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Abstract

Fiscal policy is empirically proven in many papers as procyclical in developing countries as a result of longstanding weaknesses in budgetary and political institutions. We investigate the cyclicality of fiscal policy in Egypt and the influence of budgetary and political institutions on fiscal indicators during economic cycles. We measure the cyclicality of different components of the Egyptian budget in a disaggregated manner. Golden rule violation in Egypt adversely affected fiscal aggregates and contributed to adopting a countercyclical behavior during business cycles; then a procyclical policy over the long run when debt and deficit reach uncontained levels. Moreover, common pool, principal-agent and voracity problems in Egypt have also influenced the cyclicality of fiscal policy in Egypt as they have lead into an exacerbated pressure on public expenditure during booms and recessions in the examined period. Re-adopting the Golden rule to control the current spending trends and limit discretionary fiscal interventions is recommended. In the longer term, we recommend enhancing the quality of political institutions through changing the electoral system towards a party-based, rather than an individual-based system in order to moderate opportunistic abuse of fiscal aggregates and limit political influences over the budget.

Keywords: Fiscal Cyclicality, Budget Institutions, Budget Deficit, Business Cycles, Electoral Systems.

JEL Classifications: H3 and H5.

Introduction

While Keynesian conventional wisdom argues for a countercyclical behavior of fiscal policy to ensure the efficiency of the stabilization function, empirical literature show that in many developing countries and emerging economies, fiscal policies don't precisely follow this trend. Underlying structural determinants- such as poor access to credits during economic cycles, weak budgetary and political institutions, social and political instability in times of crises as well as structural inefficiencies in fiscal performance-might contribute to a procyclical behavior of fiscal policies in these countries. Proper institutional settings should limit fiscal-expansion in good times and avoid pressures to increase expenditure and lower taxes during booms. In general, countries with structural challenges in public finance tend to have more procyclical policies (Venes, 2010; Woo, 2008; Bova et al., 2014; Ilzetzki, 2010).

Limited number of studies has analyzed the cyclicality of fiscal policy in Egypt. However, evidence on the role of budgetary and political institutions on the cyclicality of fiscal policy in Egypt is still ambiguous. Egypt witnessed many changes with regards to its fiscal discipline as well as budgetary and political institutions since end 1970s. Changes in fiscal and political settings have impacted fiscal performance in several manners. Recent dynamics in political and institutional settings pre and post January's revolution are argued to have extended adverse impacts on fiscal performance. The paper intends to address the interrelationships between budgetary and political institutions in determining the cyclicality of fiscal policy in Egypt.

Our hypothesis is that the cyclicality of fiscal policy is a function of both budgetary and political institutions. We analyze the cyclicality of fiscal policy in Egypt during the period 1976-2017 and analyze the role of both budgetary and political institutions during the economic cycles in Egypt. While several research contributions have examined the impact of budgetary institutions on fiscal cyclicality, few incorporated political institutions into the analysis as potential determinants of the cyclicality of fiscal policies.

This paper is organized as follows: in section one; we start by reviewing the theoretical and empirical literature on the cyclicality of fiscal policy, its determinants and the role of budgetary and political institutions altering the cyclical trends of fiscal policy. In section two we empirically examine the cyclicality of the Egyptian fiscal policy during the period 1976-2017 since the initiation of the economic transition in Egypt and the adoption of the Infitah policy. The impact of budgetary and political institutions on fiscal cyclicality is also examined using Vector Error Correction Mechanism. The paper finally concludes and defines some policy recommendations to improve fiscal performance in Egypt; particularly in recession times.

1. The cyclicality of fiscal policy – origins from economic theory and evidence from empirical literature

The origins of arguments supporting countercyclical fiscal policy belongs back to the so-called "Keynes conventional wisdom". Keynes theory is the origin of countercyclical fiscal policy arguments advocating for increasing deficit spending during recession to boost economic growth

and increase employment. Keynesian policies were first applied during the Great Depression in U.S. and other Western economies. They were applied several times in major economic history events and most recently they were applied in the International Financial Crisis. It was even said the President Obama was Keynesian as he enacted tax cut programs and other countercyclical discretionary fiscal policies during the crisis. Table (1) illustrates that during International Financial Crisis in 2008 most developed and developing countries adopted significant fiscal stimulus to boost economic growth.

Table 1. Fiscal Stimulus packages % of GDP in some economies during International Financial Crisis

Countries	2009	2010
Argentina	4.7%	1.4%
Russia	4.5%	5.3%
Spain	3.7%	--
South Korea	3.6%	1.1%
Finland	3.3%	--
China	3.1%	2.7%
South Africa	3.0%	2.1%
Japan	2.8%	2.2%
Australia	2.7%	1.7%
Canada	1.8%	1.7%
United State	1.8%	3.8%
Germany	1.7%	2.2%
United Kingdom	1.6%	--
Mexico	1.5%	1.0%
France	1.2%	1.1%
Turkey	1.2%	0.5%
Brazil	0.7%	0.6%

Source: Aizenman, J and Jinjarak, Y. (2011)

Keynes countercyclical policy relies on the assumption that fiscal policy stabilization function will smooth the business cycle by lowering taxes and increasing social spending components during recessions. While Keynes advocates for the discretionary forms of fiscal policy, the neoclassical model addresses fiscal policy from a close, but different perspective as it focuses on automatic stabilizers. According to Barro's (1979) neoclassical model and the tax smoothing hypothesis, budget balance should work to absorb changes to tax revenues during cycles. However, although the neoclassical model assumes that the pattern of fiscal expenditure is exogenously determined,

government consumption in the neoclassical model can also be perceived as counter-cyclical (Halland & Bleaney, 2009) [3] .

Advocators of countercyclical fiscal policy argue that governments should decrease discretionary government spending during booms since automatic stabilizers are supposed to work, while in times of recession, governments would increase discretionary spending. This is under the assumption of the presence of effective automatic stabilizers such as tax rates; especially progressive types (Alesina et al., 2008) and social programs such as unemployment benefits. Oppositely, in times of recession, government should increase discretionary spending in the form of increased spending and decreased revenues in order to stimulate aggregate demand and raise employment.

However, the relevance of Keynesian economics to developing economies is questionable. The nature of the cycle in developing countries might be different from developed countries. Many developing countries suffer from persistent structural fiscal problems regardless of the nature of the economic cycle. Those countries suffer from poor budget process resulting from poor institutions in addition to political disruptions, inherited big government from previously adopted socialist policies and related deformities. Political pressures and principal-agent problems as well as common pool problems are sounder in developing countries with loose fiscal rules and political Institutions.

1.1. Fiscal policy tends to be more procyclical in developing countries

Keynesian conventional wisdom affirms that fiscal policy should behave countercyclically to ensure the efficiency of the stabilization function (Leith and Wren-Lewis, 2005; Venes, 2006). However, empirical literature show that in many developing countries and emerging markets, fiscal policies tend to be rather pro-cyclical; that is: spending too much in booms which leads to a forced cut back in recessions (Frankel, 2011). This is not the case in developed countries as many literature claim. Ilzetzki (2010) reviews a wide strand of literature that affirms that fiscal policy in most high-income countries follow a counter-cyclical behavior with regards to both expenditure and taxation. In the same manner, Frankel et al. (2013), evidently proves that fiscal policy is procyclical in developing countries and countercyclical in developed ones and argues shifting from procyclical to countercyclical behavior causes an overall welfare shift. Alesina et al. (2008) and Ilzetzki and Vegh (2008) affirm a procyclical behavior in developing economies opposite to a countercyclical behavior in developed countries.

In a close manner, Gavin and Perotti (1997) find fiscal policy to be highly procyclical in Latin America and Venes (2006) affirms this conclusion and finds that higher level of income inequality are associated with higher procyclicality on the revenue side. Manasse (2006) provide evidence that both developing and developed countries are acyclical in bad times and procyclical in good

[3] For more information on the theoretical arguments supporting the counter-cyclicality of fiscal policy, review Halland & Bleaney, 2009

times, the difference is that bad times in developing countries are much worse or prolonged than in developed countries.

1.2. Do budgetary and political institutions determine fiscal cyclicality in developing countries?

A lot of reviewed literature assumed that procyclicality of fiscal policy is linked to financial, political and institutional determinants. Three main determinants of procyclicality of fiscal policy in developing countries have been consistently mentioned in the reviewed literature: **First**, imperfect access to credit during crisis times, limited access to financial markets and lack of financial depth; especially external financing. **Second,** political factors that influence spending decisions during booms and recessions. Inefficiencies in political institutions during social and political instability and crises directly affect fiscal performance. **Third,** the quality of budget institutions that lead to structural inefficiencies in fiscal performance; whether in equilibrium or during cycles. In general, countries with structural fiscal problems tend to have more procyclical policies (Venes, 2010; Woo, 2008; Bova et al., 2014; Ilzetzki, 2010). Stabilization programs and policies implemented in developing countries supported by IMF are also included in literature as determinant factors of the cyclicality of fiscal policy (Venes. 2006).

1.3. Budgetary institutions as determinants of fiscal cyclicality

Efficient budgetary institutions are argued to play a strong role in adjusting fiscal responses; particularly during crisis and economic downturns. In weak governments, sudden economic cycles make it harder for countercyclical fiscal policy; particularly discretionary fiscal policy, to work. Designing fiscal stimulus packages and tax cut programs take longer times to be effectuated with weak fiscal discipline and budgetary institutions however, having strong institutions might lead to less dependence on discretionary fiscal policy, and should give a space for automatic countercyclical stabilizers to operate. According to Bova et al. (2014), although imposing countercyclical fiscal rules during recessions means that governments have less tools to react to business cycles during recessions, such rules could initially limit large expenditure expansions during booms and sudden contractions during recessions. In the same manner, Ilzetzki and Vegh (2008) argue that if fiscal rules were present, countercyclical fiscal policies would be optimally producing proper solutions to business cycles.

Several studies have examined fiscal aggregates as determinants of the cyclicality of fiscal policy. For example, Dabla-Norris and others (2010) examined the responses of fiscal variables to the quality of budget institutions in low-income countries and found that countries with stronger budget institutions would be able to better conduct countercyclical policies. Combes et al. (2017) investigated the reaction of fiscal policy to the business cycle in a set of developed and developing countries. Their interesting finding was that the non-linear response of fiscal policy to business cycle is attributed to the level of public debt to GDP ratio; once exceeds “a threshold” of 87%, fiscal policy becomes procyclical. In a close manner, IMF (2003) suggests that primary surplus response to the economic cycle weakens as the debt-to-GDP ratio rises, and simply stops when debt exceeds 50% of GDP. Combes et al. (2017) examined several forms of fiscal rules and

concluded that the most significant fiscal rule when public debt is high is the Golden Rule. When public debt is high, golden rules can play a role in switching fiscal policy from procyclical into countercyclical. The Golden Rule is one of the most important fiscal rules that manage the operation of fiscal policy. According to the rule, a government should not borrow except to finance capital spending or investment. Hence, a government cannot borrow, neither during recessions nor during booms, to finance current spending on social benefits programs, wages, and interest payments.

A number of literatures, including Combes et al. (2017) highlight the fact that in general, fiscal rules are significantly affecting the cyclicality of fiscal policy conditional on the presence of certain factors and institutions. Their results also affirm other similar results of Bergman and Hutchinson (2015); that fiscal rules reduce procyclicality in fiscal policy only in the case of a strong and efficient government[4]. In our previous work (Zaky and El-Khishin, 2016a,b), we measured the quality of budget institutions in Egypt and mentioned how the weaknesses in budget institutions in Egypt - especially weaknesses in transparency, credibility and comprehensiveness' rules- influence fiscal performance. The soundest institutional weakness we highlighted was the violation of the golden rule in 2005; a violation that granted the Egyptian Ministry of Finance a greater power to finance significant increases on wages, interest payment, and social protection programs from borrowing. This has resulted in a substantial increase budget deficit, public debt, and again in interest payments.

1.4. Political institutions as determinants of fiscal cyclicality

On the other hand, the role of political institutions and factors, such as electoral rules, partisan political cycles and quality of democracies, have been also investigated as determinants of fiscal cyclicality. Gavin and Perotti (1997), Garayeva and Tahirova (2016) and Bova, Carcenac and Guerguil (2014) presented evidence of pro-cyclical government spending in developing countries as a result of political distortions, principal agent problems, common pool problem, as well as other political pressures ; particularly when accompanied with poor fiscal institutions and "when policymakers are allowed to freely manipulate government spending". In a close manner, Frankel and others (2013) find that the cyclicality of a country's fiscal policy is inversely related the quality of specific political institutions such as law effectiveness, bureaucracy and control of corruption. Ilzetzki and Vegh (2008) argue that political institutions are key determinants of the cyclicality of fiscal policy through encouraging rent-seeking activities. Similarly, Halland & Bleaney, 2009 argue that fiscal procyclicality is in itself a sign of political distortions.

In our previous work (Zaky and El-Khishin, 2016a,b), we highlighted two main political institutions problems that affect fiscal performance significantly, especially when budgetary institutions are not strong enough: The common pool problem and the principal-agent relationship between voter (the principals) and politicians (the agents). The two problems are empirically

[4] For more findings on the conditionality of fiscal rules significance on procyclicality, see Combes et al (2017).

proven to have affected fiscal performance significantly in many world countries and Egypt was not an exception. The effect is clearly larger fiscal deficits and higher debt levels[5]. Common pool problem results when politicians take biased decisions to spend money in favor of their constituencies at the expense of the whole economy of taxpayers. In this case, targeted individuals or constituencies just pay a fraction of the total costs of the provided service. This creates a high incentive for externalities where interest groups free ride on each other's contributions; thus indicating a bias towards overspending. Common pool problem directly results in a spending bias and the net benefits for taxpayers become lower than the net benefits of the targeted groups. On the other hand, principal-agent problem occurs when the demands and preferences of voters are not consistent with the priorities of their political representatives. This is a result of politicians' biased actions that seek to extract rents from being in office and spend public money on projects other than those voters desire to serve their own interests. The consequence of the political principal-agent problem is political catering to special interests. Elected politicians usually use fiscal "redistributive policies" to influence the provision and distribution of targeted public goods. This is generally their strategic tool to guarantee their re-election or staying in office (Potrafke, 2013; Perrson and Tabellini, 2003; and Von Hagen, 2005; 2006).

The impact of those two problems in partlicular on fiscal cyclicality was examined in some literature. For example, Alesina et al. (2008) argue that fiscal policy is procyclical in developing countries as a result of what he names "political agency" problems, where voters demand more public goods during booms and lower taxes and politicians respond to these demands in light of the political principal-agent and rent-seeking behaviors. Alesina et al. (2008) empirical evidence affirms that procyclicality of fiscal policy is more sound in more corrupt democracies.

Woo (2009) empirically examines the impact of social polarization on procyclicality and finds a strong evidence that countries with strong social polarization are more likely to exhibit procyclical fiscal policies[6]. In this regard, he argues that the heterogeneity of policy makers may lead to a bias in spending that appear to be individually rational but collectively inefficient Zoo (2008). This is another way to explain a common pool problem that creates free riders of a public spending decision; particularly if it is a discretionary policy. Woo (2009) affirms that political system with high plurality – "in which power is diffused among a number of agents" – will lead to a greater pro-cyclicality. Ilzetzki (2010) argues that fiscal policy is procyclical in developing countries because of political distortions resulting from high political fragmentation and disagreement on the desired distribution of public expenditures.

In addition to the common pool and principal-agent problems, some literature mentioned the voracity effect as another political institutional problem that influence the cyclicality of fiscal policy. The voracity effect was first introduced by Tornell and Lane (1999) as a cause of political cyclicality in developing economies with poor political institutions. Tornell and Lane (1999) and

[5] For a detailed literature review and analysis, see: Zaky & El-Khishin (2016a).
[6] Social polarization of preferences arises from inequality.

Venes (2010) explain the voracity effect as a case when powerful political groups significantly affect the fiscal process in a way that slows growth in equilibrium times and generates a "*more-than-proportionate change* in fiscal redistribution and reduces growth" during economic cycles; hence a procyclical behavior. Accordingly, decreasing the political concentration of power, through a democratization process will lead to diluting powerful political groups' influence over the budget process and will eventually lead to lower pro-cyclical responses to economic cycles, hence a better fiscal and economic performance.

2. Evolution of budgetary and political institutions in Egypt during the period 1976-2017 paradigm shifts in budgetary institutions

Primarily, Egypt used to enact the budget law no. 73/1973 to impose strict rules on public spending. For example, the law included an article to effectuate the golden rule; that is, prohibit borrowing to finance current expenditure. Additionally, the law supported using the accrual basis of accounting in preparing and implementing the budget. According to this law, Egypt's budget follows a line items budgeting approach when it comes to both administrative and functional classifications. However, it is worth noting that these classifications were not transparent and totally inconsistent with Government Finance Statistics (GFS) system. Also, the law didn't impose economic classification to clarify economic effects of different budget items.

On the other hand, the Egyptian budget process was very centralized. The minister of finance used to control all stages of the budget cycle. Parliament didn't have any right to modify executive's budget draft. The time allowed to the parliament and the authorities to discuss and enact the budget was very limited and usually the law used to be passed without any modification (rubber stamping). Aggregated and undistributed appropriations used to be a significant item in enacted budgets. In addition, there were a lot of budget directives that gave finance minister unlimited authority to modify and increase public expenditure during fiscal year without getting prior approval from the parliament. Accordingly, a significant deviation between enacted budget appropriations and actual figures in final accounts was a norm.

According to law no. 79/1979, a large group of public entities were detached from the budget. However, these entities continued to be affiliated administratively to the line ministries in accordance to their functions. These entities, called general economic authorities, were the key arm of the government to provide different kinds of subsidies and financial support. Government used to control the prices of the majority of goods and services provided by these entities under the obligation of financing their annual deficit. As such, the activities of the majority of these economic authorities are nonmarket activities. These entities, to a great extent, are types of off-budget expenses that are provided through extra budgetary and Quasi-fiscal activities. However, one can't deny that in many cases there were some trade and business activities that took place in these entities.

The 1979's amendments also separated investment budget process from the rest of budget process, which was a clear contributor to the budget dualism problem that is still persistent until today. In this regard, the minister of planning is in charge of the investment budget while the rest of budget's chapters are under the authority of the minister of finance. And we can also argue that the minister of planning used to have the same unlimited authority towards the investment chapter just like the minister of finance. Both finance and planning ministers had discretionary authorities over public expenditure; they had the rights to make sharp cuts in public expenditure proposed from line ministers. Accordingly, line minsters used to conceal earmarked revenues during the preparation and negotiations stage of the budget to finance their expenditure during the fiscal year. In this regard, line-minsters constituted a lot of special funds inside their ministries to keep revenues out of the budgeting process. Finally, it should be mentioned that the 1979's amendments confirmed preparing and implementing all budget chapters based on a cash basis. However, it is worth noting that, later, the Government Accounting Law no 127/ 1981 stated the necessity of applying an accrual basis in investment budget. In 1991 the government of Egypt started implementing the ERSAP program, which also included a further separation of public entities from the budget. According to law no 203 for the year 1991, the government established a public business sector to contain all public corporates that might be privatized. It also should be affirmed here that many of these firms were a financial burden on the budget due to their annual financial losses.

The major paradigm shift in budgetary institutions in Egypt took place in 2005. Essential amendments to the budget law enacted by law no. 87/2005 contributed significantly and positively to transparency and credibility practices in the budget. Amendments to the budget law resulted in adopting a complete new economic classification, and modifying functional classification, to be consistent with GFS System. The structure of budget presentation was noticeably improved in a way that shows more details and the aggregation process became rather easier. Based on data availability with international standards of classification and recording, the Ministry of Finance worked on capacity building to prepare and publish quarterly and monthly follow up reports on budget operations. Aside from presentation reforms, that law also enforced numerical ceilings on contingency funds and aggregated appropriations in the executive's budget draft. Moreover, petroleum subsidies, which used to be an off-budget activity, were for the first time presented explicitly in budget documents since 2005/06. One can't deny that such procedures were a major achievement towards improving budget transparency. The law no. 87 of 2005 also introduced tight numerical rules on budget appropriations and allocations of resource during budget cycle in order to mitigate level of centralization and degree of delegation granted to Financing and Planning Ministries and enhance budget transparency and credibility. For the first time, according to article no. 24 of the 2005 law Finance and planning Minsters must obtain prior approval from the parliament before increasing expenditure or transformation expenditure from one chapter to another during budget implementation. Additionally, the law enforced numerical ceilings on contingency funds and aggregated appropriations in the executive's budget draft[7]. Besides, applying tight

7 According to article no. (10) of law 87 of 2005 amending the budget law, unallocated expenditure of any budget

numerical ceilings on the authority of finance and planning ministries related to transferring budget appropriations inside any budget chapter during budget implementation.

However, in the midst of all the above positive achievements, the most striking amendments to budgetary institutions in 2005 were the adoption of fully cash basis of accounting in all budget chapters including the investment chapter[8]. And more striking, violation the golden rule and allowing for financing current expenditure through borrowing[9]. To conclude, violating the golden rule and applying a fully cash accounting base in budget preparation resulted not only in increase of deficit percentage to GDP, but also in substantial change in the structure of the budget deficit. In this regard, the operation deficit witnessed a substantial increase at the expense of public investment. Naturally, these structural changes in public expenditure and deficit expose public finance to more fiscal risks in addition to their effect on public infrastructure and capital expenditure.

On the other side, and to increase budget transparency and credibility, the year 2005 witnessed a new trend targeting to restrict the role of budget directives in modifying budget appropriations during the fiscal year. These directives were giving the Financing and Planning Ministries the authority to amend budget appropriations during implementation stage without having in advance approval from the parliament. Finance and planning ministers were keeping these directives to have flexibility to amend budget appropriations during implementation stage of budget. To affirm this trend, the 2007 constitutional amendments sated on the necessity of having prior approval from the parliament before increasing expenditure or transformation expenditure from one chapter to another during budget implementation and also granted the parliament the authority to amend the executive's budget proposal provided the agreement with the government on how to obtain required resources for finance. The constitutional amendments went further with the widening of

agency shouldn't exceed 5% of total expenditure of this agency. Also, general unallocated funds shouldn't exceed 5% of total expenditure in state budget without interest payments appropriations.

8 According to article no. (12) of budget law no. 53 of 1973, the budget was fully prepared and implemented in accrual basis of accounting. This article changed twice. The first time was based on the law no. 11 of 1979, amending budget law and resulted in adopting accrual basis in investment budget only and cash basis in the rest of budget. The second time was based on law no. 87 of 2005 amending budget law and leaded to adopting fully cash basis in budget. This gradual transmission from fully accrual to fully cash basis in budget process resulted in a lack of transparency and deterioration in fiscal discipline because of mismatching between timing of expenses and their impact on economy. Besides, increases in the hidden deficit because accumulation of untraceable current and investment arrears. In addition to missing of clarity in financial relations between budget and public economic authorities as a result of difference in accounting basis between them. Many public economic authorities are enforced to implement quasi fiscal activates where they provide their goods and services on nonmarket prices (subsidized prices), and assumed to get subsides from state budget in case of achieve losses. The public economic authorities adopt accrual basis however, state budget preparation and implantation are on cash basis of accounting.

9 The law no. 87 of 2005 amending budget law cancelled article no. (18) that didn't allow financing current expenses from borrowing. Cancellation of the mentioned article resulted in lack in budget transparency and accountability; and significant increase in budget deficit because of two factors; aggregating current expenses with capital investment under one budget balance (cash deficit), and Adding room to government to finance sharp and continues increase in current expenses including; wages bill, subsides, and interest payments from borrowing.

the scope of authority of the parliament to give it enough time to modify and enact the budget and audit final accounts. In this regard, the amendments developed new submission dates for the executive's budget draft and final accounts (year-end report) to the parliament to be in accordance with best practices worldwide. Submission timing of executive draft budget to parliament were amended to three months prior to the end of fiscal year instead of two months and the submission timing of final accounts (year-end report) was amended to six months after the end of fiscal year instead of twelve months. Additionally, in 2008 and based on the article no. 31 of law no. 109 amending budget law, submission timing of final accounts (year-end report) from ministry of finance to the parliament became four months by maximum after the end of fiscal year.

2.1. The electoral system in Egypt after two revolutions did not witness any fundamental changes

In regard of changes in electoral system, it should be mentioned that Egypt was following a majoritarian run-off electoral system till 2010 where candidates competed on 222 two-member constituencies and had to obtain 50%+1 of votes to win a parliamentary seat. This electoral system meant that majoritarian, candidate-based voting had dominated the electoral context before January 2011 revolution. In 2014 Egypt has adopt new constitution however, absolute majoritarian electoral system applied in Egypt for both the individual and list seats based on the new constitution ratified in 2014 does not differ from the system that was in place before January's Revolution. It is a kind of candidate – ballots' electoral systems not 'party-ballots' systems. The candidate – ballots' systems are based on political individualism and opportunism. Direct relationship between candidate and voters makes the top priority of MPs, is to increase public spending for their constituencies (Zaky & El Khishin, 2016b). However, it should be mentioned that the amendments in budget law and in constitution during the period 2005 -2008 resulted significant changes in political institutions based on strengthen the role of parliament in budget process.

On the other hand, the examined period, 1976-2017, witnessed several business cycles in Egypt. In the recent years, Egypt witnessed a set of political and economic downturns; particularly after the 25th of January revolution in 2011 real economic growth rates slowed down, to negative figures in some quarters, budget deficit and public debt exacerbated, exchange rates depreciated and accordingly the economy witnessed a general economic slowdown that continued until the beginning of 2015. In the midst of these political and economic dynamics, a new constitution was ratified in Egypt that contained minor amendments in electoral system and consequently the budget process.

Most recently, Egypt's public finance had witnessed dramatic changes as part of the IMF-supported structural reform program in an attempt to reform the longstanding structural problems in the state budget. The components of the program, though focusing on general structural reforms, appear to be procyclical, since they mostly focus on decreasing the subsidies components and increasing the revenues through introducing new tax measures and adopting value added tax

regime. However, we cannot claim that the Egyptian fiscal policy has always been procyclical without an empirical examination. In this paper we attempt to investigate the cyclicality of the Egypt fiscal policy. We additionally measure the role of budget and political institutions in impacting the cyclicality of fiscal policy in Egypt. We examine the following three questions:

3. Examining the interrelationship between fiscal rules, political institutions and the cyclicality of fiscal policy in Egypt

3.1. Political institutions, budget institutions and fiscal cyclicality in Egypt: The model and analysis

The examined period, 1976-2017, witnessed several business cycles in Egypt. In the recent years, Egypt witnessed a set of political and economic downturns; particularly after the 25th of January revolution in 2011 real economic growth rates slowed down, to negative figures in some quarters, budget deficit and public debt exacerbated, exchange rates depreciated and accordingly the economy witnessed a general economic slowdown that continued until the beginning of 2015. Most recently, Egypt's public finance witnessed dramatic changes as part of the IMF- supported structural reform program in an attempt to reform the longstanding structural problems in the state budget. The components of the program, though focusing on general structural reforms, appear to be procyclical, since they mostly focus on decreasing the subsidies components and increasing the revenues through introducing new tax measures and adopting value added tax regime.

A limited number of empirical studies have examined the cyclicality of fiscal policy in Egypt, and they tend to focus on the aggregate figures of fiscal policy variables when analyzing the fiscal cyclicality and its determinants. Hassan (2007) and El-Husseiny (2016) include total expenditure and total revenues as measures of fiscal policy. However, the two papers proposed different conclusions; El-Husseiny (2016) 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 is because Egyptian government can raise its spending during recessions easily; while expenditure contraction during expansion times might be much more difficult due to political economy and institutional factors. On the other hand, Hassan (2007) concludes that the relationship between fiscal policy and the economic activity is very weak, and that is why using fiscal policy to stabilize the output fluctuations is not efficient.

In this paper, we attempt to investigate the cyclicality of the Egypt fiscal policy and to examine the possible relation between budget and political institutions and the cyclicality of fiscal policy in Egypt. We examine the following three questions:

1. *Is the fiscal policy in Egypt pro or countercyclical?*
2. *How did fiscal institutions influence the cyclicality of fiscal policy in Egypt as opposed to* political *institutions? Which of these two forms had the dominant effect on the fiscal cyclicality?*

3. *Does the cyclicality of fiscal policy in Egypt alter when fiscal deficit exceeds a specific threshold in Egypt?*

3.2. Methodology and Data

Empirical literature proposed different approaches to examine interactions between fiscal policy variables and fiscal cyclicality. One of these approaches is using fiscal variables in an aggregated form, for example, Venes (2006) used total government expenditure and total revenues to analyze the role of political and institutional variables on cyclical pattern of government in OECD and Latin America countries. Using public debt and primary balance variables, Manasse (2006) analyzed the roles of shocks, rules and institutions as sources of procyclicality in fiscal policy in 49 emerging and industrial countries. In a structural VAR model, Boiciuc (2015) used total government expenditure and tax revenues as fiscal policy shocks Structured VAR to analyze the effect of fiscal policy shocks on macroeconomic variables such as GDP, inflation and interest rate in Romania.

On the other hand, a limited number of empirical studies preferred to disaggregate the fiscal variables. For example, Calderón and Hebbel (2009) disaggregated the government expenditure into current and capital expenditure and used tax revenues not total revenues and concluded that countries are unable to conduct counter-cyclical fiscal policies if they have poor institutions or lack access to credit markets inside and outside. Mukherjee (2014) analyzed the cyclicality of fiscal policy and found that aggregate government expenditure is largely procyclical, however there is a variation in cyclical behavior across different components of expenditure. Hallerberg and Strauch (2002) further disaggregated total expenditure into transfers, wage compensation, purchases, investments, and on the revenue side they disaggregated taxes into direct and indirect taxes. They found that public investment also displays a consistent procyclical pattern in Europe, where permanent shocks to output induce inconsistent fluctuations in taxes and expenditures in the year of the shock and in periods thereafter.

In this paper, we attempt to address the cyclicality of fiscal policy in Egypt in a disaggregated manner and from a different perspective – both methodologically and empirically. The examined hypothesis is that the budget and political institutions in Egypt have positively contributed to conduct countercyclical policies in times of economic cycles. Our contribution in this regard lies in three aspects: First we attempt to measure the cyclicality of fiscal policy in Egypt in a disaggregated manner. Following Calderón and Hebbel (2009) and Hallerberg and Strauch (2002), we disaggregate government expenditure into current and capital spending. We also disaggregate revenues into taxes and non-tax revenues. The cyclicality of each component is investigated separately. Second, the paper compares the incidence of political institutions as opposed to budget institutions on fiscal cyclicality. We attempt to measure which determinant had the stronger influence on cyclicality of fiscal policy in Egypt in the long run.

Third, and most importantly, instead of depending on dummy variables, as the case in many reviewed literature, we define new variables for political and budget institutions. Regarding budget

institutions, we use the golden rule as a proxy for budget institutions as recommended in some reviewed literature. Egypt used to apply the golden rule until 2005, after which the Egyptian government was legally granted the right to finance current expenditure through borrowing. Reviewed literature usually use dummy measures as a proxy for fiscal rules in general and golden rule in panel analysis. However, since our analysis is limited to Egypt, we use the "Current Deficit" as a new proxy for the golden rule; that is the difference between current revenues and current expenditure. It should be mentioned here that violating the golden rule in 2005 resulted in classifying capital investment above the line of cash deficit within budget expenses. We argue that this amendment enabled the government to finance increased current expenses through borrowing and hence had exacerbated the fiscal deficit (Zaky & El Khishin, 2016b). When the golden rule is abolished, primary deficit is expected to increase due to relying on financing current expenditure from loans.

Regarding political institutions, we are interested to measure the influence of political institutions –both legislative and/or executive- in imposing changes on the budget during the implementation phase. The proxy we define in this regard is "Deviation between Draft Budget appropriations and Actual Spending"; that is, the difference between actual total expenditure and approved executive budget proposal. It should be mentioned here that before 2005, Ministry of Finance had the right - through general directives - to increase public spending during budget implementation without the parliament's approval. This had resulted in a wide gap and significant deviations between actual expenditure and budget appropriations enacted by the parliament. In 2005, Budget Law amendments resulted in constraining the authority of Minister of Finance to amend the budget through applying numerical ceilings on transferring budget appropriations between chapters during budget implementation. The new law had also prevented the executive government from increasing public spending during budget implementation without the parliament's approval.

Moreover, the 2007 constitutional amendments affirmed the restriction of executive authorities over budget at one side, however, they went further with the widening of the scope of authority of the parliament to amend the executive's budget proposal provided the agreement with the government on how to obtain required resources for finance. The new constitutional amendments also gave the parliament longer time to discuss and enact the budget and audit final accounts (Zaky & ElKhishin, 2016). We assume that granting the parliament the authority to participate effectively in budget process should be reflected minimizing the deviation between actual expenditure and budget appropriations.

Vector Autoregression Analysis (VAR) and Vector Error Correction Model are constructed in order assess the multi-dimensional impact of the economic shocks on fiscal performance and fiscal institutional performance[10]. Short run responses of fiscal policy to output shocks are examined in the first model. We disaggregate fiscal components into current expenditure, capital expenditure,

10 Variables and source of data are presented in Annex (1).

tax revenues, other non-tax revenues, overall deficit (all as percentage of GDP). We include a set of control variables; namely, current account balance as a percentage of GDP, lending interest rate and real exchange rate. The variable we use to proxy for the output cycle in the first model is real GDP growth rate.

In the second model, we test the impact of both political and fiscal institutions on the cyclicality of fiscal policy in Egypt. The model includes the output gap as a proxy of output cycle, primary deficit % GDP, current account balance % GDP and real exchange rate, in addition to budget institutions and political institutions proxies. The estimated model uses Egyptian annul data from 1976 to 2017. We use variance decomposition to capture the variable with the highest significant influence on fiscal cyclicality in Egypt.

It's worth mentioning that the first model relies on real GDP growth rate and the second model uses output gap as proxies for business cycle[11]. This is mainly because the first model aims at analyzing the reaction of fiscal policy to changes in GDP. So, real GDP growth rate is more appropriate variable for this analysis. While, the second model aims at studying the effect of political and budget institutions on fiscal aggregates during business cycle, so, the model uses the interaction variables between output gap and both political and budget institutions.

3.3. Model I: Testing the cyclicality of fiscal policy in Egypt

Ho: Fiscal policy in Egypt is countercyclical during the period 1978-2017

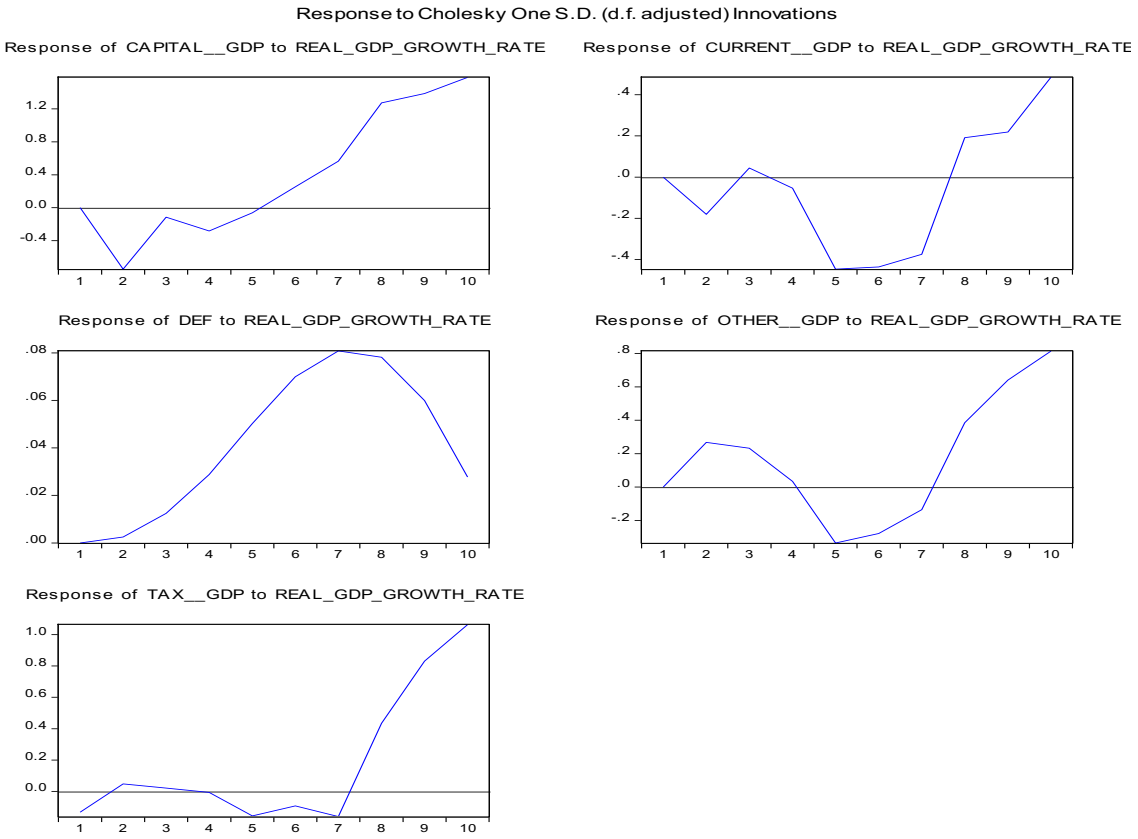
H1: Fiscal Policy in Egypt is procyclical during the period 1978-2017

We test the cyclicality of fiscal policy in Egypt through VAR model[12]. We analyze the effects of growth shocks on fiscal components in a disaggregated manner. For identification of fiscal policy shocks we used a recursive approach (Cholesky decomposition). IRF graphs (figure 1) affirm the positive relationship between capital expenditure and real GDP growth rate. This means the government increases investment spending when the economy is growing and tends to tighten this type of spending in times of economic slowdown. Capital spending in Egypt is hence proven to be procyclical. It is worth mentioning that the capital spending component of total spending is generally very weak. In its highest values in 2008 it was around 14.4% of total spending. It

11 The output gap is defined as the difference between the actual and potential output in percent of potential output. When the output gap is zero, there is no upward or downward pressure on inflation, as actual demand coincides with economy's potential. If the output gap is positive, so that actual output is greater than potential output, inflation will begin to rise in response to demand pressures. Similarly, if the output gap is negative, so that actual output falls below potential output gap, prices will begin to fall to reflect weak demand (IMF, 2015). In this study, the Hodrick-Prescott (HP) filter has been used to filter the actual GDP data and extract from it the trend which represents potential output. Then, the output gap series was calculated by the difference between the series of actual GDP and the series of trend.
12 Prior to running the VAR model, we attempt to test the stationarity of the variables to avoid spurious results. We use Augmented Dicky-Fuller (ADF) unit root test and lag length is determined based on Akaike Criterion. The results of stationarity tests and other diagnostic checks are presented in Annex (2).

decreased to around 6.8% after the revolution and then recently started to show a positive trend reaching around 11% in 2018 (Ministry of Finance).

Figure 1. IRF results for testing the Cyclicality of Fiscal Policy in Egypt

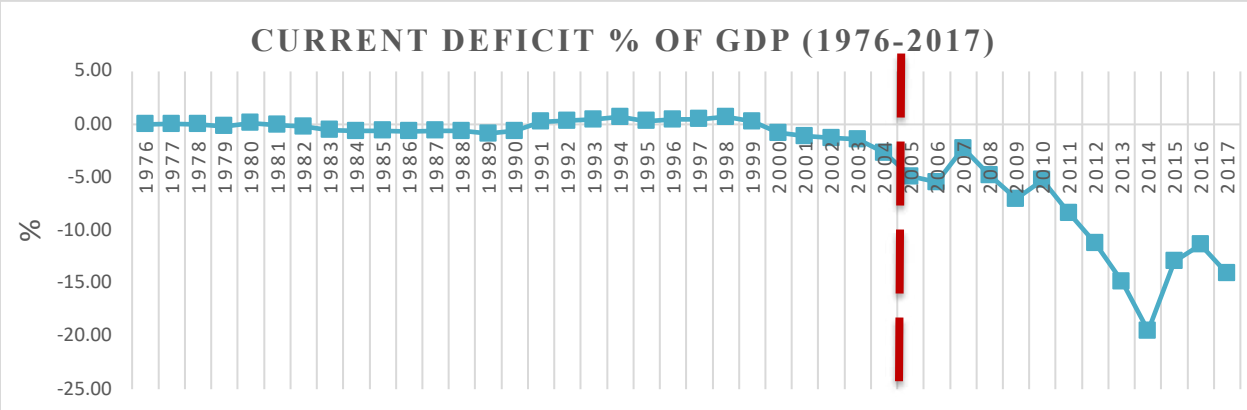


On the other hand, current expenditure response was different. The variable responds negatively to economic growth until fifth lag after which it starts to change its direction and show an increase as a reaction to increase in GDP growth. Hence, current spending starts by being countercyclical then becomes procyclical. This reflects the nature of Egyptian government policies tending to increase current expenditure at the start of recession periods and can be interpreted as follows: When the Egyptian budget deficit and public debt are in contained numbers/thresholds, the government tends to finance recessions through increasing current spending; mainly in the form of wage and subsidy increase. Later, when the government deficit and debt levels exceed contained levels, the government start to pursue contractionary policies. This reaffirms the early mentioned results of Combes et al. (2017) and IMF (2003); that fiscal policy is countercyclical as long as debt levels are contained. Once debt to GDP ratio exceeds a specific threshold, fiscal policy turns to be countercyclical.

A practical example of these reactions can be illustrated after the violation of golden rule in 2005 (figure 2). When Egypt witnessed the first cycle of 2008, there was a dramatic increase in wages, pensions and ration card subsidies. As a result, government increases wages in recession years and

refuses to cut subsidies. For example, during the 2008 recession, the Egyptian Parliament approved an unprecedented increase in basic salaries of central government's employees by 30% in addition to increasing the incentive of local administration employees from 25% to 75%. This is as well as increasing pensions payments by 20%. Additionally, it approved multiplying the quantities of ration cards goods received by citizens. In the long run the overall deficit kept increasing and the government started to control the deficit by decreasing current expenditure even in recession periods. Non-tax revenues have shown the same response to real GDP growth as current expenditure. Meanwhile, the executive government is argued to have the upper hand in increasing public spending even after strengthening the parliament's role in budget cycle in 2005.

Figure 2. Illustration of Golden Rule violation in Egypt



Source: Ministry of Finance, the Egyptian Budget.

Concerning budget deficit, theory indicates that an increase in budget deficit during recession happens through either increasing spending or decreasing revenues. Hence a countercyclical fiscal policy would imply an increasing budget deficit during recession; through the Keynesian famous mechanism of deficit spending. In our model, IRFs indicate a positive relationship between overall deficit and real GDP growth rate during the first 7 lags after which the effect of GDP growth on deficit starting to be negative. This result is intuitive and indicates that budget deficit in Egypt follows the same trend of current spending; that it is, it starts as countercyclical in the beginning of the cycles then turn to be procyclical; possibly after exceeding certain limits. As mentioned above, when the economy is in a recession, current spending increases in the beginning; indicating an increase in budget deficit in the start of the cycle. This is a clear implication of the trend in current spending and affirms the above interpretations.

Regarding tax revenues, they don't have a significant response to business cycles until the 7th lag; after which they start to respond to GDP growth in a positive manner; implying a countercyclical response to the business cycle. This can be justified by the fact that taxation policies in Egypt are not the prime discretionary tools resorted to during recessions. Egyptian government usually resorts to spending policies as a result of having a poor tax administration. Egypt suffers from a very high tax evasion rates in addition to informality problems which weakens the impact of any tax-based policy intervention and hence weakens the significance of this policy in the model. In

this manner, the only effect of tax revenues in Egypt is the automatic stabilizer effect which is normally countercyclical.

3.4. Model II: Testing the impact of political institutions and budget institutions on the cyclicality of fiscal policy

H_0: political and budget institutions significantly impact on the cyclicality of fiscal policy in Egypt.

H_1: political and fiscal institutions do not impact on the cyclicality of fiscal policy in Egypt.

After applying unit root tests and deciding on the proper lags[13], Cointegration tests are performed to determine whether there is long run relationship among the variables[14].

VECM is applied to illustrate the short and long run interactions between political institutions, budget institutions and output gap. As indicated earlier, other control variables in this model are current account balance % GDP and real exchange rate, and λ represents error correction term.

We attempt to measure the impact of both fiscal and political institutions on the fiscal aggregates during economic cycles. Interaction variables explain the interactions between the cycles and both political and fiscal institutions. Our VECM model specification examines how both variables is as follows:

$$\text{Primary deficit}_t = \beta_0 + \beta_1 \text{Polit\_inst*Output\_Gap}_t + \beta_2 \text{Budg\_inst}_t\text{*Output\_Gap} + \beta_3 \text{CA\_GDP}_t + \beta_4 \text{REXR} + \lambda \text{ECM}_{t-1} \quad (1)$$

The model uses dummy variable to capture the structural break in budget institutions indicator - current deficit. The dummy variable has been added to the model as exogenous variable and takes value zero from 1976 to 2004 and one from 2005 (after abolishing the Golden Rule) to 2017[15].

After running the VECM, the results are:

$$\underset{}{\text{Primary deficit}_t} = \underset{}{13.843} - \underset{(0.00338)}{0.029}\ \text{Polit\_inst*Output\_Gap}_t - \underset{(0.00073)}{0.0049}\ \text{Budg\_inst}_t\text{*Output\_Gap} - \underset{(0.42777)}{3.038}\ \text{CA\_GDP}_t - \underset{(0.96613)}{1.280}\ \text{REXR}_t - \underset{(0.05775)}{0.096}\ \text{ECM}_{t-1}$$

[13] Stationarity and diagnostic checks are in annex 3, model results are in annex 4.

[14] Johansen Cointegration test has been chosen to test the long run relationship. Trace and maximum Eigen values are used to determine the presence of Cointegration between variables. The results of Cointegration results illustrate that there is one Cointegrating equation based on Trace test and Maximum Eigen value test at 5% level of significance.

[15] It is worth noting that we didn't use any dummy for political institutions the model doesn't use any dummy variable because the constitutional amendments haven't led a significant change in the magnitude of deviations between actual and draft budget.

With regards to the long-run relationship, the above equation shows that both political institutions and budget institutions variables impact primary deficit in a positive manner. These results have very important implications. First, earlier we defined political institutions as the deviation of actual expenditure from appropriated draft budget, hence, larger deviation means that discretionary measures - pursued by either the parliament or the executives- are imposed to increase spending. If this happens during a recession; that is an increased output gap, this means that fiscal policy is countercyclical and vice versa. In the above equation, the negative coefficient of political institutions in the equation indicates a strong influence of the political institutions, whether the legislative or the executive, to amend fiscal appropriations during the budget cycle. The negative coefficient indicates that wider output gaps (i.e. recession times) are associated with a shrinkage in deviations between actual spending and appropriated budget. This result implies that political institutions in Egypt have played a role in making fiscal policy procyclical in the long run through discretionary interventions.

This result could be justified in light of the structure of the Egyptian political powers and the concentration of power, indicating Tornell and Lane (1999) voracity effect or the "more than proportionate change" as a result of political powerful groups as earlier explained in the paper. Moreover, the significant coefficient indicates that our earlier assumption, that granting the parliament the authority to participate effectively in budget process should be reflected in minimizing the deviation between actual expenditure and budget appropriations, didn't hold. Even after granting the parliament the power over budget amendments, this has not led into a significant decrease of the deviation between actual and planned spending. Voracity effect is obvious in the case of Egypt. Egypt's political regime is characterized by the political concentration and influence over power and decision- making centers. They always have a strong influence on government decisions and the management of public finance, whether through their presence in government or parliament. They belonged naturally to the ruling National Democratic Party (NDP) before the January 25 revolution 2011 (Table 2 and Figure 3).

Table 2. Distribution of Parliament Seats, 2005-2015[16]

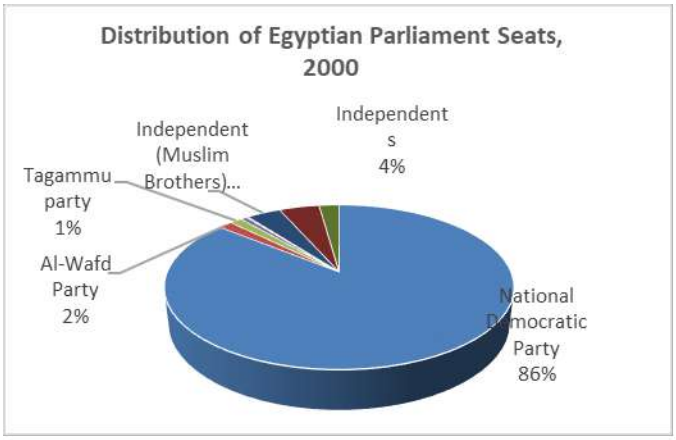
	Majority Party/ Coalition	**% of total Seats**
2000	National Democratic Party	73
2005	National Democratic Party	86
2012	Muslim Brotherhood	44
2015	Independents	56
2015 (After the formation of "Support Egypt" Coalition	Support Egypt Coalition	53

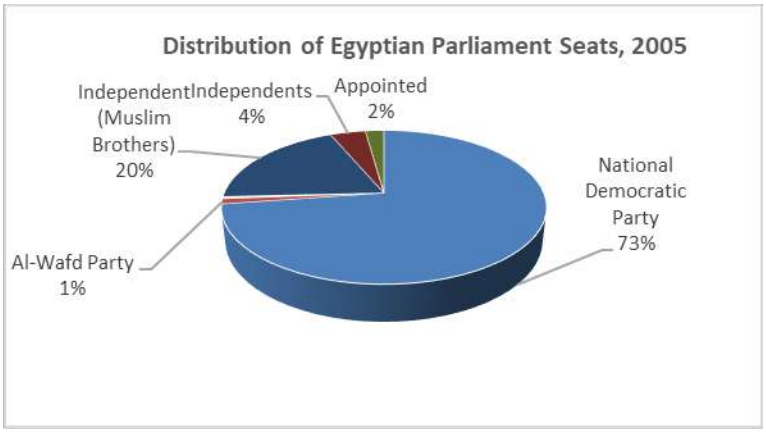
Source: Source: Hassan (2012), Zaky and El Khishin (2016a,b) and Abdellatif et al (2016)

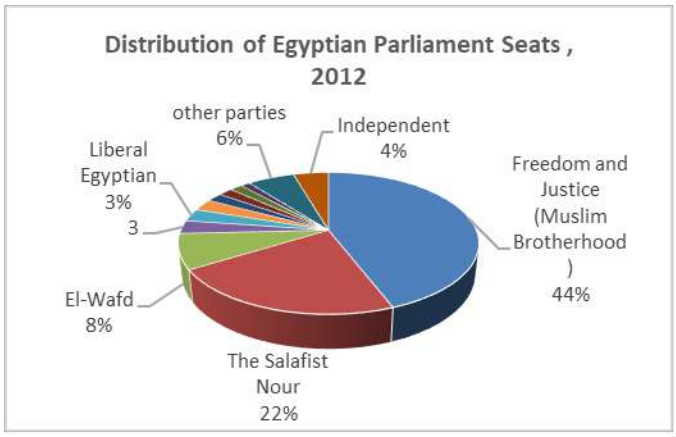
[16] Detailed presentation of data is in Annex (4).

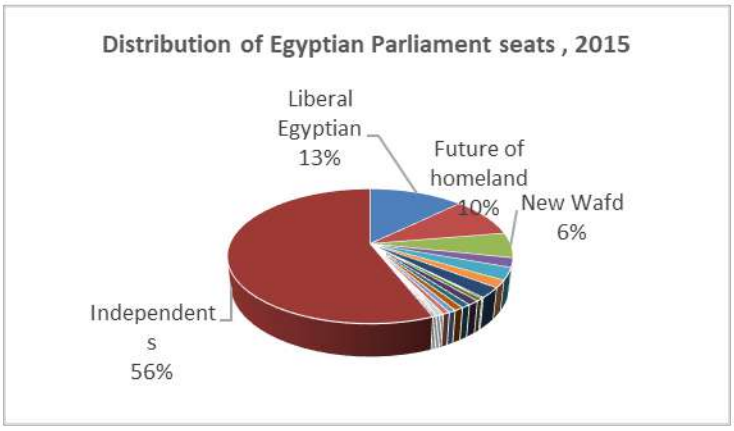
After the January 25th revolution, the political system became more fragmented because of the dissolution of the NDP, which led to a large political fragmentation within the government and in the parliament, which was formed after the adoption of the Constitution of 2014. The regime quickly returned to its nature after the formation of the "Supporting Egypt Coalition" within the parliament, which included the most of the politically influential or those who represent them once again in the parliament.

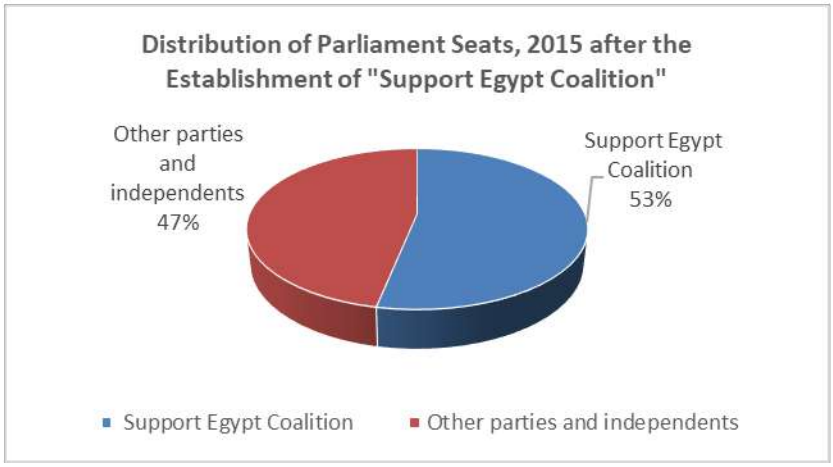
Figure 3. Distribution of Egyptian Parliament Seats, 2000-2015











Source: Hassan (2012), Zaky and El Khishin (2016b) and Abdellatif et al (2016)

On the other hand, poor fiscal institutions reflected in the violation of the golden rule and allowing current deficit finance had also resulted in a long run tendency towards an exacerbated primary deficit through current deficit finance in the long run. The Golden rule violation, in the absence of other fiscal rules, resulted in a procyclical behavior in fiscal policy in the long run. This affirms the previous short run IRF results; that when fiscal aggregated reach uncontained levels, the government shifts to a procyclical path with regards to deficit spending.

Finally, variance decomposition results indicate that budget institutions have the relatively larger influence on fiscal aggregates compared to political institutions[17]. This result is affirmed in both the short run (i.e. during a business cycle) and the long run. Hence, we can argue that, golden rule violation had the stronger influence on making fiscal policy countercyclical in the short run then procyclical over the longer term compared to political institutions.

4. Conclusion and policy implications

In this paper, we attempted to investigate the problem of cyclicality of fiscal policy in Egypt and the interactions between political institutions, fiscal institutions and fiscal indicators during business cycles.

We examined the cyclicality of fiscal policy in Egypt in a disaggregated manner. We found that current spending is countercyclical only at the beginning of the cycle. However, after reaching specific fiscal thresholds, it alters to a procyclical direction, since the government start adopting contractionary fiscal policy. This procyclical trend is maintained over the long run. Golden rule violation in Egypt contributed to adopting a countercyclical fiscal policy during business cycles; then a procyclical policy over the long run when debt and deficit reach uncontained levels. On the other hand, capital spending was found to be procyclical during the business cycle. Government increases investment spending when the economy is growing and tends to tighten this type of spending in times of economic slowdown.

Empirical results have shown that political institutions- whether legislative or executive - have a significant influence in amending fiscal appropriations during the budget cycle in the long run. The earlier proven common pool, principal-agent and voracity problems in Egypt are argued to have influenced the cyclicality of fiscal policy as they have lead into an exacerbated pressure on fiscal spending through discretionary interventions in booms and recessions during the examined period. Given the nature of electoral system in Egypt before and after January's Revolution in 2011[18], the direct relationship between candidate and voters is claimed to have caused a further spending bias and a procyclical trend in fiscal policy in the long run. Meanwhile, we argue that

[17] In the long run, 3.4% of the forecast error variance in primary deficit is caused by budget institutions compared to 1.3% caused by political institutions. In the short run, 2.8% of the forecast error variance is caused by budget institutions compared to 0.4% caused by political institutions. Variance decomposition output is presented in annex 4.

[18] It is a kind of candidate – ballots' electoral systems not 'party-ballots' system.

the executive government had the upper hand in increasing public spending even after strengthening the parliament's role in budget cycle in 2005.

The above results might give us the liberty to claim that a countercyclical trend in fiscal aggregates might not always be a sign of a healthy fiscal performance. While Keynes conventional wisdom advocated for countercyclical discretionary interventions, we question the relevance of this arguments to developing countries suffering from weak budgetary and political institutions. Weak institutions allow the abuse of discretionary interventions in order to alleviate underlying structural fiscal imbalances during pro-longed recession times. Although Egyptian spending was proven to be countercyclical during business cycles, this counter cyclicality was temporary in nature and was altered to a procyclical trend as a result of longstanding fiscal and political structural problems.

Our key recommendations include the importance of designing more effective automatic stabilizers to limit the need for discretionary interventions to alleviate structural problems and during booming times. Efficient fiscal rules will limit the authorities of both the legislative and the executive over the budget and to minimize the procyclical behavior of fiscal policy; particularly during booming times. In addition to numerical ceilings, we recommend effectively reinforcing the Golden Rule again to limit financing current spending through borrowing. Golden rule and other fiscal rules should act as proper automatic stabilizers and are supposed to minimize discretionary interventions that are proven to have hazardous impacts on fiscal performance in countries with loose budgetary and political institutions. The Egyptian government has already implemented an IMF-supported Reform program that include a radical transformation in the structure of the current spending; particularly the subsidies component. Nevertheless, another current spending component is increasing dramatically which is the interest payments. In this regard, it is worth noting that focusing on the primary deficit as an indicator of fiscal performance might be misleading. Rather, overall deficit should be the proper indicator to be targeted as it includes the currently largest component which is the debt service. Re-adopting the Golden Rule along with the current structural reforms will help avoid future pressures on the debt justified by debt service.

Regarding political institutions, we recommend changing the nature of electoral system to a party-based rather than an individual based system; in order to strengthen the role of parliament in keeping government accountable and avoid spending bias occurring from the voracity effects, common pool and principal-agent problems in Egypt.

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Annex 1

Variables and Sources of Data

Thirteen variables have been used in two models are specified in the below.

Variable	Sources
1. current expenditure % GDP	Ministry of Finance, The budget and unpublished data
2. capital expenditure % GDP	
3. tax revenues% GDP	
4. other non-tax revenues% GDP	
5. overall deficit %GDP	
6. primary deficit %GDP	
7. current account balance% GDP	Central Bank of Egypt
8. lending interest rate	Central Bank of Egypt
9. real exchange rate	Central Bank of Egypt
10. real GDP growth rate	Ministry of Planning
11. output gap	Author calculations
12. budget institutions	Author calculations based on MOF budget and final accounts
13. political institutions	Author calculations based on MOF budget and final accounts

Annex 2

Model (1) Correlation Matrix, Stationarity tests and Diagnostic Checks

The following table shows the correlation matrix for the system variables which clarifies the direction and the degree of the relationships between the variables. Correlation results primarily indicate a significant relationship between fiscal components and output cycles.

correlation matrix

Variable name	***Correlation Probability***	***REAL_GDP_GR***
Tax revenues as a percentage of GDP	TAX_GDP	0.452337* (0.0026)
Non-tax revenues as a percentage of GDP	OTHER_REV_GDP	0.275374** (0.0776)
Real GDP Growth rate	REAL_GDP_GR	1.000000
Overall Budget Deficit as a percentage of GDP	OVERALL_DEF	0.482092* (0.0012)
Total current expenditure as a percentage of GDP	CURRENT_GDP	0.552908* (0.0001)
Total current expenditure as a percentage of GDP	CAPITAL_GDP	0.435206* (0.0040)

*significant at 5%.

**significant at 10%.

Stationarity Tests

ADF uses the following regression equation for testing stationarity of variables;

$$\Delta y_t = \propto y_{t-1} + x'_t\delta + \sum_{p=1}^{k} \beta_p \Delta y_{t-p} + \upsilon_t$$

ΔYt is the first difference of the testing variable, K is lag length, X't includes external variables as (constant, constant and trend or none) as follows;

With constant and trend: $Dx_t = \propto + \beta x_{t-1} + \delta T + \upsilon_t$

With constant: $Dx_t = \propto + \beta x_{t-1} + \upsilon_t$

No constant and trend: $Dx_t = \beta x_{t-1} + \upsilon_t$

The null hypothesis is the series has unit root, while the alternative hypothesis is the series has not unit root.

As indicated in table (2), the results of ADF test shows that all variables in this model are stationary at level I (0) at 5% level of significance. It is worth noting that overall deficit and lending interest rate variables are stationary at level after using HP filter for de-trending the series.

Table 2.1. ADF unit root test results

	t-statistics	Exogenous
Real GDP growth rate	-4.827	Constant and Trend
Current exp. _ GDP	-3.753	Constant and Trend
Capital exp. _GDP	-3.212	Constant
Tax _GDP	-3.127	Constant
Other _ GDP	-4.533	Constant and Trend
Overall _def	-3.667	Constant
Current account balance	-2.414	None
Lending interest rate	-5.872	Constant and Trend
Real exchange rate	-3.586	Constant and Trend

Author Findings.

Performing some diagnostic check based on VEC residual serial correlation LM tests, the null hypothesis has been rejected. This means that the residuals have no serial correlation. At the same time, the residuals follow normal distribution at 5% level of significance. In addition, the residuals are white noise as following;

Table (2.2) white noise residuals

Lag	Q-Stat	Prob.
1	4.656	0.031*
2	5.306	0.070
3	6.740	0.081
4	7.183	0.127
5	7.345	0.196
6	8.497	0.258
7	9.063	0.291
8	9.098	0.337

*significant at 1%

Annex 3

Model II Stationarity tests and Diagnostic Checks

We start by examining stationarity of the model variables through Phillips Perron (PP) test; The results are close ADF test results and hence it increases the robustness. This paper uses PP and ADF to make sure the robustness of the model of the model results and that's because unit root tests are weak tests so using two different tests to reinforce the results. The lag length is determined using Newey-West Bandwidth. The PP test results show that all variables in the model are not stationary at level. After taking the first difference and run the test, all variables become stationary at first difference I (1).

Table 3.1. Phillips Perron unit root test results

	Constant	
	At level	**First difference**
Primary deficit_GDP	-2.048	-6.787
Output gap	-2.767	-4.035
Budg _ Inst.	1.063	-5.843
Polit. _ Inst.	3.973*	-8.246
Current account_GDP	-2.470	-6.977
Real exchange rate	-2.569	-6.445
Critical value at 5%	-2.935	-2.936

*trend and intercept, significant at 1%.

Performing some diagnostic checks based on VEC residual serial correlation LM tests, the null hypothesis has been rejected. This means that the residuals have no serial correlation. At the same time, the residuals follow normal distribution at 5% level of significance. In addition, the residuals follow white noise distribution as follows:

Table 3.2. white noise residuals

Lag	Q-Stat	Prob.
1	0.0004	0.995
2	0.024	0.988
3	0.501	0.919
4	0.842	0.933
5	2.018	0.847
6	2.208	0.900
7	2.842	0.899
8	4.684	0.791

Annex 4

Lag length criteria, Cointegration, VECM, Variance Decomposition outputs and Robustness Checks

This paper will choose one lag length when running the VEC model based on Schwarz information criterion (SC).

VAR Lag Order Selection Criteria
Endogenous variables: PRIMARY_DEF_GDP OUTPUT_GAP*BUDG_INST CA_GDP OUTPUT_GAP*POLIT_INST REX
Exogenous variables: D01
Date: 04/03/19 Time: 21:01
Sample: 1976 2017
Included observations: 40

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1054.884	NA	7.12e+16	52.99422	53.20533	53.07055
1	-927.4611	216.6194	4.30e+14	47.87306	49.13972 *	48.33104
2	-888.8469	55.99063 *	2.32e+14 *	47.19235 *	49.51455	48.03198 *

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Johansen Cointegration test

Date: 04/02/19 Time: 21:15
Sample (adjusted): 1978 2017
Included observations: 40 after adjustments
Trend assumption: Linear deterministic trend
Series: PRIMARY_DEF_GDP POLIT_INST*OUTPUT_GAP BUDG_INST*OUTPUT_GAP REX CA_GDP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.728928	101.8895	69.81889	0.0000
At most 1 *	0.462467	49.67474	47.85613	0.0334
At most 2	0.241160	24.84413	29.79707	0.1671
At most 3	0.228688	13.80555	15.49471	0.0884
At most 4	0.081925	3.419042	3.841466	0.0644

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.728928	52.21477	33.87687	0.0001
At most 1	0.462467	24.83061	27.58434	0.1082
At most 2	0.241160	11.03858	21.13162	0.6435
At most 3	0.228688	10.38651	14.26460	0.1878
At most 4	0.081925	3.419042	3.841466	0.0644

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Vector Error Correction Estimates
Date: 11/28/18 Time: 22:21
Sample (adjusted): 1979 2017
Included observations: 39 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
PRIMARY_DEF_GDP(-1)	1.000000
OUTPUT_GAP(-1)*BUDG_INST(-1)	0.004950 (0.00073) [6.73582]
CA_GDP(-1)	3.038987 (0.42777) [7.10425]
OUTPUT_GAP(-1)*POLIT_INST(-1)	0.029441 (0.00338) [8.69995]
REX(-1)	1.280576 (0.96613) [1.32547]
C	-13.84303

Error Correction:	D(PRIMARY_DEF_GDP)	D(OUTPUT_GAP*BUDG_INST)	D(CA_GDP)	D(OUTPUT_GAP*POLIT_INST)	D(REX)
CointEq1	-0.096180 (0.05775) [-1.66534]	-126.1185 (28.8197) [-4.37612]	-0.086105 (0.05335) [-1.61385]	-30.12464 (13.5845) [-2.21758]	-0.026041 (0.02280) [-1.14222]
D(PRIMARY_DEF_GDP(-1))	-0.258074 (0.19389) [-1.33102]	-20.81344 (96.7534) [-0.21512]	-0.030438 (0.17912) [-0.16993]	-37.14003 (45.6058) [-0.81437]	-0.017165 (0.07654) [-0.22426]
D(PRIMARY_DEF_GDP(-2))	-0.013017 (0.16639)	-148.5269 (83.0278)	0.057692 (0.15371)	-16.50891 (39.1360)	-0.045024 (0.06568)

	[-0.07824]	[-1.78888]	[0.37533]	[-0.42183]	[-0.68548]
D(OUTPUT_GAP(-1)*BUDG_INST(-1))	-0.000145	0.537753	0.000134	0.074609	-0.000317
	(0.00028)	(0.14185)	(0.00026)	(0.06686)	(0.00011)
	[-0.51146]	[3.79091]	[0.51004]	[1.11584]	[-2.82261]
D(OUTPUT_GAP(-2)*BUDG_INST(-2))	0.000755	0.283002	0.000455	0.064064	0.000604
	(0.00040)	(0.20176)	(0.00037)	(0.09510)	(0.00016)
	[1.86737]	[1.40267]	[1.21896]	[0.67364]	[3.78226]
D(CA_GDP(-1))	0.022291	295.7168	-0.173638	39.30025	0.090701
	(0.21848)	(109.020)	(0.20183)	(51.3879)	(0.08624)
	[0.10203]	[2.71249]	[-0.86032]	[0.76478]	[1.05168]
D(CA_GDP(-2))	-0.061521	197.2823	-0.209203	4.382324	0.005354
	(0.19903)	(99.3192)	(0.18387)	(46.8152)	(0.07857)
	[-0.30910]	[1.98635]	[-1.13777]	[0.09361]	[0.06815]
D(OUTPUT_GAP(-1)*POLIT_INST(-1))	0.002286	1.975034	0.001782	0.277860	0.000343
	(0.00148)	(0.73783)	(0.00137)	(0.34778)	(0.00058)
	[1.54614]	[2.67683]	[1.30471]	[0.79895]	[0.58733]
D(OUTPUT_GAP(-2)*POLIT_INST(-2))	0.000824	0.872023	0.001149	0.277226	0.000384
	(0.00117)	(0.58224)	(0.00108)	(0.27445)	(0.00046)
	[0.70602]	[1.49769]	[1.06558]	[1.01012]	[0.83399]
D(REX(-1))	0.513743	170.8845	1.479094	208.8896	0.189716
	(0.54816)	(273.533)	(0.50639)	(128.933)	(0.21639)
	[0.93722]	[0.62473]	[2.92084]	[1.62014]	[0.87674]
D(REX(-2))	-0.689082	588.3840	0.051506	94.15347	0.132239
	(0.65146)	(325.083)	(0.60183)	(153.232)	(0.25717)
	[-1.05775]	[1.80995]	[0.08558]	[0.61445]	[0.51421]
C	-0.828937	-760.3203	-0.071461	-216.5097	-0.000321
	(0.77110)	(384.781)	(0.71235)	(181.371)	(0.30440)
	[-1.07501]	[-1.97598]	[-0.10032]	[-1.19374]	[-0.00106]
D01	1.150807	1391.272	-0.569522	543.3625	-0.035254
	(1.38820)	(692.719)	(1.28244)	(326.521)	(0.54800)
	[0.82899]	[2.00842]	[-0.44409]	[1.66410]	[-0.06433]
R-squared	0.336540	0.674691	0.398032	0.327560	0.499948

Adj. R-squared	0.030328	0.524549	0.120200	0.017203	0.269154
Sum sq. resids	261.6729	65158345	223.3196	14476955	40.77726
S.E. equation	3.172435	1583.064	2.930736	746.1943	1.252340
F-statistic	1.099043	4.493674	1.432637	1.055430	2.166213
Log likelihood	-92.45751	-334.7496	-89.36693	-305.4165	-56.20758
Akaike AIC	5.408077	17.83331	5.249586	16.32905	3.549107
Schwarz SC	5.962598	18.38783	5.804107	16.88357	4.103627
Mean dependent	-0.218351	-144.2529	0.057264	31.30423	0.121752
S.D. dependent	3.221664	2295.860	3.124531	752.6967	1.464905

Determinant resid covariance (dof adj.)	7.18E+13
Determinant resid covariance	9.45E+12
Log likelihood	-859.3050
Akaike information criterion	47.65666
Schwarz criterion	50.64254
Number of coefficients	70

Variance Decomposition Output

Period	S.E.	PRIMARY_DEF_GDP	OUTPUT_GAP*BUDG_INST	CA_GDP	OUTPUT_GAP*POLIT_INST	REX
1	3.172435	100.0000	0.000000	0.000000	0.000000	0.000000
2	4.307239	94.22755	2.802400	1.536929	0.417633	1.015485
3	5.385958	86.16559	1.932706	5.985570	1.283340	4.632794
4	6.344733	79.84969	1.539485	8.314451	1.577509	8.718866
5	7.158444	77.11729	1.466118	8.573389	1.964009	10.87920
6	7.895213	75.91041	1.787897	8.681345	1.965027	11.65532
7	8.663460	74.29238	2.552881	9.060491	1.686287	12.40796
8	9.231422	72.73928	3.047507	9.592269	1.563766	13.05718
9	9.708924	71.91744	3.335440	10.04936	1.445447	13.25231
10	10.14462	71.70280	3.400829	10.38225	1.325929	13.18819

Cholesky Ordering: PRIMARY_DEF_GDP OUTPUT_GAP*BUDG_INST CA_GDP OUTPUT_GAP *POLIT_INST REX

Robustness checks

Performing some diagnostic checks based on VEC residual serial correlation LM tests, the null hypothesis has been rejected. This means that the residuals have no serial correlation at 5% level of significance.

VEC Residual Serial Correlation LM Tests

Lag	Prob.
1	0.008
2	0.000
3	0.001
4	0.068*

*at 10% level of significance

Besides, the VEC residual heteroscedasticity test has been done to check for heteroscedasticity problem. The null hypothesis is rejected at 5% level of significance; it means that the residuals are homoscedastic.

VEC residual heteroscedasticity test

Chi-sq	df	Prob.
365.2640	345	0.217

In addition, the residuals follow white noise distribution as follows, meaning that the model is well specified.

White noise residuals

Lag	Q-Stat	Prob.
1	0.0004	0.995
2	0.024	0.988
3	0.501	0.919
4	0.842	0.933
5	2.018	0.847
6	2.208	0.900
7	2.842	0.899
8	4.684	0.791

Annex 5[19]

Structure of Parliament Seats in Egyptian Parliaments (2000-2015)

Distribution of Parliament Seats (2000-2005)

	2000	*2005*
National Democratic Party	388	330
Al-Wafd Party	7	5
Tagammu party	6	1
Nasserist Party	3	0
Al-Azhar Party	1	0
El-Ghad (Tomorrow) Party	0	1
Independent (Muslim Brothers)	17	88
Independents	20	19
Appointed	10	10

Source: Hassan (2012) and Abdellatif et al (2016)

Distribution of Parliament Seats (2012)

Party	*2012*
Freedom and Justice (Muslim Brotherhood)	44
The Salafist Nour	22
El-Wafd	8
Egyptian Social Democratic	3
Liberal Egyptian	2.9
Contruction and Development	2.7
Conservative	2
Reform and Development	1.8
The revolution's Guardians	1.6
Al-Karama	1.2
other parties	6
Independent	4.5

[19] Based on the Supreme Council of Elections published reports for the selected years.

Distribution of Parliament Seats (2015)

The Party	*Individual seats*	*List seats*	*Total*	*% of Total*
Liberal	57	8	65	10.9%
Egyptian Future of homeland	43	10	53	8.9%
New Wafd	27	6	33	5.5%
the Nation's Guardians	10	8	18	3.0%
Republican people	13	0	13	2.2%
Conference	8	4	12	2.0%
The Salafist Nour	11	0	11	1.8%
Conservative	1	5	6	1.0%
Modern Egypt	3	2	5	0.8%
Democratic Peace	5	0	5	0.8%
Egyptian Social Democratic	4	0	4	0.7%
The Nationalist Movement	4	0	4	0.7%
The Freedom	3	1	4	0.7%
My Homeland Egypt	3	0	3	0.5%
Reform and Development	1	2	3	0.5%
Arab Democratic Nasserist	1	0	1	0.2%
the Free Egyptian Edifice	1	0	1	0.2%
The revolution's Guardians	1	0	1	0.2%
Al Tagamoa	1	0	1	0.2%
Independents	251	74	325	54.5%
Appointed			28	4.7%
Total			596	100.0%