Stat.	2.2	1.7	1.5	1.4	1.7
Jarque-Bera prob.	0.83	0.26	0.00	0.09	0.67
Breusch-Godfrey LM test (F-statistic prob.)	0.58	0.50	0.31	0.13	0.55
RAMSEY test (F-statistic prob.)	0.79	0.98	0.46	0.27	0.84
ARCH test (F-statistic prob.)	0.25	0.12	0.83	0.1	0.17

(\*), (\*\*) and (\*\*\*) indicate the significance of the coefficient at the 10%, 5% and 1% levels of significance, respectively.

to private sector as a percentage of GDP. If domestic credit to the private sector as a ratio of GDP is considered as a valid proxy for financial depth, this finding would not support the financial or credit arguments in the literature, according to which fiscal countercyclicality is expected to be more observed in economies with mature and well-developed financial markets at the domestic level. In other words, the domestic financial constraints seem insignificant for the cyclicity of government expenditure according to this model.

*The cyclical behavior of public revenues and tax revenues:* In model (2), total public revenues as a ratio of GDP is regressed on its lagged value, the output gap, as well as on the other four interaction terms. The results, as presented in the second column of table 5, show that the explanatory variables explain approximately 59% of the total variation of the dependent variable and that the whole model is significant at the one percent level. The results indicate that the output gap (as a measure of the business cycle) is negatively correlated to the ratio of public revenues to GDP. Thus, public revenues behave procyclically. This finding may indicate that even the automatic stabilizer (cyclical/non-discretionary) component of the public revenues is not strong enough to derive the optimal countercyclical behavior of the overall public revenues. Moreover, the fact that the Egyptian economy used to receive more grants during bad times compared to during the periods of expansion might provide a partial explanation for the procyclical behavior of public revenues. To exclude the latter effect, the cyclicity of public revenues is tested using the ratio of tax revenues (instead of total public revenues) to GDP as the dependent variable.

Estimation results, as shown in the third column of table 5, indicate a procyclical behavior, according to which higher ratios of tax revenues to GDP are correlated to lower output gaps. Since tax revenues represent the product of both tax 'bases' and tax 'rates', such procyclical behavior of tax policy should be derived by the behavior of the tax rates relative to that of the tax bases. More specifically, given that tax bases should expand during economic expansions and shrink during recessions, a decline in the tax revenues-to-GDP ratio during expansions should be derived by one of the three following scenarios: a) a fall in tax rates that is sufficient to offset the increase in tax bases, which would lead to lower tax revenues;

b) a fall in tax rates that is proportional to the tax bases' increase, which would keep overall tax revenues unaffected; and c) a constant or a marginal increase in tax rates that goes in parallel with the tax base increases. Since GDP increases during expansions, scenarios (a) and (b) should automatically result in a lower ratio of tax revenues to GDP during such periods. Scenario (c), however, should lead to the same result only under the condition that the increase in tax revenues during expansion periods is less than proportional to that of GDP. This third scenario was what led Kaminsky et al. (2004) to argue that a negative correlation between the tax revenues-to-GDP ratio and the output gap should not necessarily indicate a procyclical behavior. Such negative correlation might also result from increases in tax rates, as described by scenario (c).

Regarding the other control variables in the models of public revenues and tax revenues, the results are almost similar. The lagged value of the dependent variable is positive and significant at the one percent level in both models. The insignificant coefficients of the interaction terms 'output\_gap\*instituit', 'output\_gap\*credit\_GDP', and 'output\_gap\*exchange' support the idea that the cyclical behavior of public revenues and tax revenues in the Egyptian economy does not seem to be affected by either the institutional budget reforms that were implemented since 2005/2006 or the changing levels of financial development (as measured by the domestic credit to the private sector as a percentage of GDP) and the official exchange rate. However, the results indicate that public revenues (but not tax revenues) tend to act less procyclically during expansions than during recessions.

*The cyclical behavior of budget deficit:* In this model, the primary budget deficit as a ratio of GDP is used as the dependent variable, which is regressed on its lagged value, the output gap, as well as on the four developed interaction terms. Two measures of primary budget deficit are utilized, namely, cash deficit (excluding interest payments) as a ratio of GDP 'pri\_cash\_def\_gdp' and overall deficit (excluding interest payments) as a ratio of GDP 'pri\_def\_gdp'. The estimation results are shown in the fourth and fifth columns of table 5. The business cycle measure is found to be insignificantly correlated to the two measures of primary deficit. This implies that the overall fiscal policy in Egypt, as

measured by the budget deficit-to-GDP ratio, tends to behave a-cyclically; that is, it does not significantly respond to output gaps. This finding seems to be consistent with the results reached above. More specifically, since both public expenditure and public revenues as ratios of GDP decrease with economic expansions and increase with recessions, the resulting budget deficit should simply act a-cyclically by being constant over the cycle. Thus, the procyclical behavior of public revenues tends to offset the countercyclical behavior of public expenditure. As a result, the overall behavior of fiscal policy neither stabilizes nor exacerbates business cycle fluctuations.

#### Reliability and robustness checks

The results of the diagnostic tests, namely, the Breusch-Godfrey LM test for serial correlation in residuals; the RAMSEY test for regression specification error; and the ARCH test for Heteroskedasticity, as presented in table 5 indicate that the null hypothesis of these tests cannot be rejected and thus the estimated coefficients can be considered reliable. In addition, the Jarque-Bera test results imply the non-rejection of the null hypothesis of normal distribution of residuals in the estimated equations except for that of the tax revenues model.

As a robustness check, the cyclical behavior of public expenditure, public revenues and tax revenues is tested using different measures of fiscal aggregates as dependent variables. The budget deficit model, however, could not be estimated using the new specification since the time series of the relevant dependent variables in this case are non-stationary. Instead of using the fiscal variable's ratio to GDP as the dependent variable, the relationships under study are re-estimated using the deviation of the fiscal variable (as a ratio of GDP) from its potential value measured by the HP filter. Such a method was used by Calderón, Duncan, and Schmidt-Hebbel (2004). Thus, the new specification takes the following form:

$$\begin{aligned}
 F\_gap_t = & \alpha_0 + \alpha_1 F\_gap_{t-1} + \alpha_2 output\_gap_t + \\
 & \alpha_3 (output\_gap_t * institut_t) + \alpha_4 (output\_gap_t * cycle_t) + \\
 & \alpha_5 (output\_gap_t * credit\_gdp_t) + \\
 & \alpha_6 (output\_gap_t * exchange_t) + e_t
 \end{aligned} \quad (4)$$

where  $F\_gap_t$  is the percentage deviation of the fiscal variable as ratio of GDP from its HP filter at year  $t$ .

The findings of the public expenditure model in the new specification almost confirm those reached by the basic one. The output gap is negatively correlated to gaps in the public expenditure-to-GDP ratio, indicating a countercyclical behavior. The coefficient of the interaction term ( $output\_gap * cycle$ ) encounters similar sign and significance compared to the case in the basic specification. The findings indicate that the official exchange rate loses its significance under the new specification, while the domestic credit to the private sector as a ratio of GDP becomes significant. For the public revenues and the tax revenues models, the findings confirm the procyclical behavior that was concluded by the basic model specification. The four interaction terms have results under the new specification that are similar to those derived from the basic specification except for ' $output\_gap * credit\_gdp$ ', which shows a positive and significant relationship with the dependent variable under the new specification. This indicates that public revenues and tax revenues tend to be less procyclical with higher levels of financial development.

As another robustness check, the basic models are re-estimated using a different value of the smoothing parameter ( $\lambda$ ) in the HP filter applied to the real output time series. More specifically,  $\lambda$  is set according to the frequency rule of Ravn and Uhlig (2002) to equal 6.25 instead of the value of 100 suggested by Hodrick and Prescott (1997) for annual data<sup>15</sup>. This procedure, although it results in different values for the output gap measure, does not affect the main findings of the estimated models.

In general, the findings reached by this study confirm that fiscal policy in Egypt has not been conducted in a countercyclical manner to dampen business cycle fluctuations. One possible explanation might be the fact that automatic stabilizers that are built into the fiscal system itself (such as income taxes and transfer programs) are too small to have a significant smoothing effect on aggregate fluctuations. Such a finding supports the results of previous empirical studies in this regard. For example, Panizza (2001) found evidence that supports the idea that budget deficit is insignificantly correlated to GDP growth changes in Egypt during the period (1981/2000). Moreover, Ben Slimane and Ben Tahar (2009) found evidence that total government expenditure and total government

revenues measured as ratios of GDP tend to act procyclically in a sample of 16 MENA region countries over the period (1975-2008).

### *Study's limitations*

This study provides theoretical and empirical insights on the cyclical behavior of fiscal policy aggregates in Egypt during the time period (1981/1982-2013/2014). The findings of the study, however, should be analyzed taking into account certain methodological issues that might affect their accuracy. *First*, while there is a wide agreement in the literature on the validity of using the output gap (deviation of actual real output from its potential level) as a measure of business cycles, no consensus has yet been reached on the best way to estimate the potential level of output. Different approaches to estimate the trend component of real GDP time series might yield different outcomes<sup>16</sup>. Accordingly, different findings might result from this study if other measures were used to estimate the potential output instead of the HP filter.

*Second*, the amendments introduced to the classification system of the state's general budget in fiscal year 2005/2006 forced the author to introduce some changes to the fiscal data of the period (2005/2006-2013/2014) to ensure its consistency with data of the preceding period. While the introduced changes were based on a delicate approach according to which the author compared each budget item in the two classification systems, some errors that result from such a process might challenge the qualitative and quantitative analysis provided by this paper. Related to this point is the relatively short time series data (33 years) that the author could get for Egypt's fiscal variables, which in turn has limited the potential use of more explanatory variables in the estimated models.

## **5. Concluding remarks and policy implications**

This study uses a time series dataset for the Egyptian economy during the time period from fiscal year 1981/1982 to fiscal year 2013/2014. The study finds evidence for a countercyclical behavior of public expenditure and a procyclical behavior of public revenues and tax revenues. As a result, the overall fiscal policy, as measured by the primary budget deficit-to-GDP ratio, is found to act 'a-cyclically'; that is, it neither stabilizes

nor intensifies the business cycle induced fluctuations. This main finding proved to be robust with the changes in the measurement of the dependent variables and the output gap.

Moreover, the study findings indicate that the countercyclical behavior of public expenditure and the procyclical behavior of public revenues tend to get stronger during recessions than during expansions. This finding is proved to be robust and supports the author's expectation that if the Egyptian government can raise its spending during recessions easily, expenditure contraction during expansion times might be much more difficult due to political economy and institutional factors. At the same time, this finding indicates that during recession times, the government tends to raise its public and tax revenues heavily to finance the higher level of its spending, leading to a negligible change in its budget deficit.

Regarding the factors that might explain the observed cyclical behavior of fiscal policy in Egypt, there is empirical evidence that both the credit/financial factors and the institutional factors have some role to play in this regard. The effect of such factors was observed in the models of public expenditure and public revenues separately but not in the model of budget deficit. For example, the budget institutional reforms that were introduced since 2005/2006 seem to be correlated to improvements in the cyclical behavior of public expenditure (in the form of greater countercyclicity) under the basic specification. In addition, the deterioration in the value of the local currency versus the US dollar (which reflects a higher cost of external borrowing) seems to negatively affect the performance of public expenditure during the cycles. That is, the higher the foreign exchange rate, the less the government would be able to spend countercyclically. The financial development (as measured by the domestic credit to the private sector as a percentage of GDP) may affect the cyclical behavior of both of public revenues and public expenditure only when such variables are measured in terms of their deviations from the potential (HP filter) values.

If Egypt has not been able to run an optimal fiscal policy so far, the situation is not expected to change at least in the short and medium terms. The country has been suffering from several imbalances since the political uprisings of 2011, which have been negatively reflected in almost all the fiscal and economic vari-

ables, leading to a deteriorated fiscal stance and weakened economy. The fact that Egypt has always relied on domestic rather than external borrowing to finance its budget deficit may reflect the lower accessibility of the government to international capital markets due to its weak fiscal position and deteriorated creditworthiness, which in turn result in a higher cost of capital. The current situation in Egypt is expected to reinforce this trend. On one hand, the political and economic environment have not yet stabilized since the revolution of 2011. The indicators reflect that the measures of public debt and budget deficit are approaching unprecedented levels. On the other hand, the floatation of the Egyptian pound enacted on November 2016 is expected to reinforce the existing barriers to access the international capital markets and raise the cost of external borrowing in terms of the debt service payments. This implies significant structural and credible (economic and political) reforms in the country to improve the economy's rating according to the international financial institutions and thus to facilitate its accessibility to external financial markets with reasonable costs. At the same time, those reforms should be reflected in a better fiscal stance of the country that finally allows optimal behavior of the fiscal policy.

At the institutional and political economy front, efforts are needed to focus on reforming the fiscal institutional environment in Egypt to lower corruption and enhance fiscal transparency and accountability in a way that would facilitate the use of fiscal policy as a tool to stabilize the economy during business cycles<sup>17</sup>. This should include (but not be limited to) the introduction of binding or indicative fiscal rules and budget ceilings (on total public expenditure and its allocation), a better coordination between the recurrent and the investment components of the state's budget, the strengthening of the existing systems of internal and financial controls, the introduction of an effective system of internal audit, and the improvement of the external audit system's role in increasing the government's responsiveness, accountability, and transparency.

In terms of the budget structure, Egypt's state budget has a structure that not only reduces the fiscal space of the government and hinders its ability to use fiscal policy in a countercyclical fashion to stabilize its economy but also reinforces the social inequalities through

favoring the interests of the high-income groups and businessmen at the expense of the poor. Accordingly, reforming the structure of the state's budget itself in a way that enables more automatic stabilizers to work through social spending and tax progressivity would necessarily improve the government's ability to conduct a countercyclical fiscal policy. This in turn is expected to benefit the poorest and most vulnerable citizens, who usually suffer from business cycle fluctuations, especially when social spending and public investments are cut in times they are most needed.

Finally, it should be emphasized that the economic downturn Egypt has been passing through since 2011 should not be dealt with using austerity measures that are based on spending cuts and/or tax increases. Such measures, especially in a demand-constrained economy that works below its full employment level, would reinforce the situation and worsen it<sup>18</sup>. The government instead needs to seek other more effective policy options. Increasing public spending mainly on social welfare programs and investments, expanding the tax bases, and eliminating the tax evasion and tax avoidance practices through a well-designed system of tax administration might be useful.

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- Endnotes**
- 1 The 'common pool phenomenon' usually arises when the various decision makers involved in the budgetary process (legislators, the Minister of Finance, line ministers, etc.) compete for public resources and fail to internalize the current and future costs of their choices (Norris et al., 2010).
  - 2 According to Lane (2003), governments may attempt to induce a procyclical pattern in interest payments since they can better afford high debt payments during boom periods.
  - 3 It is worth mentioning that data on total public revenues that are presented in this analysis exclude all capital revenues from the second chapter 'grants' and the third chapter 'other non-tax revenues'. Such capital revenues were classified, instead, within the fourth chapter 'lending proceeds and sales of financial assets'. This amendment was necessary to ensure that fiscal data since fiscal year 2005/2006 are consistent with those of the preceding period during which the old budget classification system was used. Thus, one would expect that total public revenues are underestimated in this analysis by the amount of the excluded capital revenues.
  - 4 Using a sample of 116 developed and developing countries over the period (1972-2005), Vazquez, Vulovic, and Liu (2011) showed that the average ratio of direct to indirect taxes in developing countries is approximately one-third of the value in developed countries.
  - 5 It is worth mentioning that the General Authority of Petroleum and the Suez Canal together finance more than two-thirds of the revenues from corporate income tax in Egypt.
  - 6 The relatively high reliance on trade tax revenues such as taxes on exports, in many developing countries, makes such countries more vulnerable to external economic shocks. Tax revenues may fluctuate heavily based on the volume of exports, which in turn is affected by the economic conditions in the countries that comprise the markets for their exports, and based on the natural factors that might affect the supply of exports by the developing country itself (Bird, 2001).
  - 7 It is worth mentioning that labor incomes finance the greatest share (almost 65%) of personal income taxes in Egypt, an issue that has implications from the perspective of social justice.
  - 8 It is noteworthy that the cash deficit as calculated in this analysis is overestimated. This is because total public revenues are underestimated by the amount of capital revenues, which are excluded for data consistency reasons. Overall deficit, however, is underestimated in this analysis by the amount of the acquisition of financial assets, which could not be added to the expenditure side. The reason is that the old classification system of the budget does not allow for the separation of 'loans repayment' from the 'acquisition of financial assets', as both are aggregated in one chapter named 'capital transfers'.
  - 9 The potential output of an economy is defined as the level of GDP that is consistent with full utilization of all factors of production (capital stock, labor use, and available technology). Since potential output cannot be observed directly from data, it has to be estimated using statistical methods; thus,

- it is subject to a high degree of uncertainty (Central Bank of Iceland, 2005).*
- 10 *According to Hodrick and Prescott (1997), the smoothing parameter ( $\lambda$ ) in the filter should be set equal to 100 for annual data and 1600 for quarterly data.*
  - 11 *While other variables that capture the institutional and political economy factors, such as political regime characteristics (executive recruitment, executive constraints, political participations), democracy, corruption, etc., might be much more relevant, the non-availability of data on such measures for Egypt during the time series under study is the main reason for not being able to use any of them in the analysis. Moreover, if such data were available, they would not be expected to exert significant variability during the examined period. The reason is that institutional and political factors in Egypt, at least before January 2011, have always been static or involved trivial changes.*
  - 12 *Ben Slimane and Ben Tahar (2009) used an interaction term that involves both the output gap and the financial depth measure to test for the following hypothesis: the higher the financial depth of a given economy is, measured by the credit provided to private sector as a percentage of GDP, the greater will be the government's ability to borrow in bad times to finance its higher level of spending, and the more countercyclical its fiscal policy should be.*
  - 13 *The author believes that the 'exchange rate' variable can account for many economic, fiscal and financial factors. A deterioration in the country's local currency versus the foreign currency reflects a weakened position of the balance of payment as well as of the state's budget. It also may reflect the lack of foreign direct investment that can be caused by the lack of credibility of government policies in general and policies related to investment in particular. Moreover, the exchange rate may be used as a proxy for the accessibility to international capital markets in the sense that higher exchange rates will constrain the government's ability to borrow from abroad since the debt service payments should be made in foreign currency, which increases the burden on the government.*
  - 14 *Here, the interpretation of the estimated coefficient should take into consideration the fact that output gap is included in four interaction terms in this model.*
  - 15 *For more technical details on the HP and adjusted HP filters, see Choudhary, Hanif, and Iqbal (2013).*
  - 16 *See St-Amant and van Norden (1997) for more details on the different measures of potential output and output gap.*
  - 17 *For more details on how poor budgetary institutions in Egypt might affect the country's fiscal performance, refer to El Husseiny (2016a).*
  - 18 *See El Husseiny (2016b) for more details on the effect of government expenditure cuts on the budget deficit-to-GDP ratio in Egypt.*

## Appendix (1)

### Amendments Introduced by the Author regarding the Expenditure Side of the Budget

Name of Budget Chapter According to the New Classification System	Amendments introduced to the data of the period (2005/2006-2013/2014) which is based on the new classification system to comply with the data of the period (1981/1982-2004/2005) that is based on the old system of classification	Notes
<b>Chapter 1: Wages and Salaries</b>	No amendments were introduced to this chapter.	This chapter included the same items in both the old and new classification systems of the budget.
<b>Chapter 2: Goods and Services</b>	<p>The following items were excluded from this chapter:</p> <ul style="list-style-type: none"> <li>- Purchases for resale</li> <li>- Lamp sum allocations and general reserves</li> <li>- Excluded goods and services.</li> </ul>	
<b>Chapter 3: Interest Payments</b>	<p>The following items were excluded from this chapter:</p> <ul style="list-style-type: none"> <li>- Lamp sum allocations and general reserves</li> <li>- Excluded interest payments.</li> </ul>	
<b>Chapter 4: Subsidies, Grants and Social Benefits</b>	<p>The following items were excluded from this chapter:</p> <ul style="list-style-type: none"> <li>- Lamp sum allocations and general reserves</li> <li>- Excluded subsidies, grants and social benefits.</li> </ul>	
<b>Chapter 5: Other Expenditures</b>	<p>The following items were added to this chapter:</p> <ul style="list-style-type: none"> <li>- Lamp sum allocations, general reserves, and all other items that were excluded from the second, third, and fourth chapters.</li> <li>- Purchases for resale that was excluded from the second chapter.</li> </ul>	
<b>Chapter 6: Investments</b>	No amendments were introduced to this chapter.	This chapter included the same items in both the old and new classification systems of the budget.

### Amendments Introduced by the Author regarding the Expenditure Side of the Budget (Continued)

Name of Budget Chapter According to the New Classification System	Amendments introduced to the data of the period (2005/2006-2013/2014) which is based on the new classification system to comply with the data of the period (1981/1982-2004/2005) that is based on the old system of classification	Notes
<b><u>Total Public Expenditure</u></b>	Total public expenditure is given by the sum of the first 6 expenditure chapters in the budget after introducing the abovementioned amendments to the individual chapters.	Using terminologies of the old classification system, total public expenditure represents the sum of the first 3 chapters in the expenditure side, namely, 'wages', 'recurrent expenses and recurrent transfers', and 'investment expenditure'.
<b>Chapter 7: 'Acquisition of Financial Assets' &amp; Chapter 8: 'Loans Repayment'</b>	These two chapters are added together.	The summation value of Chapters 7 & 8 in the new classification correspond to the value of Chapter 4 in the old classification 'capital transfers'.
<b><u>Total Public Utilization</u></b>	Total public utilization is given by the sum of the 8 expenditure chapters in the budget after introducing the abovementioned amendments to the individual chapters.	Using terminologies of the old classification system, total public utilization represents the sum of the 4 expenditure chapters, namely, 'wages', 'recurrent expenses and recurrent transfers', 'investment expenditure', and 'capital transfers'.

Source: Made by the author based on "State's General Budget Classification Manual in Arab Republic of Egypt" by the Ministry of Finance (2016). Available from <http://www.mof.gov.eg/english/pages/statistics.aspx>

### Amendments Introduced by the Author regarding the Revenues Side of the Budget

Name of Budget Chapter According to the New Classification System	Amendments introduced to the data of the period (2005/2006-2013/2014) which is based on the new classification system to comply with the data of the period (1981/1982-2004/2005) that is based on the old system of classification	Notes
<b>Chapter 1: Taxes</b>	The main groups of this chapter were amended as follows:	
<b>Taxes on Incomes, Profits and Capital Gains</b>	<p>The following items were excluded from this group:</p> <ul style="list-style-type: none"> <li>- State's resources development fees</li> <li>- Stamp taxes on salaries</li> <li>- Localities' share in any kind of income taxes.</li> </ul>	
<b>Property Taxes</b>	This group was transferred to the 'other taxes' group.	
<b>Taxes on Goods and Services</b>	<p>The following items were excluded from this group:</p> <ul style="list-style-type: none"> <li>- Stamp taxes</li> <li>- Resources development fees</li> <li>- Fees and royalties.</li> </ul>	
<b>International Trade Tax</b>	<p>The following item was excluded from this group:</p> <ul style="list-style-type: none"> <li>- Localities' share in the tax on imports, exports, and movable capital.</li> </ul>	
<b>Other Taxes</b>	<p>The following items (which were excluded from the previous tax groups) are added to this group:</p> <ul style="list-style-type: none"> <li>- All types of stamp taxes</li> <li>- Resources development fees</li> <li>- Localities' share in all kinds of taxes</li> <li>- Fees and royalties</li> <li>- Property tax.</li> </ul>	
<b>Chapter 2: 'Grants' &amp; Chapter 3: 'Other Non-Tax Revenues'</b>	<p>The following item was excluded from the 'grants' chapter:</p> <ul style="list-style-type: none"> <li>- Capital grants</li> </ul> <p>The following items were excluded from the 'non-tax revenues' chapter:</p> <ul style="list-style-type: none"> <li>- Optional capital transfers</li> <li>- Miscellaneous capital revenues.</li> </ul>	

### Amendments Introduced by the Author regarding the Revenues Side of the Budget (Continued)

Name of Budget Chapter According to the New Classification System	Amendments introduced to the data of the period (2005/2006-2013/2014) which is based on the new classification system to comply with the data of the period (1981/1982-2004/2005) that is based on the old system of classification	Notes
<b>Total Public Revenues</b>	Total public revenues are given by the sum of the first 3 revenue chapters in the budget after introducing the abovementioned amendments to the individual chapters.	Using the terminologies of the old classification system, total public revenues represents the sum of the first two revenues chapters, namely, 'taxes' and 'recurrent revenues and recurrent transfers'.
<b>Chapter 4: Lending Proceeds and Sales of Financial Assets</b>	The following items were added to this chapter: - Capital grants (excluded from chapter 2) - Optional capital transfers (excluded from chapter 3) - Miscellaneous capital revenues (excluded from chapter 3).	
<b>Chapter 5: Borrowing</b>	Borrowing is represented by the difference between total public utilization, on one hand, and the first 4 chapters in the resources side (after introducing the abovementioned amendments to the individual chapters), on the other hand.	Using terminologies of the old classification system, public borrowing represents the difference between the four expenditure chapters, namely, 'wages', 'recurrent expenses and recurrent transfers', 'investment expenditure', and 'capital transfers', on one hand, and the first three revenue chapters, namely, 'taxes', 'recurrent revenues and recurrent transfers', and 'capital revenues', on the other hand.
<b>Total Public Resources</b>	Total public resources are given by the sum of the 5 revenue chapters of the budget after introducing the abovementioned amendments to the individual chapters.	Using terminologies of the old classification system, total public resources represent the sum of the four chapters on the revenue side, namely, 'taxes', 'recurrent revenues and recurrent transfers', 'capital revenues' and 'loans and credit facilities'.

Source: Made by the author based on "State's General Budget Classification Manual in Arab Republic of Egypt" by the Ministry of Finance (2016). Available from <http://www.mof.gov.eg/english/pages/statistics.aspx>

## Appendix (2)

### Description and Measurement of the Study's Variables

Variable Name/ Symbol	Variable Description and Measurement	Data Sources
Output Gap (output_gap)	Calculated by the author as the percentage deviation of actual real GDP from its trend level as measured by the HP filter. Smoothing parameter (Lambda) = 100.	Data on real GDP obtained from the Ministry of Planning.
Public Expenditure-to-GDP Ratio (exp_gdp)	Calculated by the author as the ratio of total public expenditure to GDP at current prices.	
Public Revenues-to-GDP Ratio (rev_gdp)	Calculated by the author as the ratio of total public revenues (defined as the sum of taxes; grants; non-tax revenues; and lending proceeds and sales of financial assets) to GDP at current prices.	
Taxes-to-GDP Ratio (tax_gdp)	Calculated by the author as the ratio of taxes to GDP at current prices.	Data on fiscal variables obtained from the Ministry of Finance.
Primary Cash Deficit-to-GDP Ratio (pri_cash_def_gdp)	Calculated by the author as the ratio of cash budget deficit, excluding interest payments, to GDP at current prices. Cash deficit here is defined as the difference between total public expenditure and total public (recurrent) revenues.	Data on GDP at current prices obtained from the Ministry of Planning.
Primary Deficit-to-GDP Ratio (pri_def_gdp)	Calculated by the author as the ratio of overall budget deficit, excluding interest payments, to GDP at current prices. Overall deficit here is defined as the difference between total public expenditure and total public revenues, with the latter including recurrent and capital revenues, lending proceeds and sales of financial assets.	
Budget Institutions Dummy (institut)	This dummy variable takes the value '1' for fiscal years from 2005/2006 to 2013/2014 and the value '0' otherwise.	
Business Cycle Dummy (cycle)	This dummy variable takes the value '1' when output gap is positive (expansion periods) and the value '0' otherwise (recession periods).	

**Description and Measurement of the Study's Variables (Continued)**

<b>Variable Name/ Symbol</b>	<b>Variable Description and Measurement</b>	<b>Data Sources</b>
Credit-to-GDP Ratio (credit_gdp)	This variable measures the domestic credit to the private sector as a percentage of GDP.	World Development Indicators (WDI) Database- 2013.
Official Exchange Rate (exchange)	This variable reflects the foreign exchange rate. It is measured by the amount of local currency (Egyptian pound) that can be purchased by one US dollar.	