

Hussein, Nouran; Fouad, Jasmin

## Article

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## Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics  
Düsternbrooker Weg 120  
24105 Kiel (Germany)  
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)  
<https://www.zbw.eu/econis-archiv/>

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# WHEN THE ART OF MACROECONOMIC MANAGEMENT CONFRONTS THE EVOLUTION OF BUSINESS CYCLES: ZOOMING INTO THE EGYPTIAN CASE

*NOURAN HUSSEIN, JASMIN FOUAD*

## **Abstract:**

The growing importance of macroeconomic management over time dictates the need to understand what constitutes effective management of monetary and fiscal policies during business cycles. This study aims at scrutinizing this topic empirically using Egypt as a case study during the timeframe FY 1988/89 – FY 2015/16. The business cycles have been dated during that period, and the correlation between some monetary and fiscal tools with industrial production has been tested. Deficit spending was found to be counterproductive in the near term up to the fourth quarter, while expansionary monetary policy is unfavorable for economic growth up to two subsequent quarters due to its consequential inflationary effect.

## **Keywords:**

Monetary Policy, Fiscal Policy, Business Cycle

**JEL Classification:** E30, E52, E62

## **Authors:**

NOURAN HUSSEIN, The American University in Cairo & Cairo University, Egypt, Email:  
nouki@aucegypt.edu

JASMIN FOUAD, The American University in Cairo & Cairo University, Egypt, Email:  
jfouad@aucegypt.edu

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## 1. Introduction

Sound and sustainable macroeconomic management has been and will always be the quest of countries throughout economic history and a recurring theme in macroeconomic research, given its major contribution to a country's competitiveness (Schwab, 2019). The effectiveness of macroeconomic management depends largely on the ability of the relevant authority(s) to achieve its desired macroeconomic goals; be it reined inflation, high GDP per capita, favorable trade dynamics, employment promotion, prevention of excessive risk buildup...etc. Opinions differ regarding the weight that should be placed on each of the tools of macroeconomic management; primarily monetary and fiscal policies. Achieving price stability via monetary policy and fiscal sustainability via fiscal policy are two of the core macroeconomic targets of countries at present. These two goals entail high levels of complexity, not to mention the challenges and trade-offs encountered by policy makers as they strive to reach them. Said complexity arises mainly from the fact that the two policies are administered by different entities while having spillovers between them. Moreover, the decisions taken by one entity can be easily neutralized or at times reversed by the other if enough caution was not employed. Hence, effective coordination between both policies is needed in to ensure that each one is used in a way that effectively serves its ultimate purpose, an aspiration that is not achievable by all countries.

Monetary and fiscal policies have witnessed extensive research and debates in the past decades, both on independent as well as collective bases. Traclet (2004) believes that the management of fiscal and monetary policies has witnessed a significant transformation in recent years, whereby developed nations have been continuously refining these policies in an attempt to reach economic sustainability. The increased importance of research on macroeconomic management primarily arises from the slippage of several countries in phases of economic deterioration in recent decades. This was mainly triggered by mismanagement or misalignment of these policies, whereby monetary policy became constrained by the reduction of interest rates towards or below zero and fiscal policy was not providing much needed fiscal stimuli swiftly due to the excessive public debt levels run by several countries (Bartsch et al., 2019). This importance, however, has never been as high as recently on the back of the increasing economic uncertainty in the international arena arising from enfeebled growth and trade outlooks in addition to the surfacing of protectionist approaches ("Macroeconomic Policies and Other Development Strategies," 2017). Effective and agile macroeconomic management is needed in all the stages of a country's business cycle to weather economic hardships during downturns and sustain economic prosperity and achieve inclusion and equality during booms. Abdalla (2016) sheds light over the relevance of analyzing macroeconomic management in the context of the business cycle, arguing that policymakers act upon forecasted economic developments that are primarily dictated by the business cycle stage. Hence, it becomes of paramount significance to analyze business cycle stages concurrently with macroeconomic management decisions, as different driving forces would trigger a different policy decision on the part of policymakers.

Motivated by the usefulness of incorporating business cycle developments in the macroeconomic policy making environment in countries that are still developing, the article will aim at carrying out an empirical assessment of the macroeconomic

management, specifically the use of monetary and fiscal tools, in the Egyptian economy. Egypt represents a rich case for analysis since it has been striving at reaching long-term economic stabilization, while undergoing several economic upturns and downturns over the past decades. Towards that end, the article will try to analyze and evaluate Egypt's macroeconomic management techniques amid its latest business cycles. It will cover the influence of monetary policies and fiscal policies on the business cycle. Literature has not reached consensus as to which policy has supremacy over the formulation of the business cycle. The deliberations on that matter have enriched the topic and added flexibility to the conduct of macroeconomic management, as there is no one-size-fits-all approach. Hence, with the miscellany of opinions on that topic, the analysis of the effectiveness of macroeconomic management has become more challenging.

This article could be useful to policymakers in several ways. First, it will aim at identifying the tools that exhibit highest correlation to economic growth, hence narrowing down economic agents' scope to the most effective focal points. Second, it will try to analyze historical policy decisions in the theoretical and empirical contexts while factoring in the prevailing stage of business cycle. This will allow policymakers to be mindful of historical pitfalls and design macroeconomic management in the form most conducive to economic growth and development. Third, it will shed light on the interplay between the different variables, thus uncovering the possible areas of coordination between the multiple economic agents in the country.

## 2. Review of Mainstream Literature

The degree to which variations in economic performance can be explained by monetary and fiscal policies is of profound interest for scholars. Understanding this relationship allows policymakers to take effective decisions to influence the direction of the economy in a favorable way. Economists have not reached consensus over the exact attributes of this relation. The debate stems from the merits of each of the two foundations of macroeconomic management; namely monetary policy and fiscal policy. Some scholars advocate the exclusive correlation between monetary policy and business cycle, while others believe that fiscal policy is the reason behind the evolution of the business cycle. The idea that monetary policy and fiscal policy may be complements instead of substitutes was not popular at the early stages of the debate, but rather evolved later on. This chapter reviews the main studies pertaining to the relationship between the two pillars of macroeconomic management – monetary and fiscal policies – and business cycles. It is divided into two parts, synopsis of theoretical underpinnings and compendium of empirical studies.

One of the mainstream theories is the *Monetarist Theory*, which emphatically advocates the premise that monetary policy and variations in money supply levels are the prime drivers of cyclical changes in economic activity. Monetarists argue that the monetary policy's role in shaping the business cycle is preemptive and incomparable. They assert that changes in the level of money supply in an economy will influence real variables in the short-run and will impact the price level in the long run, indicating the neutrality of money on the long term. The heart of the Monetarist Theory is the Quantity Theory of Money (QTM), developed by Fisher (1911),

whereby he argues that a change in the level of money in the economy will have a transient impact on real output as well as on employment levels in the short run and impact the business cycle fluctuations. The dynamics differ on the long-term, whereby monetary variations are theorized to be neutral on the real front. With the ease in stickiness of wages and prices on the long run, business cycles occur due to the sluggish adjustment of nominal interest rates to the changes in the average price level in the economy. This incites a change in business investments until the time when nominal interest rates adjust proportional to price changes.

Another prime school of thought on the camp of monetary policy advocacy was led by Hayek (1933), whereby he proposes that monetary and real factors interact together to form the cyclical behavior of the economic activities. Variations in money supply level influence banks' decisions on where to set the interest rate level, which in turn affects the feasibility of one production method over the other. Entrepreneurs decide to employ either the direct production method or the indirect one; each with its unique characteristics of payback period, amount of needed investment and debt-servicing requirement – the direct method being on the lower end of all three dimensions. When the bank interest rate is lower (higher) than the natural rate in the economy, entrepreneurs opt to use the indirect (direct) method of production of consumer goods. This decision increases (decreases) the prices of consumption goods due to their scarcity (abundance) in the intermediate term, which induces a rise (drop) in the relative prices of consumption goods versus capital goods. The impact on the relative prices is Hayek's central elucidation of business cycle periodicity. The change in the relative prices, and hence the lucrativeness, of consumption (capital) goods as well as the consequential inflation (deflation) will herald an upswing (downswing) in business activity. Concurrently, individuals will encounter a shortfall (excess) in their cash level, prompting the withdrawal of (addition to) their bank savings and leading to a drain (increase) in the funding of the banking sector. Subsequently, banks are incited to increase (decrease) their interest rate, the aftereffect of which will be commencement of recessionary (expansionary) phase of the business cycle.

Up to the time of the Great Depression, the business cycle has been strictly regarded as an outcome of alterations in a country's monetary policy orientation. The economic proceedings back at the time cemented that perception and reinforced the role of monetary policy as the prime stabilization tool for economic activity. The emancipation of economic thought from the monetary paradigm came about with the advent of John Keynes – the preeminent proponent of the role of fiscal policy in impelling economic activity. As stressed by Lucas (1980) and Wheelock (1998), the outset of the Great Depression, and the inability of the Federal Reserve to deploy the tools of monetary policy to counter the depression and kick-start the economy, casted doubt over the primacy given to monetary policy. Keynes was an eminent promoter of the use of fiscal policy as the foremost tool that resuscitates the economy from an inevitable vicious cycle that is set to occur once the economy slips into fainting aggregate demand. For Keynes, the variation in the aggregate demand is the fundamental source of any fluctuations in the level of economic activity. Ergo, aggregate demand cannot be left without close monitoring on the side of the government, to intervene through deficit spending when deemed necessary,

specifically upon the advent of any signs of weakness in that front. Keynes defies the monetarists' line of thought by (i) affirming that full employment conditions are unattainable as it necessitates the presence of sufficient aggregate demand and (ii) renouncing that supply creates its own demand, averring that the funds received in return for the provision of the factors of production are discretionally allocated between spending and savings leading to a gap between supply and demand. In order to avoid the instigation of a recessionary vicious cycle, Keynes emphasizes the need for an activist government and fiscal policy, as he is skeptical regarding the efficacy of monetary policy during liquidity traps. Furthermore, he argues that investments dwindle in economic downturns, as entrepreneurs opt to cut back on capital expenditures due to the prevailing negative business sentiment that casts doubt over the economic and financial feasibility of new and/or expansionary projects. This exacerbates the recessionary situation, further substantiating the case for an active role of the fiscal authorities to support the demand side. In short, Keynes claims that if private supply and demand forces are left to interact alone, the economy will inevitably slip into recession, as demand will not keep up with the supply due to hoarding decisions. In order for the economy to move from the recessionary phase of the business cycle into the expansionary phase, the government should adopt deficit spending with the aim of boosting the demand side and keeping the economy running.

With a line of thought reminiscent to that of Keynes, and as highlighted by Rima (2001), Hansen came to be known as the "American Keynes". He formulates his theory on the contrast between "circular-flow economy" and a "dynamic economy". He accentuates that the mechanics of the earlier promote the full utilization of income in consumption and maintenance capital expenditures; hence fostering perpetual economic stagnation and a level of economic performance that falls short of full employment conditions. On the other hand, with a "dynamic economy", the materialization of full employment status is relatively more practicable if ample investments are carried out. Hansen underlines the criticality of said investments, explicating that it is the one factor that prevents a dynamic economy from following its natural tendency and retrogressing into the unprogressive "circular-flow economy". Upon proving the need for continuous investments to attain and sustain a "dynamic economy" and arguing that the conventional investment drivers have dried up in comparison to earlier eras, Hansen asserts that a passive role for the fiscal authorities will keep the economy lingering in a state of economic depression. Only with an active fiscal role can the economy escape from such economic stagnation and move into economic growth and witness the peak of the business cycle. In light of this proposition, Hansen provides four recipes to reach a dynamic economy and attain the peak of the business cycle; one of which is mandatory for him and the other three are substitutes for one another, yet all rest upon an active fiscal role. As for the mandatory recipe, he argues for a two-tier economy, with public institutions playing an active role in economic development in parallel with private ones. Moving on to the substitutable recipes, they are all expansionary ones resting upon fiscal policy. The first policy recommendation to achieve a "dynamic economy" is to embark on deficit spending that is financed by increased borrowings, which will spur public spending without distorting consumption and savings as it leaves tax rates unchanged. An alternative option is deficit spending financed via an increase in tax

rates, which Hansen recommends to be applied only on the top earners in the economy to minimize the distortions to private savings and consumption. This is set to keep the fiscal debt level unchanged, yet it will inevitably result in reduced savings and spending, which will be made up for by public spending and its multiplier effect. The third alternative is reducing taxes in an attempt to boost disposable income and private investments, while maintaining the same level of public spending. All three alternatives are seen by Hansen as the roadmap to economic progression, whereby fiscal expansionary decisions (and absence thereto) are the main cause of economic growth (depression), and accordingly of periodicity in business cycles.

On the empirical front, and given that the article's focus is Egypt, it is useful to shed light on some of the studies carried out on the most relevant regions to the country – namely Africa and Middle East & North Africa (MENA) – as well as country-specific studies. On the African front, Matthew Ocran (2009) carried out an empirical study to assess the impact of fiscal policy measures on economic growth in South Africa over the period 1990-2004. By employing vector regression methodology on quarterly data, Ocran tested the correlation between a set of fiscal measures – namely taxes, budget deficit, governmental consumption and governmental gross fixed capital – and real GDP growth. Additionally, the author decided to incorporate two monetary policy measures in his model (namely GDP Deflator and 30-day Treasury bill rate) to increase its comprehensiveness and usefulness to policy makers. The study's results show that budget deficit is not significantly correlated to economic growth, while the other three fiscal variables are positively correlated with economic growth, with governmental consumption being the factor with the largest impact in South Africa. The surveyed empirical literature body contains some studies on Nigeria, the majority of which support a stronger correlation between monetary policy and economic growth, trivializing the weight of fiscal policy in influencing economic activity (See: Ajayi, 1974 and Bynoe, 1994). One of the main recent papers written on the Nigerian case is that of Adefeso and Mobalaji (2010). Adefeso and Mobalaji's work capitalizes upon the earlier study by Ajisafe and Folorunso (2002). The scholars use the Ordinary Least Square methodology to estimate the existence and the significance of the correlation between monetary and fiscal policies on one hand and economic growth on the other hand. The authors obtain data for M2 – as a proxy for monetary policy, openness and government expenditure – as proxies for fiscal policy, and GDP – as a measure of economic growth for the years 1970-2007. The study concludes that the correlation between monetary policy and economic growth is positive and more statistically significant than that between fiscal policy and economic growth in Nigeria. Thus, they advise authorities to place more emphasis on monetary policy to arrive at economic stabilization in Nigeria.

With regards to the MENA region, Kablan Alkahtani (2013) carried out a recent study on one of the MENA region's countries, namely Saudi Arabia, to evaluate the existence of a correlation between fiscal policy and economic growth. Towards that end, the scholar uses structural vector autoregression methodology on quarterly data over the period 1993-2011. He develops three models; assessing the impact of fiscal policy (public spending and tax levels) on (i) real GDP growth, (ii) exports, imports, private consumption and investment (in real terms) and (iii) inflation and interest rate. The empirical models show that increased public spending is positively correlated

with GDP growth and private consumption (in line with result of Joharji & Starr, 2010), yet is negatively correlated with private investment due to its crowding out effect. As for taxes, GDP growth is generally hindered by increases in tax level. Upon inclusion of interest rate and inflation in the empirical model, the same results were achieved. Moreover, Cerisola et al. (2015) conducted a research on 19 countries in Middle East, North Africa, Afghanistan and Pakistan (MENAP) region with the aim of analyzing the effect of fiscal changes on output levels (in terms of fiscal multipliers) in the sample countries. They utilized Bayesian algorithm methodology to scrutinize annual data over the timespan 1990-2008. In this regards, they chose four variables; GDP, private consumption, government spending and net tax revenues – all of which have been quoted in real terms. Additionally, they opted to deal with their sample on a category basis, rather than standalone basis, by grouping the countries into: GCC, oil exporters, oil importers and Arab Countries in Transition. The authors found out that government's investment spending is the most impactful fiscal approach, due to its enhancement of demand on the short term and supply on the long term. Government consumption comes second in impact, followed by current spending and then net tax revenues.

Moving on to Egypt, Moursi et al. (2007) completed a study on Egypt, whereby they evaluated the impact of changes in monetary policy on the country's economic performance. Towards that end, the scholars obtained/constructed monthly data for real GDP, Consumer Price Index (CPI), non-borrowed reserves (total reserves net of total credits for commercial banks) and three-months deposit rate over the period 1985-2005. They used semi-structural vector autoregression (VAR) methodology to test for the correlation between the monetary variables and economic growth. Upon carrying out their regression analysis, the researchers concluded that monetary policy changes did not have a significant impact on the country's economic growth and the formation of its business cycle in the period under study. Also, Mansouri (2008) produced a recent study on the relationship between fiscal policy and economic growth in Egypt (over the period 1975-2002), with two comparative cases: Morocco (covering 1972-2002) and Tunisia (during 1970-2002). For his econometric model, the author uses real GDP, public investment as percent of GDP, private investment as percent of GDP, and public consumption as percent of GDP in addition to two proxies for labor and droughts (only for the comparable countries). The author employs time series analysis for each country, using techniques such as unit root and causality tests. The study shows that public investment spending tends to positively impact real GDP in the short and long terms in Morocco, while only on the long term in Egypt and Tunisia. As for public consumption, it hinders real GDP on the short and long terms in Morocco and Tunisia, while only on the short term in Egypt. The third conclusion of the study pertains to the impact of private investment, which turned out to be positively correlated with real GDP on the short and long terms in Egypt, while only on the long term in Morocco and Tunisia.

### **3. Methodology and Empirical Results**

The methodology employed in this study will be based on a twofold framework. The first pertains to the detection of the business cycles experienced by Egypt during the period FY 1988/89 – FY 2015/16, whereby this will be the focal period of the



examination. The second is concerned with empirically scrutinizing the correlation between Egypt's economic performance on one hand and monetary and fiscal tools on the other hand. The two research questions that will be addressed by the second fold of the empirical study are:

- Did the monetary and fiscal tools exhibit a direct or inverse relation with Egypt's economic growth?
- Which tool(s) within the two policies has exhibited the highest correlation with Egypt's economic growth?

### 3.1. Detection of Egypt's Latest Business Cycles

First, the start and end years of the business cycle for Egypt are determined. Three types of economic data are gathered for the country, leading, coincident and lagging indicators. Leading indicators are quantifiable economic variables that fluctuate prior to the unfurling of certain trend in the economy, hence are best situated as forecasters of potential economic patterns, while coincident indicators are quantifiable economic variables that vary concurrently with the evolution of a certain trend in the economy. As for lagging indicators, they are quantifiable economic variables that fluctuate in subsequence to a certain trend unfolding in the economy. To date Egypt's latest business cycle, data for the hereunder economic indicators are gathered for the period FY 1988/89 – FY 2015/16. The 28 years coverage is more than double the maximum duration of a normal business cycle, as per the National Bureau of Economic Research (NBER, 2010), which is 128 months, and Everts (2006) to be 35 to 47 quarters (8.75 – 11.75 years), hence guaranteeing the occurrence and conclusion of at least one business cycle. The description and rationale for each variable is highlighted in the following section. All data is sourced from CBE, except for Industrial Production Index that is sourced from CAPMAS.

#### A. Leading Indicators:

- Exchange rate: this represents the buying rate of USD against EGP for transfers at the end of each quarter.
- Net International Reserves (NIR): Egypt's NIR is its gross international reserves (gold + SDRs + foreign currencies + loans to IMF) net of reserve liabilities. It is quoted in USD and basically represents the pool of foreign currency held at and managed by Central Bank (Debt and Reserve-Related Indicators, 2000).
- Foreign Direct Investments (FDI): FDI shows the net capital inflows into the country and is quoted in USD.
- Money Supply (M2): M2 is a measure of money supply that includes M1 items (cash and demand deposits) plus time deposits, saving deposits and money market funds. It is quoted in EGP and represents the currency circulating outside the banking system and local and foreign currency denominated non-governmental deposits.

#### B. Coincident Indicators:

- Industrial Production Index: this indicator is a reflection of total quarterly industrial production in public and private sectors in Egypt. The index base year is June 1992 and it is used in this research as a proxy for economic growth.

- Trade Balance: this measure is equal to exports minus imports for the period, quoted in EGP. It serves as an indicator of how the economy has been performing with its trade partners over a period, and how the trade is interacting with the fundamentals of the economy in terms of the relative value of the local currency, the level of international reserves as well as the level of foreign debt.

### C. Lagging Indicators:

- Discount rate: this is the main operations annual rate set by CBE, falling in between the overnight deposit and overnight lending rates.
- Consumer Price Index (CPI)<sup>1</sup>: this index demonstrates the period over period change in the prices of a basket of goods and services at the consumer level in urban areas.

## 3.2. Analysis of the Data

A de-trending technique is applied to the data to decompose it into its several constituents. According to Larsson and Vasi (2012), the four major de-trending techniques are “The Baxter King (BX) filter”, “The Christiano Fitzgerald (CF) filter”, “The Hodrick Prescott (HP) filter” and “The first order difference (FOD)”. These techniques mainly differ in their ability to detect the severity of up/downturns of the cycle. Pandey et al. (2016) highlight that business cycle literature capitalizes primarily on either The HP filter or The CF filter due to their relatively higher precision and usefulness in larger datasets. Nilsson and Gyomai (2009) carry out a comparison between both techniques and accentuate the advantage of each. They recommend using HP filter when priority is given to determining the cycle’s turning points, while CF filter is best used when the objective is diminishing aggregate revisions. They accordingly advise OECD to shift their de-trending technique to HP filter. Since priority in this study is given to the determination of the turning point(s) of the Egyptian business cycle, the gathered time series data is de-trended using Hodrick-Prescott filter to decompose the it into its different elements. Per Hodrick and Prescott (1997), any time series can be expressed as shown in equation (1):

$$y_t = g_t + c_t \quad (1)$$

Where:

$y_t$  denotes the original time series

$g_t$  denotes the growth (trend) constituent

$c_t$  denotes the cyclical constituent

Additionally, the decomposition of the time series is done through the optimization problem shown in equation (2):

$$\text{Min}(g_t) \{ \sum_{t=1}^T (y_t - g_t)^2 + \lambda \sum_{t=1}^T [(g_t - g_{t-1}) - (g_{t-1} - g_{t-2})]^2 \} \quad (2)$$

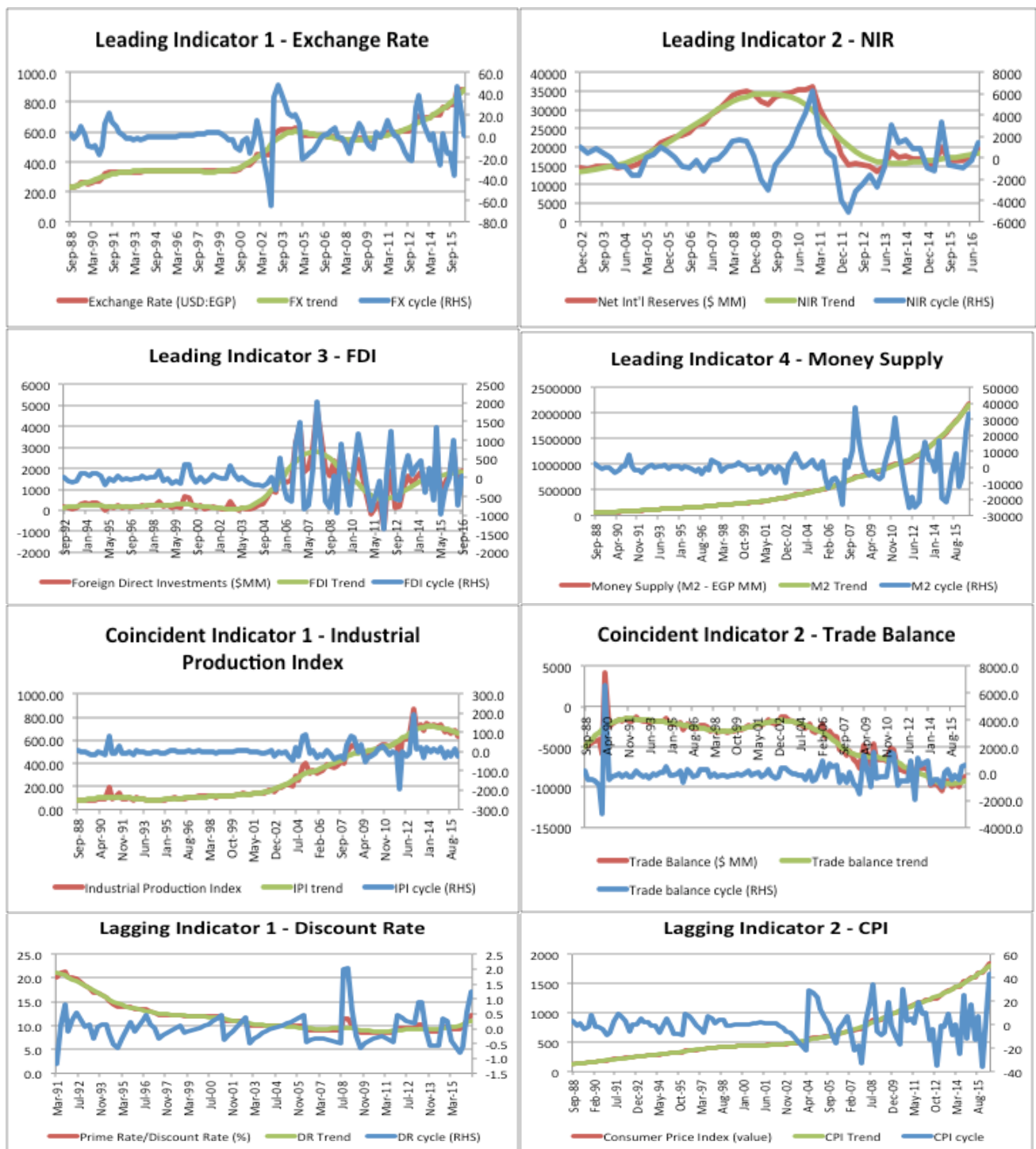
Whereby Cogley and Nason (1995) presume that the smoothness of the growth constituent is obtained via the summation of the square of its second difference. The cyclical constituents represent deviances from the growth constituents, and tend to

<sup>1</sup> Base year was 1986/97 until June 1996 when the base year was changed to 1995/96 and index value of June 1996 became 100. Hence, all data from June 1996 onwards was adjusted by multiplying the index value by 365.8/100 (365.8 being June 1996 index value with a base year 1986/87).

average out near zero over the long run. Thus, minimizing the growth constituent allows for reaching the cyclical constituent of the time series, hence depicting the phases of the business cycle. Also, the  $\lambda$  factor is a smoothing factor that is directly related to the smoothness of the growth constituent, such that extremely large value of  $\lambda$  implies that  $g_{t+1} - g_t$  is equal to a constant  $\beta$ , making  $g_t = g_0 + \beta_t$ .

Upon applying the HP de-trending mechanism to the three sets of business cycle indicators, using  $\lambda$  equal to 100 for annual data as per Choudhary et al. (2013), the cyclical component of each indicator was derived as shown below.

**Figure 1: Cyclical components of indicators**



Source: CBE and CAPMAS.

De-trending the Egyptian business cycle necessitates locating the lowest point in the cycle to be used as benchmark to determine the remaining troughs in light of the following four criteria. First, high frequency movements (periods shorter than six quarters) are excluded as per Machado (2001). Second, the duration between the two troughs is a minimum of two years in light of Everts' (2006) estimation of the minimum duration of the business cycle to be five to seven quarters. Third, the troughs are synchronously evident in the cyclical component of the two coincident indicators so that the trend is confirmed. Fourth, the troughs of coincident indicators are preceded by those of leading indicators and are confirmed by the subsequent troughs of lagging indicators. Accordingly, the troughs of the cyclical components of all indicators have been located as depicted in table 1 below.

**Table 1: De-trending Outcome of Business Cycle Indicators**

	Duration	Troughs Occurrences		
		Leading Indicators	Coincident indicators	Lagging indicators
Cycle 1	From FY 89/90 – FY 96/97	Outside of study timeframe	FY 89/90	FY 90/91
Cycle 2	From FY 97/98 – FY 07/08	Q3 94/95 - Q1 96/97	FY 97/98	FY 98/99
Cycle 3	From FY 08/09 to the year spanning over Q2 10/11 – Q2 11/12	- Q3 06/07 - FY 07/08	FY 08/09	- FY 09/10 - FY 10/11
Cycle 4	From the year Q2 11/12 – Q2 12/13 up to FY 14/15	- FY 11/12 - FY 12/13	Q2 11/12 – Q2 12/13	FY 15/16

*Source: Data from CBE & Capmas, computation by author*

The troughs of the two coincident indicators concurred in FY 89/90, 97/98, 08/09, Q2 11/12 – Q2 12/13 and 14/15. This signifies four business cycles, the first of which occurred between FY 89/90 – FY 96/97, and was confirmed by the lagging indicators' troughs reached a year later<sup>2</sup>. The second cycle took place between FY 97/98 – FY 07/08, which was forecasted by leading indicators' troughs occurring over the period Q3 94/95 - Q1 96/97 and was validated by lagging indicators' troughs in FY 98/99. The third cycle lasted from FY 08/09 to the year spanning over Q2 10/11 – Q2 11/12. This cycle was forecasted by three leading indicators reaching troughs in Q3 06/07 & one in FY 07/08, and was confirmed by lagging indicators reaching troughs in FY 09/10 & FY 10/11. The last cycle arose from the year Q2 11/12 – Q2 12/13 up to FY 14/15, which was forecasted by leading indicators' troughs during FY 11/12 and FY 12/13, and was confirmed by lagging indicators' troughs a year later in FY 15/16.

Observations from de-trending the Egyptian cycle suggest that the exchange rate had a one to two years lead to the business cycle, NIR and money supply showed one to two and half years' lead, while FDIs displayed one to three years lead. As for the lagging indicators, both indicators exhibited one to one and half years' lag.

<sup>2</sup> Leading indicators for this cycle would fall before the timespan covered by this study

In light of these empirical findings, the management of Egypt's monetary and fiscal policies will be scrutinized over the different business cycles, the methodology for which will be detailed in the following section.

### 3.3. Empirical Tests

After defining the business cycles that took place over the period 1988/89 – 2015/16 as shown in the preceding section, Autoregressive Distribution Lag (ARDL) model was employed to test the existence and nature of the relationship between monetary and fiscal policies and economic growth in Egypt. The choice of ARDL approach to cointegration is hinged upon its multiple benefits, whereby it does not require the variables used to be of the same order. Also, it employs a single equation to test the cointegration the desired variables, as opposed to Johansen test that capitalizes on a chain of equations (Dingela and Khobai, 2017; Solarin and Shahbaz, 2013).

Upon running ordinary covariance analysis, it is evident that all the variables' correlations are positive except for fiscal budget deficit, with all independent variables being significantly correlated with industrial production, except for 91-day T-bill. The highest correlation being spotted is between governmental expenditure and tax revenues, which follows naturally, given the fact that tax revenue in Egypt represents one of the major budget inflows; hence its movements ought to be highly correlated to government expenditure level. Additionally, this matches the findings of Abou Al Foul and Baghestani (2004), who empirically deduce that there is a causal relationship running from tax revenues to spending in Egypt and is a manifestation of the tax-and-spend hypothesis advocated by Friedman (1978), arguing that an increase in taxes ignites increased spending.

Since correlation cannot be assumed to imply causality, a Granger Causality Test was conducted to assess short-run (current) causality, with the dependent variable being the Industrial Production Index (as proxy for economic growth) and including 2 lags. The results show the null hypothesis can be rejected with regards to the effect of fiscal budget deficit and M2 on economic growth. Accordingly, it can be concluded that money supply and fiscal budget deficit do cause economic growth. This outcome is in line with Obaid (2007) study on the relationship between money supply and GDP growth in Egypt and Abdel Fattah (2016) study on relationship between fiscal space and economic growth in Egypt.

The variables were tested for the existence of unit root using Augmented Dickey Fuller test, which showed that all the variables have unit root except for 91-day T-bills. This non-stationary nature of the variables renders employing regression misleading as one of the assumptions of regression analysis is non-existence of unit root, as advised by Baumöhl and Lyócsa (2009). Treatment of unit root was carried out via log transformation of data, yet this methodology did not preserve the causality effect. While taking the first difference was an option, it was preferred to find the best-fit model to the actual data. Thus, cointegration test was carried out.

The results of the cointegration test indicate the presence of long run relationship between the variables (in first differences) for at most one period ahead. Given that the variables appeared to be non-stationary and cointegrated, Vector Error

Correction (VEC) model was used, which suggested the presence of long run equilibrium between industrial production on one-hand and government expenditure and tax revenues on the other hand, evidenced by the negative coefficients.

### 3.4. The Model

The long-run relationship between the dependent and independent variables will be tested using autoregressive distributed lag (ARDL) cointegration approach, a dynamic model that preserves the format of the actual data while account for its non-stationary nature. The model was run including all the variables, except for 91-day T-bill given its non-significant relationship with industrial production index as depicted from covariance analysis before, in addition to lagged values of industrial production index. The model equation is therefore expected to be as follows:

$$IPI_t = \beta_1 IPI_{t-1} + \beta_2 M2 + \beta_3 FBD + \beta_4 GE + \beta_5 Tax + C \quad (3)$$

Where:

IPI = Industrial Production Index

$IPI_{t-1}$  = Lagged values of IPI

M2 = Money supply measure

FBD = Fiscal budget deficit

GE = Government Expenditure

Tax = Tax revenues

C = Constant

$\beta_1$ ,  $\beta_2$  and  $\beta_4$  are expected to be positive as industrial production data are non-stationary, while higher money supply and government expenditure increase investments, hence economic growth. On the other hand,  $\beta_3$  and  $\beta_5$  are expected to be negative, as higher budget deficit would need to be financed via money or capital markets, accordingly crowding out the private sector, while higher taxation tends to discourage investments and reduce disposable income.

The results (summarized in table 2) indicate the presence of significant relationship between the dependent variable and independent variables, albeit at different lags.

**Table 2: Summary of Variables with Significant Impact on Industrial Production**

Significant Variable	Coefficient
Industrial Production (-1)	0.8621
M2 (-3)	-0.0061
M2 (-4)	+0.0038
Fiscal Budget Deficit	-0.0029
Fiscal Budget Deficit (-2)	-0.0040
Fiscal Budget Deficit (-4)	+0.0040
Gov't expenditure (-2)	+0.0045
Gov't expenditure (-4)	-0.0048
Tax revenues (-2)	-0.0055
Tax revenues (-4)	+0.0060

Source: Author computation

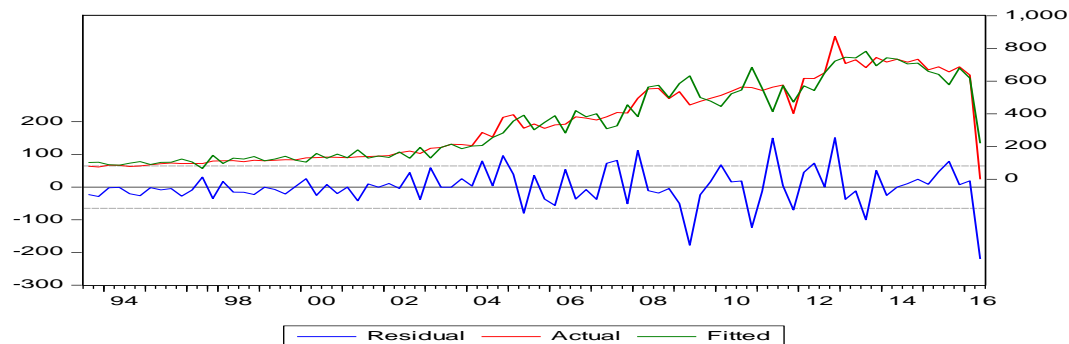
Accordingly, the best-fit estimation equation is as follows:

$$IPI_t = \beta_1 IPI_{t-1} + \beta_2 M2_{t-3} + \beta_3 M2_{t-4} + \beta_4 FBD + \beta_5 FBD_{t-2} + \beta_6 FBD_{t-4} + \beta_7 GE_{t-2} + \beta_8 GE_{t-4} + \beta_9 Tax_{t-2} + \beta_{10} Tax_{t-4} + C \quad (4)$$

By substituting the coefficients:

$$IPI_t = 0.8621 * IPI_{t-1} - 0.0061 * M2_{t-3} + 0.0038 * M2_{t-4} - 0.0029 * FBD - 0.0040 * FBD_{t-2} + 0.0040 * FBD_{t-4} + 0.0045 * GE_{t-2} - 0.0048 * GE_{t-4} - 0.0055 * Tax_{t-2} + 0.0060 * Tax_{t-4} + C \quad (5)$$

**Figure 2: Fitted Outcome vs. Actual Outcome.**



Source: Author computation

### 3.5. Commentary

The study analyzed the effects of certain fiscal variables – namely government expenditure, tax revenues, and budget deficit – and monetary variables – namely money supply and interest rates – on industrial production index as proxy for economic growth. There are several outcomes that can be derived from the above results. First, the current value of industrial production index tends to be a significant determinant of the economic growth of the following quarter. Second, the impact of money supply M2 takes around four quarters to have a positive significant impact on economic growth. This can be attributed to the lag effect of monetary policy and the time taken for pass-through of the increase in money supply into interest rate changes and ultimately into investment decisions and cash flow reliefs for liquidity constrained borrowers (Gruen et al., 2004). The model outcome matches the findings of Shahid et al. (2008); and Hussain and Haque (2017), but goes against the findings of Adusei (2013); and Gatawa et al. (2017). As for fiscal budget deficit, it exhibits a negative correlation with economic growth in the quarter during which it is incurred and two quarters after. This can be attributed to the fact that budget deficit is typically financed via debt, which results in crowding-out effect, a phenomenon that was specifically emphasized by Abdel Fattah (2016) in her study on Egypt. By the fourth quarter, the impact of the budget deficit turns into positive, coming in line with Peter Kretzmer (1992) study as well as the Keynesian notion that public sector acts as a balancing factor and budget deficit tends to increase aggregate demand when the private sector cannot achieve such on its own. Conversely, government expenditure shows a positive impact on economic growth after two quarters and then turns into negative in the fourth quarter. This seconds the outcome of Cerisola et al. (2015) study, which showed that governmental spending has a positive short-term impact on growth due to its effect as a demand booster. Over time, higher government

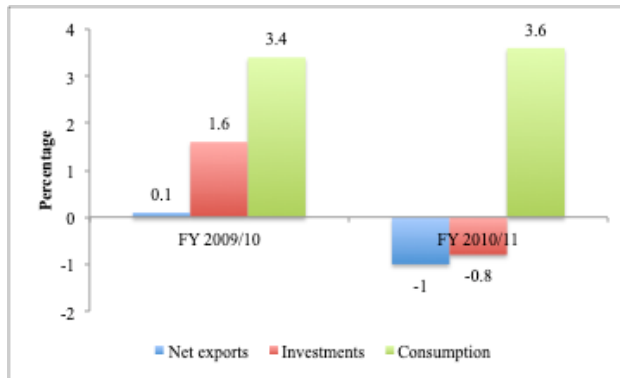
expenditure leads to allocation of resources from the private sector to the public sector that uses them in a relatively less effective manner, as asserted by Barro and Sala-i-Martin (1995), which explains the slipping of the impact into negative territory. Finally, taxes demonstrate negative impact on economic growth in the second quarter, which is in line with the findings of Kablan Alkahtani (2013) as well as Skousen's (1992) argument that citizens tend to cut back on expenditures in anticipation of future tax increases. However, towards the fourth quarter from the tax increase, the impact on economic growth turns positive as argued by Vatavu et al. (2019) that taxes are typically a means for transferring income from the private sector to the public sector, which the latter employs into infrastructure and welfare spending that helps make economic growth more sustainable.

#### **4. Zooming into Egypt's Latest Business Cycle**

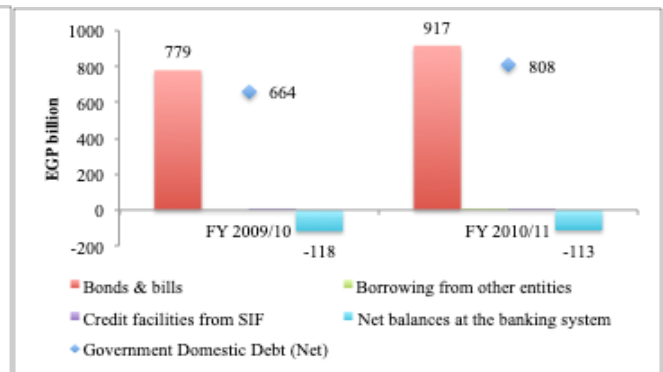
In light of the previous business cycle dating process, the latest business cycle appeared during the timeframe Q2 11/12 – Q2 12/13 up to FY 14/15. The political uprising in January 2011 had its toll on all the fronts of the Egyptian economy, making the short-term outlook gloomy. The political uprising heavily compromised the country's economic growth, trimming down GDP growth from 5.1% in FY 09/10 to 1.9% in FY 10/11. Growth was primarily driven by consumption, while investments and net exports turned into negative territory (figure 3). Also, the balance of payments (BoP) registered a deficit of USD 9.8bn in FY 10/11 compared to a surplus of USD 3.4bn a year earlier, triggered chiefly by the net outflow of capital and financial account that reached USD 4.8bn (versus net inflow of USD 8.3bn in FY 09/10). Capital and financial account was impaired by two factors. First, the already waning FDI – from the effect of 2008 financial crisis – was further hit by the domestic uprising, reaching one of its lowest annual inflow levels in the range of USD 2.2bn in FY 10/11, down around 70% year-on-year. Second, portfolio investments moved from net inflows of USD 7.9bn in FY 09/10 to net outflows of USD 2.6bn in FY 10/11. Yet, the negative impact of the capital and financial account on BoP was toned down by the current account, which – despite the shrinkage in tourism receipts by around 9% (USD 1bn) – exhibited a narrower deficit on the back of a 5.3% reduction in trade deficit and 25.6% increase in net unrequited transfers (CBE Annual Report 10/11).

The combination of the aforementioned factors exerted pressure over receipts of foreign currency, consequently pressuring the country's net international reserves (NIR). NIR dwindled from a high of USD 36bn in December 2010 to USD 26.6 in June 2011. Moreover, a more profound mismatch occurred between governmental revenues and expenditures, where the earlier declined by 3.2% to EGP 259.6bn (around 18.8% of GDP) and the latter surged by 7.1% to EGP 392.1bn (28.5% of GDP). Accordingly, budget deficit amplified to reach a high of -9.5% of GDP in FY 10/11 (EGP 130.4bn) versus -8.1% a year earlier (EGP 98bn) – 19.5% in excess of budget. This necessitated an increase in governmental borrowings, whose % of GDP witnessed an increase from 55% in FY 09/10 to 58.9% in FY 10/11 (figure 4). Consequentially, interest payments mounted by 12.1% year-on-year to register EGP 81.1bn, consuming up around 31% of governmental revenues.



**Figure 3: Share of demand components in real GDP growth.**

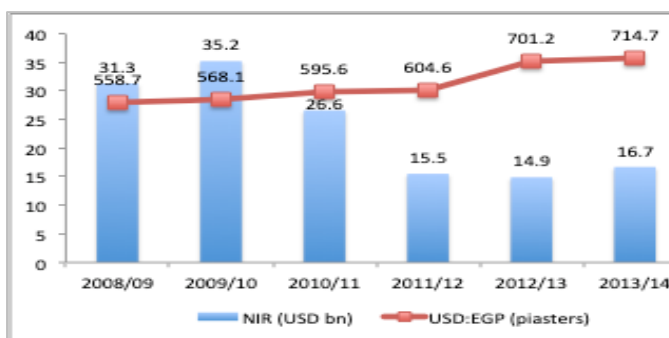
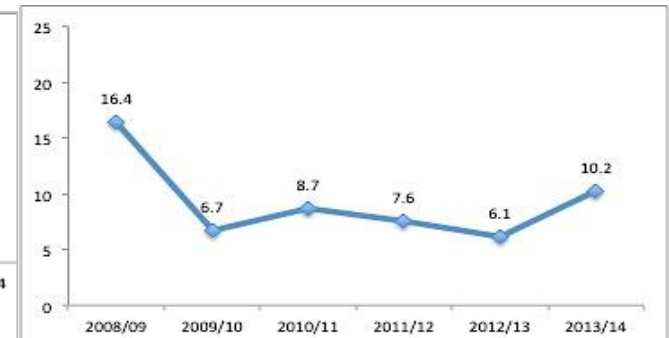
Source: CBE Annual Report 2010/11

**Figure 3: Net domestic debt of government – FY 2009/10 vs. FY 2010/11.**

#### 4.1. Remedies

Egypt has witnessed a series of reforms since the onset of the revolution; hence this section will shed light over the major remedies implemented. On the monetary front, the unfavorable macroeconomic fundamentals highlighted earlier and their consequential pressure on NIR impaired the central bank's ability to maintain the USD:EGP rate unchanged, leaving no option but to devalue the local currency to a level that is reflective of the pressured balance of payments. Towards that end, the central bank adopted step devaluations (figure 5), decreasing the exchange rate from EGP 5.96 in FY 2010/11 to EGP 6.05 in FY 2011/12 and further to 7 in FY 2012/13.

With the first signs of devaluation, inflation started to become upward sloping in FY 2010/11 (figure 6), a development that necessitated preemptive handling to avoid more deterioration in macroeconomic fundamentals. Thus, the Central Bank adopted a tightening policy between FY 2011/12: Q2 till FY 12/13: Q4, taking the discount rate from 8.5% to 10.3%, which reversed inflation trend into a downward sloping one in FY 11/12 and FY 12/13. Yet, the Central Bank opted to maintain the tightening environment to keep inflation contained given its step currency devaluations.

**Figure 4: NIR & exchange rate developments (FY 2008/09 – FY 2013/14).****Figure 6: Consumer Price Index % (FY 2008/09 – FY 2013/14)**

Source: Egypt's Five Year Macroeconomic Framework & Strategy, 2015

The fiscal situation was worsening until the government embarked on fiscal reform program starting FY 2013/14, which constituted of two main pillars; tax reforms and subsidy reforms, aiming at boosting revenues and rationalizing expenditures. With respect to taxes, the government initiated an electronic system for tax collections to

facilitate payment and expand the reach of the system, hence the tax base. Additionally, the government introduced 10% capital gains tax on mergers and acquisitions and dividends. Also, sin taxes on cigarettes and alcoholic beverages were doubled, together with the revival of the real estate tax and changing its floor to be EGP 2MM. As for subsidies, the government rolled out rationalization plans on several phases, covering electricity, fuel and social solidarity subsidy schemes. The government decided to reduce electricity and fuel subsidies gradually until they are phased out by towards the end of the decade, with the first phase implemented in July 2014. With respect to social solidarity programs, the government implemented an overhaul of the existing system, targeting the replacement of the mechanism from in-kind to cash transfers to the deserving groups only, introducing two cash transfer programs – namely Takaful and Karama in July 2014. These measures contributed to the first post-revolution reduction of budget deficit from 13.7% of GDP in FY 2012/13 to 12.8% in FY 2013/14 and further to 10.5% in FY 2014/15.

#### **4.2. Assessment**

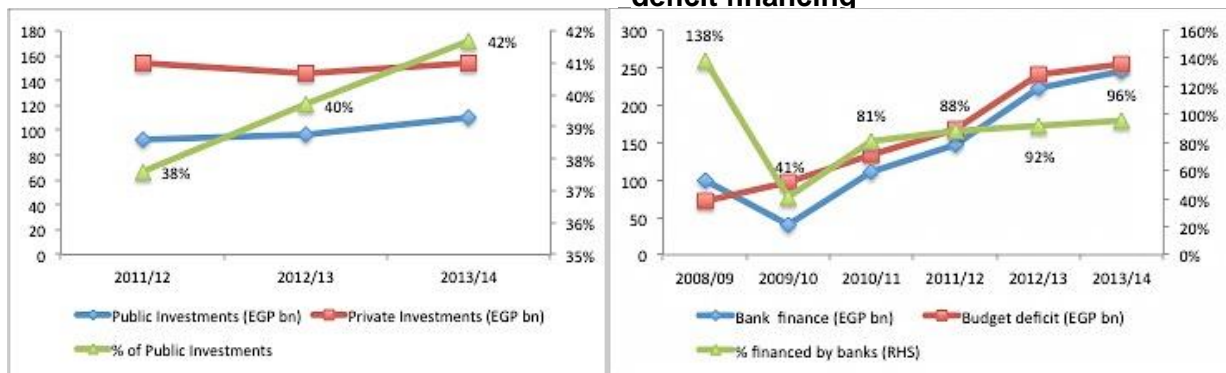
Egypt was delayed in undertaking the much-needed reforms in the wake of the revolution – a happening that could be largely attributed to the fear of aggravating the social unrest at the time – which entangled the economic condition. Up to FY 2014/15 (the last year in the coverage of this study), the country's reform plan was still work in progress, with many dimensions yet to shape and unfold. Nonetheless, there are several takes on the pillars that materialized up to that point in time.

The tightening monetary policy, manifested in the step increases in the discount rate from 8.5% in FY 2010/11 to 10.3% in FY 2012/13, resulted in lower money supply. According to the outcome of the study, this would only be beneficial for economic growth up to two subsequent quarters, yet on the longer run, it will decelerate economic growth. This move was, however, much needed in light of the prevailing economic environment at the time. The scarcity of net foreign inflows and the massive decline in NIR, which consequently weakened the Central Bank's ability to maintain the USD:EGP exchange rate, made the devaluation of the local currency inevitable, especially with the gradual emergence of the parallel market. The Central Bank's Monetary Policy Committee (MPC) – realizing the inflationary pressures that would result from the required local currency devaluation – preemptively increased interest rates despite the recessionary environment that started to emerge at the time. This tightening approach increased the attractiveness of saving in local currency, whose share in total banking deposits increased from 79.0% in FY 10/11 to 81.1% in FY 13/14, hence increasing MPC's grip over inflationary expectations.

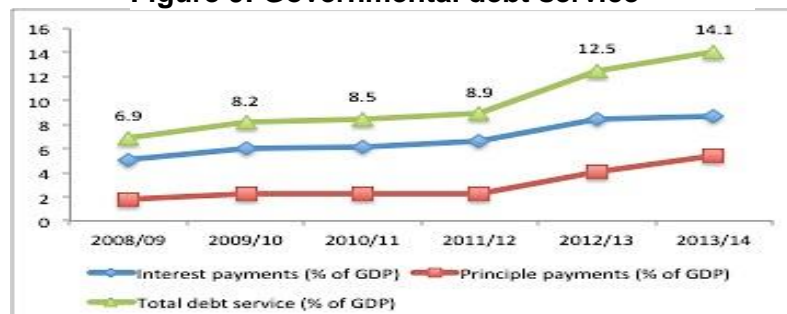
On the fiscal front, the government decided to undertake deficit spending to boost economic activity and keep the economy afloat. Public spending was leveled up to compensate the waning private investments on the back of the tightening monetary policy. The contribution of public sector to the pool of capital investments was on the rise during the period FY 11/12 till FY 13/14 as shown in figure 7. This increased outflow, coupled with the sluggish revenue sources owing to the recessionary environment, further pressured the budget dynamics, exacerbating the need for deficit finance. The empirical outcome of the study proposes that deficit spending is unfavorable for economic growth on the short term. This could be justified by the

highly acclaimed consequences of deficit spending. First, deficit spending results in crowding out of the private sector that was manifested in the increase in banks' contribution to deficit financing (figure 8). This was highly discouraged by monetarists – such as Blinder (1972) – as this displacement effect tends to hamper the positive impact of deficit spending on aggregate demand because it comes at the expense of forgone private capital expenditures that were set to boost production as well as employment levels. Second, the resulting debt service burden (figure 9) pushed the country into a vicious circle that could only be solved by cost rationalization and boosting of revenues, which started to take place since FY 2013/14 onwards. An alternative and more sustainable scenario would have been providing incentives to private sector to boost spending and adopt the two-tier economy model proposed by Hansen (1938).

**Figure 7: Breakdown of capital investments. Figure 8: Banks' contribution to budget deficit financing**



**Figure 9: Governmental debt service**



Source: Egypt's Five Year Macroeconomic Framework & Strategy, 2015

## 5. Conclusion and Policy Recommendations

The study has shown empirically that money supply is the impactful monetary tool, while governmental expenditure and deficit spending as well as taxes are the main fiscal tools that are proven to influence economic growth, albeit at different lags and correlations. Deficit spending might be counterproductive in the near term, while its ripple effect tends to kick in starting the fourth quarter from the spending. Also, expansionary monetary policy would only be harmful for economic growth up to two subsequent quarters due to its consequential inflationary effect. Yet, by the fourth subsequent quarter, it will have a favorable impact on economic growth as businesses benefit from the low interest rate environment to undertake capital expenditures and boost productivity, hence containing inflation.

Beyond the timeframe analyzed in this study, Egypt has adopted an ambitious reform plan. On the fiscal front, it continued its subsidy rationalization program with a planned phase out of energy subsidies towards the end of the decade and electricity subsidies by 2022. It adopted a more effective VAT, rolled out a phased privatization program and targeted a gradual reduction of deficit as % of GDP. On the monetary front, the central bank has adopted a full floatation of the local currency in November 2016 and reverted to its tightening monetary policy – after ceasing it in the period FY 2013/14 - 2014/15 – to combat the ensuing inflation. Concurrently several initiatives have been adopted, including SME subsidized lending package and financial inclusion campaigns. In addition to the implemented and ongoing reforms, this section will propose several policy recommendations to contribute to the revival of the economy and unleashing its potential.

In light of the empirical results of this study and the insignificance of taxes on GDP growth, it could be plausible for the country's fiscal rationalization to increase taxes. As per the latest World Bank Data, Egypt's taxes constitute around 12.5% of GDP, which falls below the world's average of 15.2% and MENA's average (excluding high income nations) of 16%. Concurrently, the country needs to radically tackle the problem of tax evasion and the informal economy. Regarding tax evasion, the head of tax authority estimated that the country lost some USD 22.3bn due to tax evaders in FY 2016/17, causing the country to collect only 40% of the taxes' pool that ought to have been collected (Abdel Zaher, 2018). As for the informal economy, El Shamy (2015) argues that its size is estimated to have reached some 40% of the GDP. This represents untapped potential, as this economy is unbankable and untaxable, leading to forgone revenues that could have contributed to balancing out the budget and reducing the need for bank finance and consequential crowding out effect. The formalization of the informal economy and the combating of tax evasion could be potentially tackled by changing the currency in circulation with a timeframe for adherence. During the process of bank notes' replacement by individuals and businesses, the records could be regularized and completed for the inclusion of this society into the banking system, hence into the taxable pool.

Another front that could revive economic growth and alleviate pressure on governmental finances is embarking more on Public Private Partnerships (PPP) when undertaking capital expenditures or national projects. This helps serve two purposes; implementing much needed national projects in an efficient way given private sector bidding will take place and bank finance will be availed to private rather than public sector, hence preventing crowding out effect and ensuring continuous workflow for the private sector. A byproduct of the PPP programs as well will be increased taxable income from the private sector, thus contributing to the budget's revenue side as well. The PPP concept is not anew to the governmental sector and has been previously implemented in several projects, yet it needs to be adopted on a more extensive scale, enable Egypt to run Hansen's two-tier economy model and realizing its full spectrum of benefits.

On the monetary front, and given that the second round inflationary effects of the floatation have subsided, it is a plausible move to start an expansionary round and lower interest rates, benefiting from a favorable base effect. The relatively high level

of interest rates are hindering green field projects as well as expansionary capex, and pushing up the required internal rate of return (IRR) for investors on the back of the high risk free rate. The delay in interest rate reduction was fueled by the fear of losing the carry trade advantage, hence the consequential withdrawal of hot money with its negative implications on the foreign currency reserves. However, with the flair currently given by the Federal Reserve of adopting an expansionary environment, the indications of global recession with the inversion of US and UK yield curves, the anticipated boost in foreign currency receipts with the energy discoveries and Egypt turning into a net exporter – among others, the scene is now more accommodative of a the long-awaited expansionary monetary policy.

Another dimension that is worth tackling is the local currency's peg to USD, Several scholars, such as Kheir Eldin & El-Shabrawy, 2015 and Nouredin, 2017, tackled that aspect, emphasizing that Egypt is disadvantaged by maintaining determining its exchange rate in USD, while exchange rate with other currencies is indirectly determined based on the exchange rate of USD with the respective currency. This is the case given that Egypt's major trading partner is the EU (both in terms of imports and exports), hence pegging the local currency to the USD made Egypt vulnerable to changes in EUR/USD exchange rate, which negatively impacted Egypt competitive advantage as highlighted previously. Accordingly, a more suitable setup would be pegging the EGP to a weighted average of the USD and EUR according to the respective shares of each party in the country's trade balance.

### **Compliance with Ethical Standards**

The authors declare that they have no conflict of interest.

This article does not contain any studies with human participants or animals performed by any of the authors.

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