Is there a need for a Marshall plan in the Egyptian economy? An investigation of the fiscal stimulus package

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Is there a need for a Marshall plan in the Egyptian economy?

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Abstract

It has been three years since the outbreak of the January 25[th]revolution, the Egyptian economy has been suffering lower economic growth rates that reached 2.4 percent in 2012/2013, low investment rate triggered by the lack of security and political instability, which reached 13.3% in 2012/13, High unemployment rate among university graduates recorded 30.1 percent by the end of March 2013, and high poverty headcount ratio, which reached 25.2% in 2010/11. Egypt received economic aids of about US$ 12 billion from Arab Gulf States after June 2013. In order to stimulate the economy, the Egyptian government announced the first stimulus package program, of about LE 29.738 billion. I Used VAR models to estimate the elasticity of economic growth to public investment and four main public investment categories, both livelihood and industrial investments are expected to boost economic growth. The impact "short-run" multiplier is expected to be 0.625, the peak multiplier is expected to equal 1.68, and the cumulative "long-run" multiplier is expected to equal 1.58. Concerning the contribution of the fiscal stimulus program to economic growth, it is expected to boost real short-run economic growth rate by 0.61 percent, and it is expected to boost real long-run economic growth rate by 0.45 percent. If the second stimulus package is to be implemented, the short-run economic growth rate will be expected to reach 3.62 percent, also the long-run economic growth rate is expected to record 3.3 percent.

1. Introduction:

In the Economic literature, there has been a long debate on the role of the government in the economy. On one hand, the "minimal statism" concept proposed by the classical economists means that the government should minimize its role in economic activity and to be responsible for the protection of individuals from aggression, theft, breach of contract, and fraud via governmental institutions such as the military, police, and courts. On the other hand, Keynes argued the state guardian concept and Say's law, thought that the fiscal policy can play an important role in stabilizing the economy through the multiplier effect. Empirical experience showed that the minimal role for the government is no longer appropriate, but recent developments in the global economy magnified the necessity of an active government, which can intervene with certain policy instruments to correct market failures, without disturbing the

market forces. The government can intervene in the economy to lessen the negative impacts of a recession and stimulate the economy using expansionary fiscal policies, which are called "Fiscal Stimulus Packages", which were applied by several developed and developing countries in the aftermath of the global financial crisis, by injecting finance for developmental projects such as infrastructure, transportation and public services.

Empirical studies tried to tests the Keynesian notion that government expenditures can have a multiplier larger than 1 on aggregate income, Wang and Wen (2013) tried to estimate the size of the multiplier in china, they concluded that the size government expenditure multiplier is significantly larger than between 2,7 and 5,6 at the national level and between 2,8 and 6,5 at regional level, which is larger than those found in the United States or other developed countries. The large size of the multiplier effect in China may justified by the 4 trillion RMB stimulus package implemented in 2008 and 2009, which was effective in preventing economic slowdown. The large multiplier effect may have negative and detrimental effects on the economy; government expenditure may be a major aggravating source of inflation and business cycles when consumption is highly sensitive to a positive shock in government expenditure than output "GDP", as empirical studies found for China and Algeria (Wang and Wen, 2013), (Chibi et.al,2010).

The global financial crisis of 2008/09 and national governments' endeavors to stimulate the economy in several countries through the implementation of fiscal stimulus packages has revived the interest in analyzing the potential impact of these packages at a macroeconomic level, using the multiplier concept trying to identify the potential effectiveness of the fiscal policy (Bruckner and Tuladhar. 2010). The American Congress passed the American Recovery and Reinvestment Act (ARRA) in the spring of 2009, the largest fiscal stimulus package in U.S. history, of $825 billion , was approved (Leduc and Wilson, 2012).

It has been more than three years since the outbreak of the January 25th revolution, which was mainly fueled by economic and social needs of the Egyptian citizens; as the Egyptian economy was suffering macroeconomic imbalances which were vividly reflects in macroeconomic indicators such as budget deficit, inflation rate, exchange rate, balance of payments deficit, high unemployment rate; which in turn affected the well-being of the Egyptians. No effective economic policies were actually set in place to improve the economic and social conditions in Egypt, to be felt by lower and middle classes. However, after the new government was formed in July 2013, realizing the implications of the deteriorating economic situation and the need for measures that can restore confidence in the Egyptian economy and stimulate economic activity, with some policies to ease the burden on the poor; the government announced about the first fiscal stimulus plan which became effective after the presidential decision to open an additional appropriation in the budget of the State for the financial year 2013/2014 of about 29.738 LE billions for the implementation of the stimulating program.

The main objectives of the paper are: **First:** Investigating the potential contribution of the stimulus package program to economic growth both in the immediate and long run; as far as I know no empirical research has been conducted to investigate this potential impact. **Second:** Identifying promising investments that might have a significant contribution to growth and result in a high fiscal multiplier. **Third:** Providing policy recommendations for decision makers.

The paper is organized as follows: **Section Two:** covers the literature review and theoretical background. **Section Three:** explores problems facing the Egyptian economy, whether is there a room for government intervention, and the prerequisites for the effectiveness of economic aids. **Section Four:** explains econometric methodology. **Section Five:** includes empirical results. **Section Six:** is the conclusion and policy recommendations.

2. Literature Review& Theoretical Background:

There is an extensive empirical literature on the multiplier effect of fiscal policy. The empirical research on the impact of government expenditure on economic growth can be grouped into two main strands. While the first strand focuses on the effects of the overall government expenditures on economic growth, the second tries to differentiate the impact of different types of government expenditures on economic growth.

As for the first strand of literature, although several studies have investigated the relationship between government expenditure and economic growth using different methodologies, yet the results are inconclusive. Some studies concluded the existence of anegative relationship between government expenditure and economic growth such as Landau (1983); Barro (1989); Romer, 1990; Alexander, 1990; Folster and Henrekson, 1999, and Josaphat et al. (2000). Niloy et al. (2003) examined the effect of government expenditure for a panel of thirty developing countries over the period 1970-80 , they concluded the esxistence of a positive and significant correlation between both government capital expenditure-to-GDP ratio and economic growth, but current expenditure was not found to have a significant effect on growth (Alshahrani and Alsad, 2014).

As for the second strand of literature, it is known that the composition of the program can have a substantial impact on the outcomes or the effectiveness of the program, this has been confirmed by empirical studies. Cullison (1993) analyzed the impact of government spending on education and labor training, found a statistically significant impact for them on future economic growth, furthermore the reduction of defense spending by 20% and apportioning the proceeds between debt reduction and spending on education and training can result in higher levels of real private GDP than what would have resulted without reductions in defense spending. Bertrand and Mamatzakis (2001) tested the impact of investment in infrastructural projects on long-run economic growth rates in South Africa and Chile and found positive growth impacts. Using a similar methodology, M'Amanja and Morrissey (2005), using data covering the period (1964-2002), reached the same conclusion for the Kenyan case. Leduc and Wilson (2012) showed that transportation spending can be associated with larger economic benefits than other types of

government spending which generally do not increase the productivity of private sector production (Alshahrani and Alsad, 2014).

There are myriad of methodologies that can be used to estimate the size of the fiscal multiplier, such as: **i. Model Simulations:** models with an ISLM structure and little or no forward looking behavior result in positive multipliers by construction. **ii. Case Studies:** the main drawback of this approach is that the results are specific to the type of fiscal measure "shock" studied, the prevailing macroeconomic conditions at the time of implementation. **iii. Vector Auto-Regression models (VAR):** it is useful to correctly identify and track the impact of an exogenous movement in public expenditure or taxes. VARs give the response of the economy to a specific shock using relatively simple tools such as the impulse response functions (IRFs) and variance decompositions (VDs). The main criticism to this approach is that the fiscal policy decisions are usually announced by the fiscal authorities, so the response to the expected shock may occur before the decisions are actually set in place. **iv. Econometric studies of consumer behavior:** they focus on the response of consumption to the change in income as a result of a specific fiscal shock (Spilimbergo et al. 2009). The size of the fiscal multiplier is of great importance, as it gives signs concerning the potential effectiveness of fiscal policy in stimulating the economy. Empirical studies reached different estimates for the size of the fiscal multiplier due to differences in econometric methodologies used; examples are in the following table:

Table 1: Estimates of the Public Investment Multipliers in the Literature:

Publication	Country	Multiplier	Methodology	Description
Hida, et.al. (2008)	Japan	1.1	Error Correction Model	Multiplier (Maximum)
Perotti (2004)	Australia Canada Germany United Kingdom Untied States	1.07 0.74 5.46 0.16 1.68	VAR - quarterly	Multiplier (Maximum, Cumulative)
Afonso and Aubyn (2008)	France Germany Canada United Kingdom Japan United States	1.5 1.7 -2.3 -1.6 .014 1.8	VAR - annual	Multiplier Cumulative (Marginal Productivity)
Freedman, Kumhof, Laxton and Lee (2009)	United States	1.8	Dynamic Neo-Keynesian Model	Multiplier Period 1

Source: Brückner, M and Tuladhar, A. April 2010. "**Public Investment as a Fiscal Stimulus: Evidence from Japan's Regional Spending During the 1990s".** IMF Working Paper No. 10/110.

The fiscal multiplier is theoretically defined as the proportional change in output (ΔY) to an exogenous change in a particular fiscal variable such as government expenditure, taxes, transfer payments or other fiscal policy variables with respect to their respective baselines. Depending on the time frame considered when analyzing the impact of the fiscal policy on output and growth, there are three main types for the fiscal multipliers, which are (Spilimbergo, et.al, 2009):

1. **The Impact "Short run" Multiplier (IM):** which reflects the elasticity of output to the fiscal policy variable of concern "government expenditure" at the impact period, it could be expressed as:

$$\mathbf{IM} = \frac{\Delta y(t)}{\Delta G(t)}$$

2. **The Peak Multiplier (PM):** indicates the maximum expected response of output in the initial booming phase of the boom-bust cycle, it could be expressed as:

$$\mathbf{PM} = \mathbf{max}_N \frac{\Delta y(t+N)}{\Delta G(t)}$$

3. **The Cumulative "Long run" Multiplier (CM):** it is the cumulative changes in output over time divided by the cumulative changes in government spending. The rationale behind the long-run multiplier is that government expenditure may be persistent and may trigger output responses in several time periods after the initial shock, as in the standard Keynesian IS-LM model where the multiplier is the infinite sum of the incremental changes in output in each period after the shock (Wang and Wen, 2013). It could be expressed as:

$$\mathbf{CM} = \frac{\sum_{j=0}^{N} \Delta y(t+N)}{\sum_{j=0}^{N} \Delta G(t+N)}$$

Concerning the determinants of the fiscal multiplier, there are three main factors that affect the size of the fiscal multiplier, such as: **i. The size of leakages:** the relative size of leakages of the stimulating funds from the income –expenditure circular flow in the economy should be minimized to guarantee the effectiveness of government expenditure, this could be achieved when the marginal propensity to consume (save and import) is large (small). **ii. Monetary Policy:** coordination between monetary and fiscal policies is crucial in order to avoid contradiction; the multiplier effect of government expenditure on output will be large if the monetary policy is accommodative and the nominal interest rate does not increase in response to fiscal expansion, to avoid the crowding out effect. Christiano, Eichenbaum, and Rebelo (2009) ensured the importance of the zero lower Bound for interest rate, as the multiplier should be large when monetary policy has hit the lower zero bound. **iii. Fiscal Sustainability:** fiscal expansions can be contractionary if they reduce consumers' and investors' confidence in government economic policies, especially if the fiscal expansion raises fiscal sustainability concerns; as it would lead to high risk premium on government debt, hence crowding out the private investment; that's why the sources of finance are important to consider when the stimulus plan is designed (Spilimbergo et.al, 2009).

Brückner and Tuladhar (2010) estimated both short run and long run fiscal multipliers for Japan, their estimates were about 0.28 and 0.56, respectively. They justified the lower size of multiplier estimates by the existence of a significant crowding out effect for public investment on private consumption; as a 1 percent increase in public investment was found to decrease private consumption by 0.1 percent.

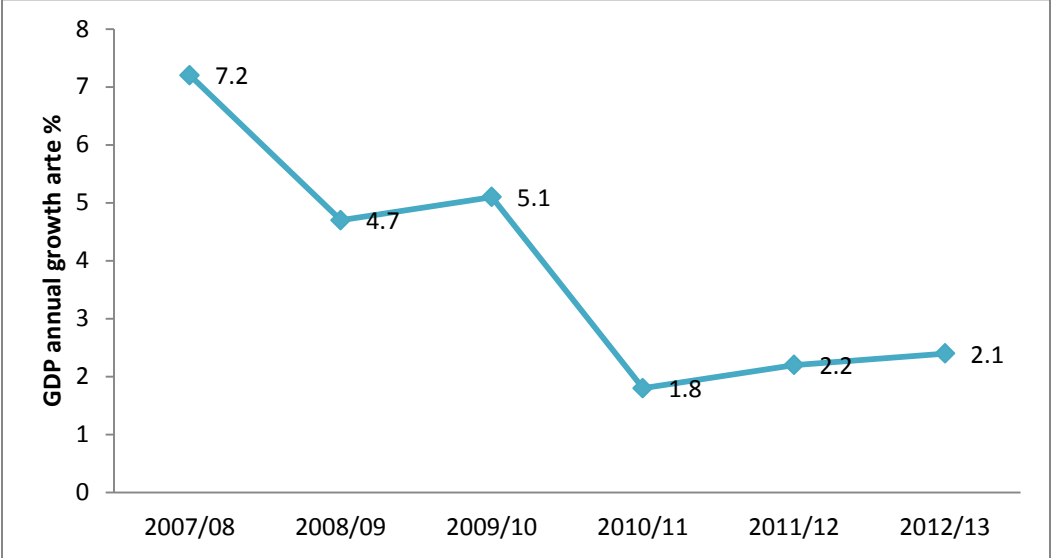## 3. Is there a need for a Marshall Plan in the Egyptian Economy?

3.1.1. Challenges Facing The Egyptian Economy:

It has been three years since the outbreak of the January 25th revolution, which was mainly fueled by economic and social needs of the Egyptian citizens; as Egyptians were suffering higher levels of unemployment, miserable social status and inequality in income distribution in society due to the lack of well-designed social policies that could have guaranteed pro-poor growth. Marotta et al. (2011) examined the relationship between growth and poverty in Egypt for the period (2005 – 2008), they concluded that only 45 percent of the population in Egypt remained consistently out of poverty throughout the period, while the remaining 55 percent of Egyptians experienced at least one near-poverty episode.

After the January 25th revolution, no effective economic policies were actually set in place to improve the economic and social conditions in Egypt, to be felt by lower and middle classes. Inferior economic conditions in Egypt are reflected in macroeconomic fundamentals such as: a. Lower economic growth rates that reached 2.4 percent in 2012/2013. b. Low investment rate triggered by the lack of security and political instability, which reached 13.3% in 2012/13. c. High unemployment rate; the overall unemployment rate reached 13% 2011/12, and unemployment rate among university graduates recorded 30.1 percent by the end of March 2013. d. High poverty headcount ratio, which reached 25.2% in 2010/11. e. Deterioration in net international reserves; which reached to a critical level of US$ 15.53 billion in 2012, but thanks to the economic aids received from Arab Gulf States after June 2013 they have recorded US$ 17.03 billion by the end of December 2013[1]. f. Real public investment- GDP ratio has been declining over time; it dropped to 5.72 percent in 2012/13. g. A considerable increase in overall government budget deficit-GDP ratio, which reached 13.7 percent in 2012/13 *(See figures 1-7 below)*.

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[1] More details about the composition of economic aids received recently from the Arab Gulf States will be mentioned later on in this section in the context of the Egyptian fiscal stimulus package program.

Figure 1: Real Economic Growth Rates in Egypt (2007/08 - 2012/13)

Figure 2: Investment Rates in Egypt (2007/08 - 2012/13)

Figure 3: Unemployment Rates in Egypt (2007/08 - 2011/12)

Figure 4: Poverty Headcount Ratio in Egypt (2007/08 - 2011/12)
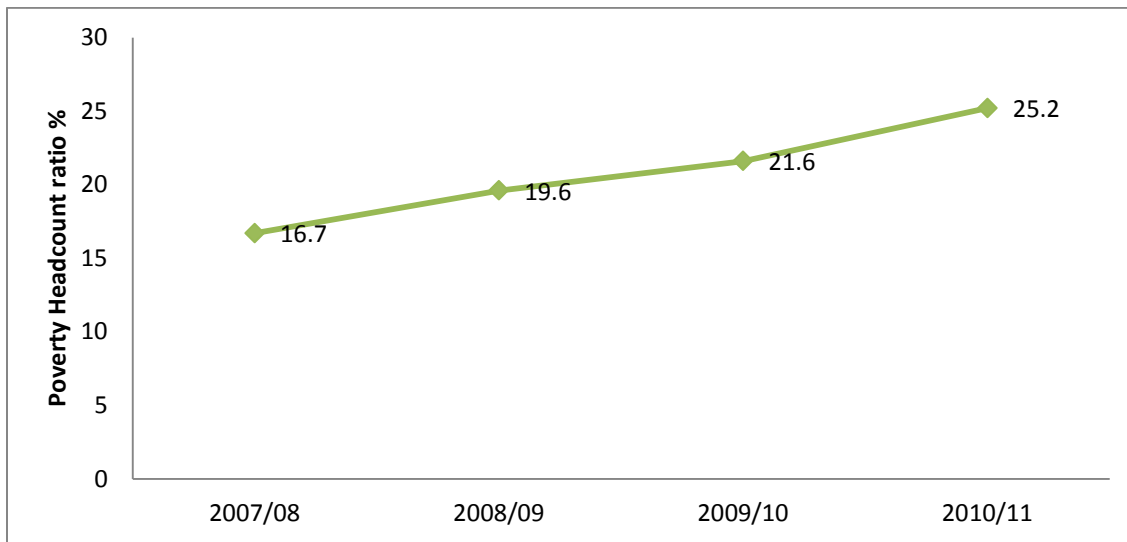
Figure 5: Net International Reserves (2008 – Dec-13)
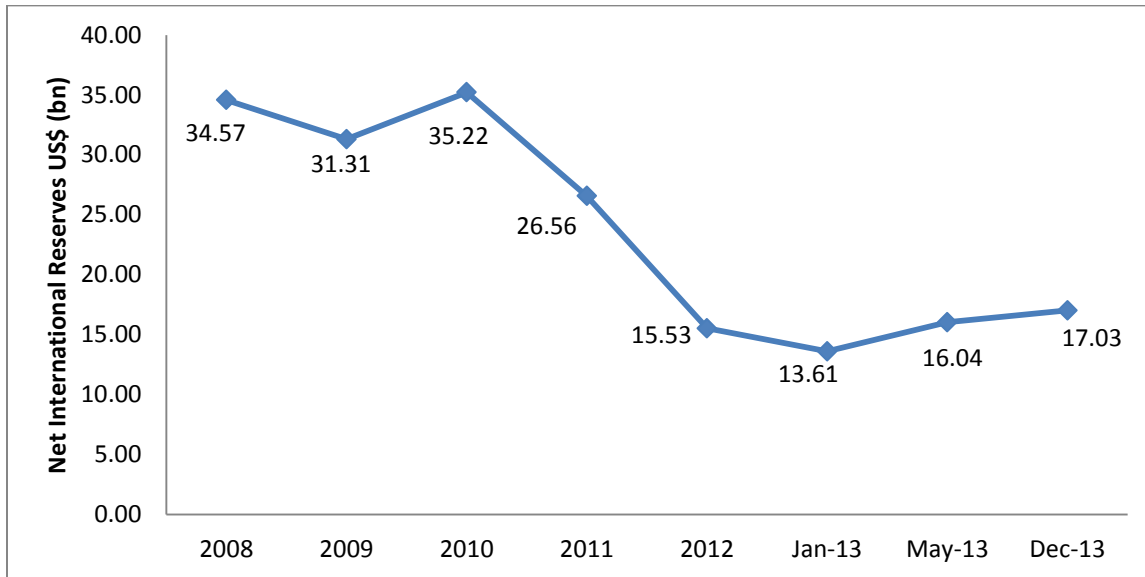
Figure 6: Real Public Investment-GDP Ratio in Egypt (2002-2012)

Figure 7: Government Overall Budget Deficit-GDP % (2008-2012)
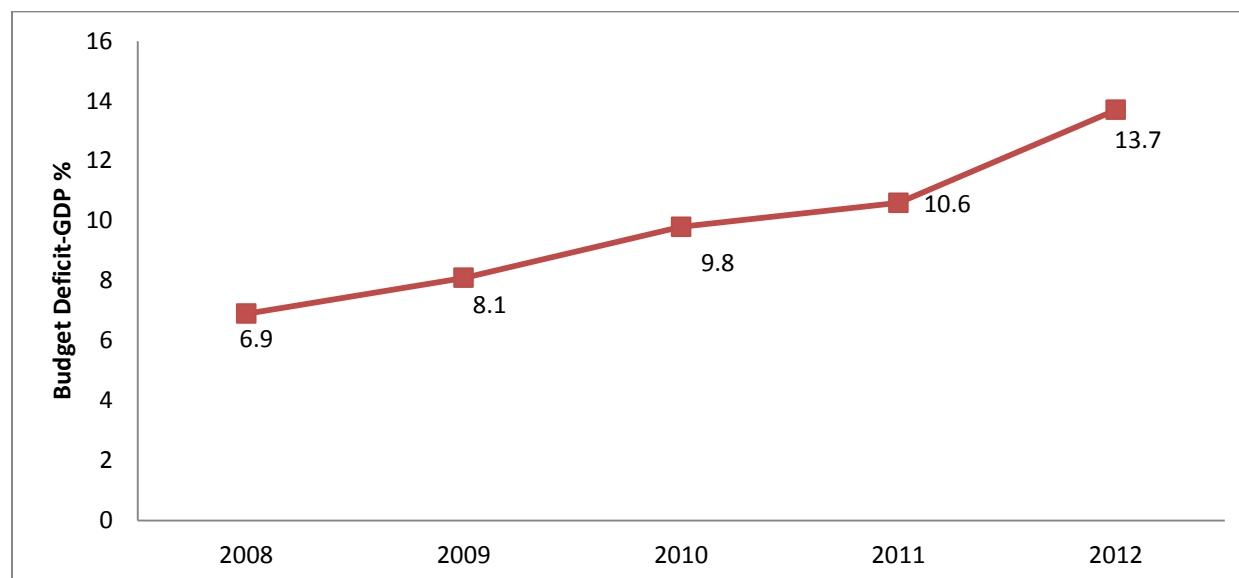
Given the previously mentioned economic challenges, it could have been difficult for the government to follow a tightened budget constraint or to reduce public expenditure on certain sectors. Also certain procedures which are crucial to ensure fiscal discipline such as the restructuring of the subsidy system and the gradual reduction of energy subsidies to energy-intensive industries due to resistance of interest groups. Whose power is relatively large due to the slowdown of economic activity. That's why the Egyptian government should have been resort to policies that can stimulate economic activity, recently Egypt received economic aids from the Arab Gulf States after June 2013 of about US$ 12, the decomposition of these funds can be summarized in the following table:

Table 2: Economic Aids to Egypt from Arab Gulf States after June, 2013

Economic Aids	Saudi Arabia	Kuwait	United Arab Emirates	Total
Petroleum Products	2	1	-	3
Deposits	2	2	2	6
Grants (Cash)	1	1	1	3
Total	5	4	3	12

The Egyptian government announced the implementation of a fiscal stimulus package program, according to the Presidential Decree under Law No. 105 of 2013[2], of about LE 29.738 billion to implement some economic and social programs to stimulate the Egyptian economy.

As for the composition of the fiscal stimulus package that was announced by the Egyptian government,

Figure 8: The composition of the Fiscal Stimulus Package:
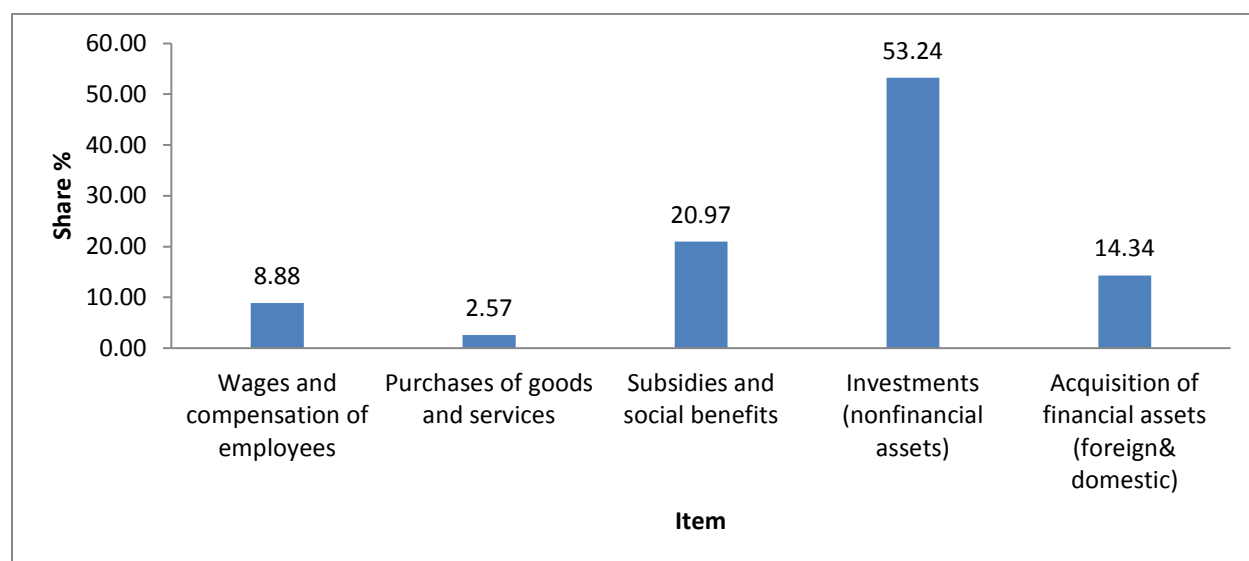
Source: Ministry of Finance.

3.1.2. The effectiveness of Economic Aids:

There has been a strong debate in the literature concerning the effectiveness of foreign aid in promoting growth. On one hand, several empirical studies found a positive relationship between aid and economic growth such as Dalgaard and Hansen (2000); Hansen and Tarp (2000); Lensink and White (2001), and Clemens et al (2004). Aid can have a positive relationship with growth on average across countries, but with diminishing returns as the volume of aid increases. There are three main channels through which aid promotes growth because: i. Aid augments savings, finances investment, and adds to the capital stock. ii. Aid increases worker productivity through investments in health and education. iii. Aid promotes the transfer of technology or knowledge from donor to the recipient countries. On the other hand, aid might have no effect on

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[2] According to the Presidential Decree under Law No. 105 of 2013: The Central Bank of Egypt purchases the funds receives in foreign exchange and an equivalent amount of about LE 60.785 billion should be added to the account of the Egyptian ministry of finance, to be used as follows: First: 29.738 billion pounds to be used to open an additional provision for the general budget of the state to implement economic and social programs to stimulate the Egyptian economy. Second: The rest of the Egyptian pound equivalent amount is added to the balance of the interim accounts of the Ministry of Finance to contribute to the reduction of the budget deficit.

growth and may actually undermine growth due to: i. Corruption. ii. Poor economic policies and the moral hazard problem as policy makers may rely on these funds as interim solutions to certain economic and financial problems rather than implementing certain reforms in economic policies. iv. Aid can reduce both domestic private and public saving (Chowdhury and Garonna, 2007).

In fact, there are critical factors that determine the effectiveness of economic aids which are: i. The characteristics of the recipient country: empirical research found that aid can accelerate growth only in countries with sound macroeconomic policies, the terms of trade, and institutional quality. (Burnside and Dollar 2004, Collier and Hoeffler 2002, and Radelet 2006). ii. Practices and procedures adopted by the donors: it is argued that aid can be more effective if there were greater country ownership and participation among government and community groups or civil society in recipient countries in setting priorities and designing programs. iii. Type of activity supported by aids: empirical studies found that aids for health and education might only affect growth in the long run "after a time lag", while aids for infrastructural projects such as building roads, ports, and agriculture may have a direct positive affect on growth (Chowdhury and Garonna, 2007).

It is worth mentioning that the lack of an attractive business environment can weaken the positive impact of stimulus programs as it discourages private investment, Egypt's rank in the Doing Business in Egypt 2014 subnational report recorded 128 (World Bank, 2013) this can also have a detrimental effect on the competitiveness of the Egyptian economy[3]. Also, uncertainty in economic policies can have a negative impact on the effectiveness of the fiscal policy in stimulating economic growth, which is actually the case in the Egyptian economy, as the consumer confidence index (CCI) of economic performance dropped by 3.9% between (April – May) 2013 which was associated with a decline in other sub-indices such as expected better standard of living for the Egyptian households and confidence in economic policies.(IDSC. 2013).

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[3]According to the Doing Business in Egypt 2014 subnational report: "A strong correlation exists between Doing Business rankings and World Economic Forum rankings on global competitiveness for Egypt". It means that there is appositive statistical correlation between an enhancing business environment and competitiveness.

4. Econometric Analysis:

4.1.1. Empirical Models:

In order to empirically estimate the fiscal multiplier, I will use the **Vector Auto-Regression (VAR)** methodology. I will use two models, while the first focuses on the effects of total government expenditures on economic growth, the second differentiates the impact of different types of government expenditures on economic growth.

Model 1: will include the following variables:

- **RGDPG**: Real GDP growth rate.
- **RPUBINVESTGDP**: real public investment-GDP ratio.
- **RPRINVESTGDP**: real private investment-GDP ratio.
- **PRCONSGDP:** Real private consumption-GDP ratio.
- **NEXPGDP:** Real exports-to-GDP ratio in real terms.

Model 2: this model differentiates the impact of different types of government expenditures on economic growth, public investment will be decomposed into four main groups as follows:

- **Agricultural Investment.**
- **Livelihood Investment:** this category includes (water- health - education – sewerage- electricity- Real estate and housing- natural gas- insurance& social security- other social services).
- **Industrial investment:** this category includes (Suez canal- manufacturing – transportation- communication- information- Oil& Mining).
- **Other investment:** this category includes (Restaurants& hotels- financial intermediaries & supporting services - internal trade).

This model will include the following variables:

- **RGDPG**: Real GDP growth rate.
- **RPUBINVESTGDP**: will be decomposed into: **(RAGRICGDP – RINDUSGDP – ROTHGDP – RLIVGDP)**, these are the real investment -GDP ratios for the investment categories previously mentioned.
- **RPRINVESTGDP**: real private investment-GDP ratio.
- **PRCONSGDP:** Real private consumption-GDP ratio.

4.1.2. Data:

Data is covering the period (1982-2012). Following Alshaharani and Alsadiq (2014), data for all variables are obtained in nominal terms from the Egyptian Ministry of Planning, and then deflated using the GDP deflator obtained from the IMF World Economic Outlook Database.

4.1.3. Econometric Methodology:

The **Vector Auto-Regression (VAR)** methodology will be used to estimate the size of the fiscal multiplier in the Egyptian economy. (VAR) is a set of dynamic equations, in which each variable is specified as a function of an equal number of lags of itself and all other variables in the system.

The estimation of the fiscal multiplier can be accomplished into four steps, which are:

1. **Testing for unit roots:** All the variables should be tested for stationary before the estimation of the model, in order to avoid a spurious regression problem, Augmented Dickey Fuller (ADF) Unit Root test will be used.
2. **VAR estimation:** All the variables should be entered in their stationary states. The lag length for the model will be determined using information criteria such as Akaike and Schwarz information criterion, and then the model will be estimated by the Ordinary Least Squares (OLS) method.
3. **Diagnostic Checks:** diagnostic tests should be applied to ensure the reliability of the results and estimates derived. The LM test for autocorrelation, hetroscedasticity, as well as stability tests should be applied to make sure that the model does not suffer any problems and to ensure the robustness of the results.
4. **Deriving elasticity and multiplier estimates:** After the VAR model is estimated, both Impulse Response Functions (IRFs) and Cumulative Impulse Response Functions (CIRFs) can be used to identify both short, medium, and long term elasticities of economic growth and other variables of interest to public investment. The fiscal multiplier can be estimated by multiplying the elasticity of economic growth to public investment by the inverse of public investment-to-GDP ratio; then Impact, Peak, and Cumulative multipliers can be derived.

5. Results:

Augmented Dickey Fuller (ADF) Unit Root test was used to test for the stationarity of all variables that would be used in the two models. All variables were found to be integrated of order one, with the exception of public investment components which are integrated of order zero. Results can be summarized in the following table, for more details see tables (1-5) & (12-15) at the appendix:

Table 3: Results for ADF unit root test for all variables:

Variable	Order of Integration	t-Statistic	Significance Level
RGDPG	I(1)	-5.067	0.01, 0.05, 0.10
RPUBINVESTGDP	I(1)	-7.647	0.01, 0.05, 0.10
RAGRICGDP	I(0)	-4.635	0.01, 0.05, 0.10
RINDUSGDP	I(0)	-4.615	0.01, 0.05, 0.10
RLIVGDP	I(0)	-3.481	0.01, 0.05, 0.10
ROTHGDP	I(0)	-3.604	0.01, 0.05, 0.10
RPRINVESTGDP	I(1)	-5.888	0.01, 0.05, 0.10
PRCONSGDP	I(1)	-4.681	0.01, 0.05, 0.10
NEXPGDP	I(1)	-9.137	0.01, 0.05, 0.10

Source: Researcher's calculations.

For the estimation of VAR models, annual time series were used to guarantee the accuracy of the multiplier estimates especially in the long run. Concerning the lag length, only 2 lags were included in the following model, and one lag was included in the second VAR model (See tables (6-16) at the appendix). In model two we excluded **NEXPGDP** for estimation purposes due to data limitations. Diagnostic tests were applied for both models to ensure the reliability of the multiplier estimates that will be derived. Both models don not suffer any hetroscedasticity, autocorrelation or stability problems. Summary results for these tests can be summarized in the following table, for more details see tables (7-9) & (17-19) at the appendix:

Table 4: Diagnostic Tests:

Test	Model 1		Model 2	
	Test Statistic	P-value	Test Statistic	P-value
Residual Serial Correlation LM Test	24.24	0.50	52.36	0.344
Residual Heteroskedasticity Tests	304.72	0.413	406	0.302
Stability Test	VAR satisfies the stability condition	No root lies outside the unit circle	VAR satisfies the stability condition	No root lies outside the unit circle
Residual Normality Tests (Jarque Bera)	5.75	0.835	304.04	0.00

Source: Researcher's calculations.

Elasticity Estimates:

The elasticity estimates for both models can be derived based on Impulse Response Functions (IRFs), which indicate the response of different variables to a one standard deviation shock to the variable of interest. IRFs for model 1 are in table 10 at the appendix, estimates of short, medium, and long term elasticities can be summarized in the following table:

Table 5: Elasticity Estimates for model 1:

Variable	Short- term Elasticity	Medium-term Elasticity	Long-term Elasticity
RGDPG	0.083	0.223	0.053
RPRCONSGDP	-0.096	-0.187	-0.067
RPRINVESTGDP	0.957	-0.028	0.057
NEXPGDP	0.287	1.404	0.316

Source: Researcher's calculations.

As for model 1, Economic growth was found to be positively inelastic to public investment, private consumption is negatively inelastic to public investment, private investment is negatively (positively) inelastic to public investment in the medium (short and long) terms, but is positively inelastic in both short and long terms. Net exports are positively inelastic (elastic) to public investment in both short and long (medium) terms. It means that public investment is expected to stimulate a economic growth and boost exports, while uncertainty and the lack of confidence in economic policies can have to a negative impact on private consumption. This may be justified by the fact that in case of unstable macroeconomic environment and volatile inflation rates may induce households to increase savings by precautionary motive. The response of economic growth, private consumption, private investment, and net exports to public investment can be easily visualized by the following figure.

Figure 9: Impulse Response Functions (IRFs) for Model (1):

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of D(RGDPG,1) to D(RPUBINVESTGDP,1)

Response of D(RPRCONSGDP,1) to D(RPUBINVESTGDP,1)

Response of D(RPRINVESTGDP,1) to D(RPUBINVESTGDP,1)

Response of D(NEXPGDP,1) to D(RPUBINVESTGDP,1)
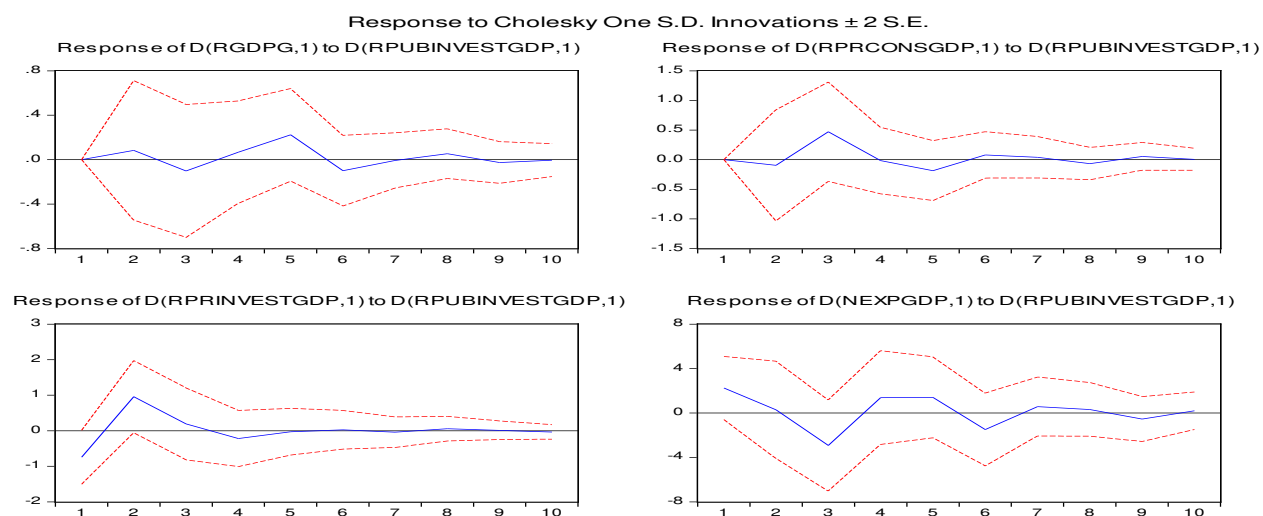
Source: Researcher's calculations.

IRFs for model 2 are in table 20 at the appendix, estimates of short, medium, and long term elasticities of economic growth, private consumption, and private investment to livelihood, agricultural, industrial, and other investments. The response of economic growth, private consumption, private investment, and net exports to these different categories of public investment can be easily visualized by the following figure. Elasticity estimates can also be summarized in the following tables:

Table 6: Elasticity estimates with respect to Livelihood Investment:

Variable	Short- term Elasticity	Medium-term Elasticity	Long-term Elasticity
RGDPG	0.680	-0.051	-0.002
RPRCONSGDP	0.067	-0.073	0.002
RPRINVESTGDP	0.054	0.011	-0.008

Source: Researcher's calculations.

Concerning the response of economic growth, private consumption, and private investment to livelihood investments, it is evident that livelihood investments can have a positive impact on the three variables mentioned earlier in the short run, while it effect may turn around to be negative in the medium-to-long run due to uncertainty and lack of confidence in macroeconomic

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performance which discourage private consumption, private investment, hence have a negative impact on economic growth rates.

Table 7: Elasticity estimates with respect to Agricultural Investment:

Variable	Short- term Elasticity	Medium-term Elasticity	Long-term Elasticity
RGDPG	-0.076	-0.040	-0.051
RPRCONSGDP	-0.329	-0.308	-0.188
RPRINVESTGDP	0.179	0.059	0.018

Source: Researcher's calculations.

Concerning the response of economic growth, private consumption, and private investment to agricultural investments, it is evident that public investment in the agriculture sector does not contribute positively to economic growth. This may be justified by inequality in land ownership which is a common phenomenon in developing countries, due to the lack of a well- designed and a targeting investment strategy in the agriculture sector. Nin-Pratt (2011) concluded that an efficiently targeting allocation of agricultural R&D investment across regions can play an important role in alleviating poverty. However, it contributes positively to private investment, may be because it enables firms to bur raw materials at lower costs.

Table 8: Elasticity estimates with respect to Industrial Investment:

Variable	Short- term Elasticity	Medium-term Elasticity	Long-term Elasticity
RGDPG	0.011	0.030	-0.002
RPRCONSGDP	0.354	-0.018	-0.029
RPRINVESTGDP	-0.298	0.076	0.003

Source: Researcher's calculations.

Concerning the response of economic growth, private consumption, and private investment to industrial investments, it is evident that industrial investment can have a positive impact on economic growth in short and medium terms, but it may have a small negative impact on the long run. Private consumption is expected to respond positively (negatively) in the short (medium and long) run, while private investment responds negatively (positively) to public industrial investment in the short (medium and long) run. All these results ensure that fact that uncertainty, political instability, and institutional constraints can all have negative impact on these variables, so harming economic growth in the long run.

Table 9: Elasticity estimates with respect to Other Investment:

Variable	Short- term Elasticity	Medium-term Elasticity	Long-term Elasticity
RGDPG	-0.041749	0.009	-0.003648
RPRCONSGDP	-0.164909	-0.023	-0.026514
RPRINVESTGDP	-0.360614	0.043	0.003254

Source: Researcher's calculations.

It is obvious that other investments such as public investments in Restaurants & hotels, financial intermediaries & supporting services, and internal trade cannot contribute significantly to economic growth.

Figure 10: Impulse Response Functions (IRFs) for Model (2):
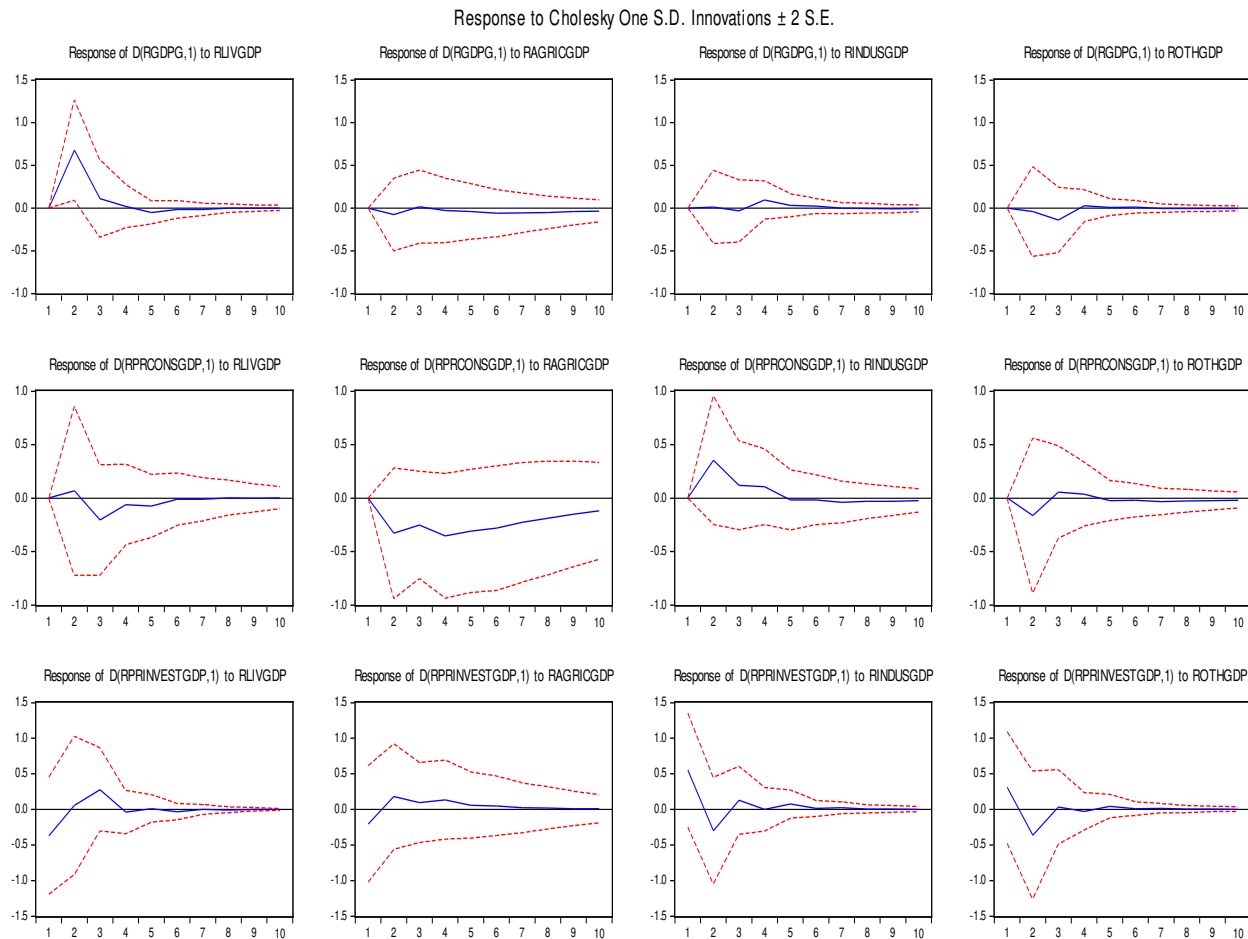
Source: Researcher's calculations.

To sum up, both livelihood and industrial investments are expected to boost economic growth, as livelihood investments such as investments in health and education can improve labor productivity and improve the country's competitiveness, hence positively contributing to economic growth. Industrial investment in information & communication technology is expected to lay the ground for private investment.

Multiplier Estimates:

The fiscal multiplier can be estimated by multiplying the elasticity of economic growth to public investment by the inverse of public investment-to-GDP ratio; then Impact, Peak, and Cumulative multipliers can be derived. The average public investment-GDP ratio during the period (1882-2012) is about 13.28 percent, then the fiscal multipliers can be derived as follows:

1. **The Impact multiplier (IM):**
Since the elasticity of economic growth to public investment in the second period year) following the shock is 0.083, so the impact "short-run" multiplier IM is expected to be 0.625, which is acceptable. Spilimbergo et al. (2009) found that, as a rule of thumb, the size of fiscal multiplier may range between 1 and 1.5 for large economies, between 0.5 and 1 for medium sized economies, and 0.5 or less for small open countries.

2. **The Peak Multiplier (PM):**

Since the maximum expected elasticity of GDP to public investment in the 10 -years period following the shock is0.223, so the peak multiplier PM is expected to equal 1.68.

3. **The Cumulative/Long-rum Multiplier (CM):**

Since the cumulative elasticity of GDP to public investment, in the 8th year following the shock, is 0.21, CIRFs for model 2 are at table 10 at the appendix, so the cumulative "long-run" multiplier CM is expected to equal 1.58.

Concerning the potential contribution of the stimulus package implemented by the Egyptian government to economic growth[4]. Real GDP growth rate in 2012/13 recorded 2.1 percent. In the short-run, this fiscal stimulus program is expected to boost real economic growth rate by 0.61 percent; real economic growth rate is expected to reach 2.71 percent[5]. Long-run economic growth rate is expected to reach 2.6 percent. This effect should be expected because the size of the fiscal stimulus program is not too large; it is only about 1.61 percent of GDP[6].

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[4] I will consider only the impact of public investment on economic growth, excluding funds that were used for salaries and wages and compensations for employees, of about LE 2.6 billion. The impact of LE 27.09 billion is investigated.

[5] Changes in output can be calculated as : Δ Y = Δ PubInvest **.** Multiplier.

[6] Brückner and Tuladhar (2010) estimates for both short run and long run fiscal multipliers for Japan were about 0.28 and 0.56, respectively. Although the Fiscal stimulus-GDP ratio in Japan over the period (1992- 2008) was about 2.3 percent, on average.

This may justify the government's tendency to implement a second fiscal stimulus package, to be highly concentrating on infrastructural projects "among livelihood investments" due to their strong contribution to economic growth, this is in line with the results that we reached as livelihood investments were found to have a relatively high positive impact on economic growth in the short run than other categories of public investment. According to the initial announcements released by government officials recently, the second stimulus package will be expected to be of LE30 billion. If this package will focus on public investment rather than being directed to salary adjustments, it would be expected to boost short- run economic growth by 0.90 percent, and to boost long-run economic growth by 0.73 percent. It means that the two stimulus packages jointly will be expected to boost short-run economic growth by 1.51 percent, and to boost long-run economic growth by 1.2 percent.

6. Conclusion and Policy Implications:

It has been three years since the outbreak of the January 25[th]revolution, no effective economic policies were actually set in place to improve the economic and social conditions in Egypt, to be felt by lower and middle classes. The Egyptian economy has been suffering lower economic growth rates that reached 2.4 percent in 2012/2013, low investment rate triggered by the lack of security and political instability, which reached 13.3% in 2012/13, High unemployment rate among university graduates recorded 30.1 percent by the end of March 2013, and high poverty headcount ratio, which reached 25.2% in 2010/11. Political instability over the past three years worked as a push factor to capital inflows, which led to the deterioration of international reserves; which reached to a critical level of US$ 15.53 billion in 2012. However, thanks to the economic aids received from Arab Gulf States after June 2013 have recorded US$ 17.03 billion by the end of December 2013. In order to stimulate the economy, the government announced the frst stimulus package program, of about LE 29.738 billion. I estimated the elasticity of economic growth to public investment and four main public investment categories, both livelihood and industrial investments are expected to boost economic growth.

The size of the fiscal multiplier is this study is in line with those reached by other empirical studies for medium sized and small open economies. The impact "short-run" multiplier is expected to be 0.625, the peak multiplier is expected to equal 1.68, and the cumulative "long-run" multiplier is expected to equal 1.58. In the short-run, the fiscal stimulus program is expected to boost real economic growth rate by 0.61 percent; real economic growth rate is expected to reach 2.71 percent. Long-run economic growth rate is expected to reach 2.6 percent. If the second stimulus package is to be implemented, the   short-run economic growth rate will be expected to reach 3.62 percent, also the long-run economic growth rate is expected to record 3.3 percent. The Egyptian government has to implement a set of reforms such as restructuring the subsidy system, encouraging the informal sector to formalize, providing incentives to the private sector, achieve political stability and security to attract foreign direct investment, and enhancing

the business environment. All these reforms are crucial for better economic performance, which in turn can reduce uncertainty and guarantee the effectiveness of fiscal policy.

References

Alshahrani, S. and Alsadiq, A. January 2014. **"Economic Growth and Government Spending in Saudi Arabia: An Empirical Investigation".** IMF Working Paper No. 14/3. Avalable at: http://www.imf.org/external/pubs/ft/wp/2014/wp1403.pdf

Brückner, M and Tuladhar, A. April 2010. "**Public Investment as a Fiscal Stimulus: Evidence from Japan's Regional Spending During the 1990s". IMF Working Paper No.** 10/110. Avalable at: http://www.imf.org/external/pubs/ft/wp/2010/wp10110.pdf.

Burnside and Dollar. 2004. **"Aid, Policies, and Growth: Revisiting the Evidence".** World Bank Policy Research Paper No. O-2834 . Available at: http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-3251

Chibi, Benbouziane and Chekouri. August 2010. **"THE MACROECONOMIC EFFECTS OF FISCAL POLICY SHOCKS IN ALGERIA: AN EMPIRICAL STUDY".** ERF.Working Paper No. 536.Accesed at 12th of September, 2013. Available at:http://www.erf.org.eg/CMS/uploads/pdf/1282037771_536.pdf

Christiano, Eichenbaum, and Rebelo. 2010. **"When is the Government Spending Multiplier Large?"** Available at: http://www.kellogg.northwestern.edu/faculty/rebelo/htm/multiplier.pdf

Chowdhury and Garonna. 2007. **" EFFECTIVE FOREIGN AID, ECONOMIC INTEGRATION AND SUBSIDIARITY: LESSONS FROM EUROPE".** UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE Geneva, Switzerland. Discussion Paper Series No. 2007.2. Available at: **http://www.unece.org/fileadmin/DAM/oes/disc_papers/ECE_DP_2007-2.pdf**

Collier and Hoeffler. 2002. **" Aid, Policy and Growth in Post-Conflict Societies".** World Bank Policy Research Working Paper No. 2902**.** Available at: **http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-2902**

CBE Annual Reports. Vol.53, No Available at:

http://www.cbe.org.eg/NR/rdonlyres/04DF7443-48B5-478E-99A86A789F8C3A35/2147/EconomicReviewVolumesVol53No220122013.pdf

Doing Business 2014. Economy Profile. Egypt. Arab Rep. Available at:

http://www.doingbusiness.org/data/exploreeconomies/egypt/~/media/giawb/doing%20business/documents/profiles/country/EGY.pdf?ver=2

IDSC. **" Consumer confidence index of economic performance"**. IDSC. Monthly bulletin, No.117. May, 2013. Accesed at 12th of September, 2013. Available at: http://www.idsc.gov.eg/upload/news/300/conf_05-13.pdf

Leduc,S., Wilson,D. **"ROADS TO PROSPERITY OR BRIDGES TO NOWHERE? THEORY AND EVIDENCE ON THE IMPACT OF PUBLIC INFRASTRUCTURE INVESTMENT"**.NBER.Working Paper No. 18042. May 2012. Accesed at 12th of September, 2013. Available at: http://www.nber.org/papers/w18042.pdf?new_window=1

Marotta, Yemtsov, El-Laithy, Abou-Ali, and Al-Shawarby. 2011. **"Was Growth in Egypt Between 2005 and 2008 Pro-Poor? From Static to Dynamic Poverty Profile".** The World Bank, Middle East and North Africa Region. Poverty Reduction and Economic Management. Policy Research Working Paper No. 5589. Available at: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/03/14/000158349_20110314154349/Rendered/PDF/WPS5589.pdf

Ministry of Planning. 2013. Presidential Decree under Law No. 105. Available at: http://www.mop.gov.eg/Urgentplan/low%20105.pdf

Ministry of planning. Indicators Report Q4 & 2012/2013. Available at: http://www.mop.gov.eg/MopRep/%D9%85%D8%A4%D8%B4%D8%B1%D8%A7%D8%AA%20%D8%A7%D9%84%D8%B1%D8%A8%D8%B9%20%D8%A7%D9%84%D8%B1%D8%A7%D8%A8%D8%B9%20%D9%88%D8%A7%D9%84%D8%B9%D8%A7%D9%85%20%D8%A7%D9%84%D9%85%D8%A7%D9%84%D9%8A2012-2013.pdf_10222013121527PM.pdf

Ministry of Finance. Monthly Budget performance Reports. http://www.mof.gov.eg/MOFGallerySource/English/Monthly-Budget-Performance.pdf

Spilimbergo, Symansky and Schindler. May 20, 2009. **"Fiscal Multipliers"**.IMF. Staff Position Note No. 11. Accesed at 12th of September, 2013. Available at: http://www.imf.org/external/pubs/ft/spn/2009/spn0911.pdf

Wang,X. and Wen,Y. February 1, 2013. **"Multiplier Effects of Government Spending: A Tale of China"**.Accesed at 12th of September, 2013. Available at: https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=SED2013&paper_id=214

Appendix

ADF unit root tests for model 1:

Table 1: RGDPG is I(1)

Null Hypothesis: D(RGDPG) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.067449	0.0017
Test critical values: 1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDPG,2)
Method: Least Squares
Date: 01/26/14   Time: 09:59
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDPG(-1))	-0.966178	0.190664	-5.067449	0.0000
C	-0.434490	0.580122	-0.748963	0.4606
@TREND(1982)	0.013202	0.032116	0.411089	0.6844

R-squared	0.499745	Mean dependent var	-0.039345
Adjusted R-squared	0.461264	S.D. dependent var	1.970743
S.E. of regression	1.446499	Akaike info criterion	3.673866
Sum squared resid	54.40133	Schwarz criterion	3.815311
Log likelihood	-50.27106	Hannan-Quinn criter.	3.718165
F-statistic	12.98676	Durbin-Watson stat	1.968200
Prob(F-statistic)	0.000123		

Table 2: RPrconsgdp is I(1)

Null Hypothesis: D(RPRCONSGDP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.681802	0.0000
Test critical values: 1% level	-2.647120	
5% level	-1.952910	

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	10% level	-1.610011

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RPRCONSGDP,2)
Method: Least Squares
Date: 01/26/14   Time: 09:50
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RPRCONSGDP(-1))	-0.874531	0.186794	-4.681802	0.0001

R-squared	0.439071	Mean dependent var	-0.016223
Adjusted R-squared	0.439071	S.D. dependent var	2.565031
S.E. of regression	1.921084	Akaike info criterion	4.177531
Sum squared resid	103.3358	Schwarz criterion	4.224679
Log likelihood	-59.57420	Hannan-Quinn criter.	4.192297
Durbin-Watson stat	1.983872		

Table 3: Rpubinvestgdp is I(1)

Null Hypothesis: D(RPUBINVESTGDP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.647836	0.0000
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RPUBINVESTGDP,2)
Method: Least Squares
Date: 01/26/14   Time: 10:01
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RPUBINVESTGDP(-1))	-1.345919	0.175987	-7.647836	0.0000

R-squared	0.676231	Mean dependent var	0.034530
Adjusted R-squared	0.676231	S.D. dependent var	3.658416
S.E. of regression	2.081664	Akaike info criterion	4.338087
Sum squared resid	121.3332	Schwarz criterion	4.385235

| Log likelihood | -61.90226 | Hannan-Quinn criter. | 4.352853 |
| Durbin-Watson stat | 2.156474 | | |

Table 4: Rprinvestgdp I(1)

Null Hypothesis: D(RPRINVESTGDP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.888628	0.0000
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RPRINVESTGDP,2)
Method: Least Squares
Date: 01/26/14   Time: 09:57
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RPRINVESTGDP(-1))	-1.112540	0.188930	-5.888628	0.0000

R-squared	0.553232	Mean dependent var	-0.023910
Adjusted R-squared	0.553232	S.D. dependent var	3.234140
S.E. of regression	2.161721	Akaike info criterion	4.413561
Sum squared resid	130.8451	Schwarz criterion	4.460709
Log likelihood	-62.99663	Hannan-Quinn criter.	4.428327
Durbin-Watson stat	2.013210		

Table 5: NEXPGDP is I(1)

Null Hypothesis: D(NEXPGDP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.137762	0.0000
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(NEXPGDP,2)
Method: Least Squares
Date: 01/26/14   Time: 12:14
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NEXPGDP(-1))	-1.515125	0.165809	-9.137762	0.0000

R-squared	0.748784	Mean dependent var		0.341338
Adjusted R-squared	0.748784	S.D. dependent var		18.11881
S.E. of regression	9.081417	Akaike info criterion		7.284212
Sum squared resid	2309.220	Schwarz criterion		7.331360
Log likelihood	-104.6211	Hannan-Quinn criter.		7.298978
Durbin-Watson stat	2.239669			

Table 6: VAR model 1 :

Vector Autoregression Estimates
Date: 01/28/14   Time: 14:24
Sample (adjusted): 1985 2012
Included observations: 28 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	D(RGDPG,1)	D(RPRCONSG DP,1)	D(RPUBINVES TGDP,1)	D(RPRINVEST GDP,1)	D(NEXPGDP,1)
D(RGDPG(-1),1)	0.251881	-0.086726	-0.427242	0.423551	1.200300
	(0.26300)	(0.41454)	(0.39432)	(0.43697)	(1.63869)
	[0.95773]	[-0.20921]	[-1.08348]	[0.96929]	[0.73248]
D(RGDPG(-2),1)	0.382717	0.015338	0.471967	-0.277600	2.274481
	(0.24690)	(0.38917)	(0.37019)	(0.41023)	(1.53839)
	[1.55008]	[0.03941]	[1.27494]	[-0.67670]	[1.47848]
D(RPRCONSGDP(-1),1)	-0.218254	0.147899	0.217247	0.097944	-1.777099
	(0.16363)	(0.25791)	(0.24533)	(0.27187)	(1.01952)
	[-1.33386]	[0.57345]	[0.88553]	[0.36027]	[-1.74307]
D(RPRCONSGDP(-2),1)	0.241496	-0.010256	-0.339245	-0.142585	1.574144
	(0.19346)	(0.30494)	(0.29007)	(0.32144)	(1.20544)
	[1.24827]	[-0.03363]	[-1.16953]	[-0.44358]	[1.30587]
D(RPUBINVESTGDP(-1),1)	0.130564	-0.008416	-0.399225	0.517796	0.878000
	(0.16393)	(0.25839)	(0.24579)	(0.27237)	(1.02141)
	[0.79647]	[-0.03257]	[-1.62428]	[1.90108]	[0.85960]
D(RPUBINVESTGDP(-2),1)	0.081596	0.117517	-0.145454	0.183691	-0.348867
	(0.17438)	(0.27486)	(0.26146)	(0.28974)	(1.08654)
	[0.46791]	[0.42755]	[-0.55632]	[0.63399]	[-0.32108]

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D(RPRINVESTGDP(-1),1)	-0.000940	0.142462	-0.042566	0.011281	-0.579809
	(0.15525)	(0.24470)	(0.23277)	(0.25794)	(0.96731)
	[-0.00606]	[0.58218]	[-0.18287]	[0.04373]	[-0.59940]
D(RPRINVESTGDP(-2),1)	0.061941	-0.023839	0.055481	-0.080234	0.031135
	(0.15259)	(0.24052)	(0.22879)	(0.25353)	(0.95076)
	[0.40593]	[-0.09911]	[0.24250]	[-0.31647]	[0.03275]
D(NEXPGDP(-1),1)	-0.076192	0.011384	0.016968	-0.017196	-0.823142
	(0.04122)	(0.06497)	(0.06180)	(0.06849)	(0.25684)
	[-1.84840]	[0.17522]	[0.27455]	[-0.25108]	[-3.20492]
D(NEXPGDP(-2),1)	-0.063157	0.045249	-0.003943	0.048471	-0.483219
	(0.04141)	(0.06527)	(0.06208)	(0.06880)	(0.25800)
	[-1.52524]	[0.69328]	[-0.06351]	[0.70453]	[-1.87292]
C	-0.075506	0.589432	-0.728966	0.270388	-0.559057
	(0.32540)	(0.51291)	(0.48789)	(0.54066)	(2.02753)
	[-0.23204]	[1.14920]	[-1.49412]	[0.50011]	[-0.27573]

R-squared	0.396395	0.125964	0.442193	0.312011	0.587758
Adj. R-squared	0.041333	-0.388175	0.114072	-0.092688	0.345263
Sum sq. resids	32.84103	81.59247	73.82720	90.66069	1274.981
S.E. equation	1.389901	2.190789	2.083933	2.309325	8.660188
F-statistic	1.116412	0.244999	1.347650	0.770970	2.423794
Log likelihood	-41.96292	-54.70373	-53.30360	-56.17915	-93.18902
Akaike AIC	3.783066	4.693124	4.593114	4.798511	7.442073
Schwarz SC	4.306432	5.216490	5.116480	5.321877	7.965439
Mean dependent	-0.207357	0.612250	-0.451914	-0.110107	-0.665357
S.D. dependent	1.419548	1.859424	2.214035	2.209210	10.70271

Determinant resid covariance (dof adj.)	6330.808
Determinant resid covariance	522.2922
Log likelihood	-286.2666
Akaike information criterion	24.37618
Schwarz criterion	26.99301

Diagnostic Tests for model (1) :

Table 7: Hetroscedasticity test:

VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)
Date: 01/28/14   Time: 14:20
Sample: 1982 2012
Included observations: 28

Joint test:

Chi-sq	df	Prob.
304.7231	300	0.4133

Individual components:

Dependent	R-squared	F(20,7)	Prob.	Chi-sq(20)	Prob.
res1*res1	0.679641	0.742526	0.7194	19.02996	0.5199
res2*res2	0.795113	1.358262	0.3557	22.26318	0.3264
res3*res3	0.663888	0.691320	0.7578	18.58887	0.5487
res4*res4	0.839490	1.830552	0.2106	23.50573	0.2646
res5*res5	0.966852	10.20868	0.0021	27.07185	0.1333
res2*res1	0.711076	0.861391	0.6326	19.91013	0.4636
res3*res1	0.548377	0.424982	0.9369	15.35454	0.7558
res3*res2	0.832990	1.745677	0.2306	23.32371	0.2732
res4*res1	0.828845	1.694935	0.2436	23.20767	0.2787
res4*res2	0.906732	3.402620	0.0516	25.38849	0.1870
res4*res3	0.817807	1.571044	0.2793	22.89861	0.2938
res5*res1	0.783428	1.266088	0.3959	21.93597	0.3440
res5*res2	0.873146	2.409083	0.1184	24.44810	0.2234
res5*res3	0.730521	0.948801	0.5730	20.45458	0.4298
res5*res4	0.735487	0.973184	0.5572	20.59363	0.4214

Table 8: Autocorrelation Test:

VAR Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 01/28/14   Time: 14:23
Sample: 1982 2012
Included observations: 28

Lags	LM-Stat	Prob
1	29.82565	0.2309
2	24.24086	0.5055

Probs from chi-square with 25 df.

Table 9: Stability Test:

Roots of Characteristic Polynomial
Endogenous variables: D(RGDPG,1) D(RPRCONSGDP,1) D(RPUBINVESTGDP,1) D(RPRINVESTGDP,1) D(NEXPGDP,1)
Exogenous variables: C
Lag specification: 1 2
Date: 01/28/14   Time: 14:22

Root	Modulus
-0.367238 - 0.667571i	0.761916
-0.367238 + 0.667571i	0.761916
-0.662086	0.662086
0.614316	0.614316
0.230704 - 0.538200i	0.585562

0.230704 + 0.538200i	0.585562
-0.419511	0.419511
0.340444	0.340444
-0.205700 - 0.241127i	0.316946
-0.205700 + 0.241127i	0.316946

No root lies outside the unit circle.
VAR satisfies the stability condition.

Inverse Roots of AR Characteristic Polynomial
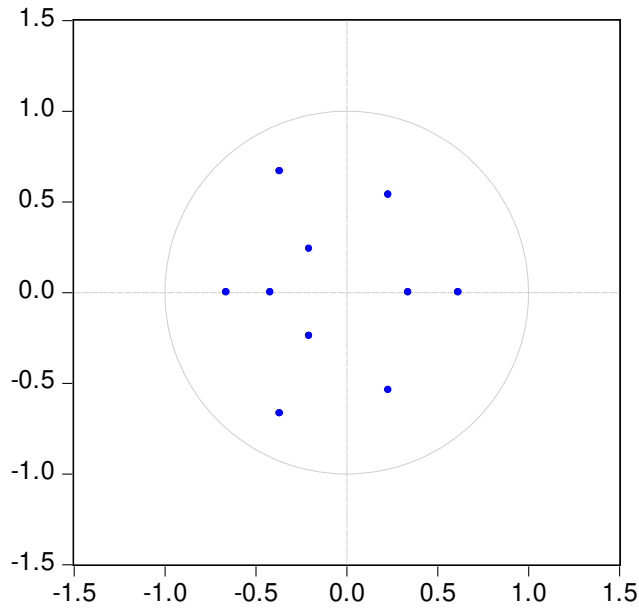
Table 10: Impulse Response Functions (IRFs) for model 1:

Period	D(RGDPG,1)	D(RPRCONS GDP,1)	D(RPRINVES TGDP,1)	D(NEXPGDP, 1)
1	0.000000	0.000000	-0.743618	2.244526
	(0.00000)	(0.00000)	(0.37993)	(1.41797)
2	0.083036	-0.096717	0.957768	0.287301
	(0.31390)	(0.46917)	(0.50774)	(2.18976)
3	-0.102292	0.471467	0.191447	-2.923910
	(0.29935)	(0.41964)	(0.50661)	(2.05069)
4	0.067307	-0.016613	-0.220583	1.382882
	(0.23076)	(0.28048)	(0.39457)	(2.10915)
5	0.223546	-0.187220	-0.028943	1.404958
	(0.20863)	(0.25292)	(0.32880)	(1.81850)
6	-0.099648	0.080196	0.026404	-1.491731
	(0.15900)	(0.19587)	(0.27143)	(1.64348)
7	-0.007386	0.040248	-0.041479	0.575757
	(0.12406)	(0.17472)	(0.21469)	(1.32561)
8	0.053469	-0.067741	0.057510	0.316881
	(0.11183)	(0.13637)	(0.17345)	(1.20702)

Period			
9	-0.025927	0.054119	0.012061	-0.552381
	(0.09382)	(0.11695)	(0.13092)	(1.00841)
10	-0.004826	0.004027	-0.035203	0.200642
	(0.07391)	(0.09345)	(0.10198)	(0.84733)

Cholesky Ordering: D(RGDPG,1) D(RPRCONSGDP,1)
D(RPUBINVESTGDP,1) D(RPRINVESTGDP,1)
D(NEXPGDP,1)
Standard Errors: Analytic

Table 11: Cumulative Impulse Response Functions (CIRFs) for model 1:

Period	D(RGDPG,1)	D(RPRCONS GDP,1)	D(RPRINVES TGDP,1)	D(NEXPGDP, 1)
1	0.000000	0.000000	-0.743618	2.244526
	(0.00000)	(0.00000)	(0.37993)	(1.41797)
2	0.083036	-0.096717	0.214150	2.531827
	(0.31390)	(0.46917)	(0.61449)	(1.89585)
3	-0.019257	0.374750	0.405598	-0.392083
	(0.49464)	(0.69128)	(0.79240)	(2.08018)
4	0.048050	0.358137	0.185015	0.990799
	(0.53754)	(0.65015)	(0.72192)	(1.45147)
5	0.271596	0.170917	0.156072	2.395757
	(0.58714)	(0.64208)	(0.70963)	(1.73356)
6	0.171948	0.251113	0.182475	0.904026
	(0.61432)	(0.60806)	(0.72114)	(1.68787)
7	0.164562	0.291361	0.140996	1.479783
	(0.59646)	(0.54493)	(0.68249)	(1.36825)
8	0.218031	0.223620	0.198507	1.796664
	(0.62481)	(0.58294)	(0.69871)	(1.60841)

Cholesky Ordering: D(RGDPG,1) D(RPRCONSGDP,1)
D(RPUBINVESTGDP,1) D(RPRINVESTGDP,1)
D(NEXPGDP,1)
Standard Errors: Analytic

ADF unit root tests for public investment categories in model 2:

Table 12: RLIVGDP is I(0)

Null Hypothesis: RLIVGDP has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.481971	0.0011
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RLIVGDP)
Method: Least Squares
Date: 01/28/14   Time: 11:12
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RLIVGDP(-1)	-0.597031	0.171464	-3.481971	0.0016

R-squared	0.294620	Mean dependent var		0.227167
Adjusted R-squared	0.294620	S.D. dependent var		13.80048
S.E. of regression	11.59060	Akaike info criterion		7.771031
Sum squared resid	3895.918	Schwarz criterion		7.817737
Log likelihood	-115.5655	Hannan-Quinn criter.		7.785973
Durbin-Watson stat	2.189187			

Table 13: RAGRICGDP is I(0)

Null Hypothesis: RAGRICGDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.635971	0.0009
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RAGRICGDP)
Method: Least Squares
Date: 01/28/14   Time: 11:14
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RAGRICGDP(-1)	-0.866693	0.186950	-4.635971	0.0001
C	0.798545	0.331265	2.410595	0.0227

R-squared	0.434255	Mean dependent var		0.008027
Adjusted R-squared	0.414049	S.D. dependent var		2.032164
S.E. of regression	1.555569	Akaike info criterion		3.785900

Sum squared resid	67.75423	Schwarz criterion	3.879313
Log likelihood	-54.78850	Hannan-Quinn criter.	3.815784
F-statistic	21.49223	Durbin-Watson stat	2.009874

Table 14: RINDUSGDP is I(0)

Null Hypothesis: RINDUSGDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.615431	0.0009
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RINDUSGDP)
Method: Least Squares
Date: 01/28/14   Time: 11:15
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RINDUSGDP(-1)	-0.862771	0.186932	-4.615431	0.0001
C	5.335887	2.044765	2.609536	0.0144

R-squared	0.432074	Mean dependent var	0.145493
Adjusted R-squared	0.411791	S.D. dependent var	12.19601
S.E. of regression	9.353708	Akaike info criterion	7.373763
Sum squared resid	2449.772	Schwarz criterion	7.467176
Log likelihood	-108.6064	Hannan-Quinn criter.	7.403647
F-statistic	21.30220	Durbin-Watson stat	2.019079
Prob(F-statistic)	0.000079		

Table 15: ROTHGDP I(0)

Null Hypothesis: ROTHGDP has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.604960	0.0008

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Test critical values:	1% level	-2.644302
	5% level	-1.952473
	10% level	-1.610211

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ROTHGDP)
Method: Least Squares
Date: 01/28/14   Time: 11:38
Sample (adjusted): 1983 2012
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROTHGDP(-1)	-0.622983	0.172813	-3.604960	0.0012

R-squared	0.309410	Mean dependent var	0.004914
Adjusted R-squared	0.309410	S.D. dependent var	0.630645
S.E. of regression	0.524077	Akaike info criterion	1.578407
Sum squared resid	7.965031	Schwarz criterion	1.625114
Log likelihood	-22.67611	Hannan-Quinn criter.	1.593349
Durbin-Watson stat	2.160796		

Table 16: VAR model 2:

Vector Autoregression Estimates
Date: 01/28/14   Time: 13:21
Sample (adjusted): 1984 2012
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	D(RGDPG,1)	D(RPRCONSG DP,1)	RLIVGDP	RAGRICGDP	RINDUSGDP	ROTHGDP	D(RPRINVEST GDP,1)
D(RGDPG(-1),1)	0.130035	0.106533	0.582771	0.030482	0.293642	0.027319	0.286249
	(0.21358)	(0.29148)	(1.74647)	(0.26179)	(1.53166)	(0.07970)	(0.36599)
	[0.60884]	[0.36549]	[0.33369]	[0.11644]	[0.19171]	[0.34277]	[0.78213]
D(RPRCONSGDP(-1),1)	-0.140589	-0.132479	0.846992	0.126651	0.936361	0.038676	0.264474
	(0.18930)	(0.25835)	(1.54796)	(0.23204)	(1.35757)	(0.07064)	(0.32439)
	[-0.74266]	[-0.51280]	[0.54717]	[0.54583]	[0.68973]	[0.54750]	[0.81530]
RLIVGDP(-1)	0.143623	0.252439	0.787077	-0.019679	-0.096206	0.030340	0.097559
	(0.20400)	(0.27840)	(1.66814)	(0.25005)	(1.46297)	(0.07613)	(0.34957)
	[0.70403]	[0.90674]	[0.47183]	[-0.07870]	[-0.06576]	[0.39855]	[0.27908]
RAGRICGDP(-1)	0.004295	-2.705231	-4.644756	0.026877	-5.069365	-0.088422	2.277942
	(1.53393)	(2.09338)	(12.5432)	(1.88019)	(11.0004)	(0.57242)	(2.62853)
	[0.00280]	[-1.29228]	[-0.37030]	[0.01429]	[-0.46083]	[-0.15447]	[0.86662]
RINDUSGDP(-1)	-0.013923	0.415733	1.807498	0.277814	2.128662	0.078047	-0.148176
	(0.22136)	(0.30209)	(1.81005)	(0.27132)	(1.58743)	(0.08260)	(0.37931)
	[-0.06290]	[1.37621]	[0.99859]	[1.02393]	[1.34095]	[0.94484]	[-0.39064]
ROTHGDP(-1)	-1.409680	-4.299415	-35.65311	-4.747537	-21.79581	-1.802608	-6.774839
	(5.36456)	(7.32110)	(43.8667)	(6.57552)	(38.4714)	(2.00189)	(9.19265)
	[-0.26278]	[-0.58726]	[-0.81276]	[-0.72200]	[-0.56655]	[-0.90046]	[-0.73698]
D(RPRINVESTGDP(-1),1)	0.094422	0.166359	-0.266899	-0.016803	-0.259399	-0.008253	-0.063963
	(0.13947)	(0.19034)	(1.14050)	(0.17096)	(1.00023)	(0.05205)	(0.23900)
	[0.67699]	[0.87400]	[-0.23402]	[-0.09829]	[-0.25934]	[-0.15856]	[-0.26763]
C	-0.605703	0.205616	5.562501	0.744026	4.868042	0.242465	-0.054911
	(0.32193)	(0.43934)	(2.63246)	(0.39460)	(2.30869)	(0.12013)	(0.55166)

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	[-1.88147]	[0.46801]	[2.11304]	[1.88552]	[2.10857]	[2.01828]	[-0.09954]
R-squared	0.267611	0.221964	0.138703	0.120741	0.168178	0.126470	0.107173
Adj. R-squared	0.023481	-0.037382	-0.148395	-0.172345	-0.109096	-0.164706	-0.190436
Sum sq. resids	40.14456	74.76709	2684.281	60.31393	2064.592	5.590315	117.8798
S.E. equation	1.382623	1.886886	11.30588	1.694725	9.915336	0.515951	2.369245
F-statistic	1.096182	0.855861	0.483121	0.411965	0.606540	0.434343	0.360112
Log likelihood	-45.86449	-54.88191	-106.8034	-51.76709	-102.9974	-17.27844	-61.48357
Akaike AIC	3.714792	4.336683	7.917473	4.121869	7.654993	1.743341	4.791971
Schwarz SC	4.091977	4.713868	8.294659	4.499054	8.032178	2.120526	5.169156
Mean dependent	-0.229690	0.554099	7.238534	0.941260	6.292376	0.313747	-0.127771
S.D. dependent	1.399147	1.852577	10.55015	1.565206	9.415055	0.478080	2.171485

Determinant resid covariance (dof adj.)	0.277701
Determinant resid covariance	0.028995
Log likelihood	-236.7055
Akaike information criterion	20.18658
Schwarz criterion	22.82688

Diagnostic Tests for model 2:

Table 17: Hetroscedasticity Test:

VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)
Date: 01/28/14   Time: 13:17
Sample: 1982 2012
Included observations: 29

Joint test:

Chi-sq	df	Prob.
406.0000	392	0.3023

Individual components:

Dependent	R-squared	F(14,14)	Prob.	Chi-sq(14)	Prob.
res1*res1	0.234718	0.306707	0.9828	6.806813	0.9419
res2*res2	0.485943	0.945309	0.5412	14.09234	0.4429
res3*res3	0.594064	1.463442	0.2427	17.22785	0.2442
res4*res4	0.593017	1.457107	0.2451	17.19750	0.2458
res5*res5	0.590887	1.444313	0.2502	17.13573	0.2490
res6*res6	0.594012	1.463126	0.2428	17.22634	0.2443
res7*res7	0.492943	0.972165	0.5207	14.29535	0.4279
res2*res1	0.289185	0.406835	0.9481	8.386355	0.8682
res3*res1	0.600601	1.503763	0.2275	17.41743	0.2346
res3*res2	0.348971	0.536030	0.8722	10.12016	0.7533
res4*res1	0.620163	1.632705	0.1850	17.98471	0.2075
res4*res2	0.311773	0.453009	0.9247	9.041423	0.8284
res4*res3	0.591727	1.449340	0.2482	17.16007	0.2477
res5*res1	0.605319	1.533693	0.2168	17.55426	0.2278
res5*res2	0.310721	0.450791	0.9259	9.010899	0.8304
res5*res3	0.591340	1.447019	0.2491	17.14885	0.2483
res5*res4	0.592066	1.451380	0.2474	17.16993	0.2472
res6*res1	0.623612	1.656835	0.1780	18.08476	0.2029
res6*res2	0.353274	0.546250	0.8650	10.24495	0.7441
res6*res3	0.594606	1.466737	0.2414	17.24358	0.2434
res6*res4	0.592486	1.453903	0.2464	17.18209	0.2466
res6*res5	0.591633	1.448778	0.2484	17.15736	0.2479
res7*res1	0.133774	0.154434	0.9994	3.879459	0.9961
res7*res2	0.258075	0.347844	0.9712	7.484163	0.9144
res7*res3	0.581271	1.388181	0.2738	16.85687	0.2639
res7*res4	0.632671	1.722353	0.1603	18.34745	0.1914
res7*res5	0.582928	1.397669	0.2696	16.90492	0.2613
res7*res6	0.565880	1.303509	0.3133	16.41051	0.2890

Table 18: Autocorrelation Test:

VAR Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 02/02/14   Time: 09:54
Sample: 1982 2012
Included observations: 29

Lags	LM-Stat	Prob
1	52.36974	0.3446

Probs from chi-square with 49 df.

Table 19: Stability Test:

Roots of Characteristic Polynomial
Endogenous variables: D(RGDPG,1)
D(RPRCONSGDP,1) RLIVGDP RAGRICGDP
RINDUSGDP ROTHGDP D(RPRINVESTGDP,1)
Exogenous variables: C
Lag specification: 1 1
Date: 01/28/14   Time: 13:19

Root	Modulus
0.791219	0.791219
-0.515994	0.515994
0.438844	0.438844
0.256967 - 0.194449i	0.322246
0.256967 + 0.194449i	0.322246
-0.180733	0.180733
0.026331	0.026331

No root lies outside the unit circle.
VAR satisfies the stability condition.

Inverse Roots of AR Characteristic Polynomial
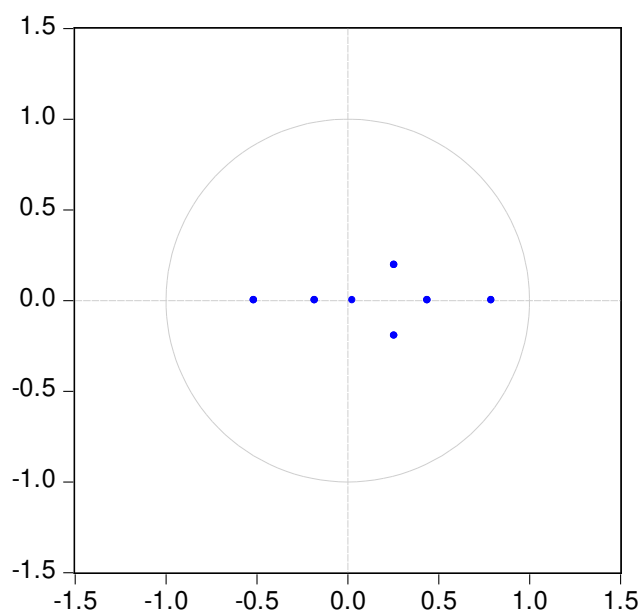
Table 20: Impulse Response Functions (IRFs) for model 2:

Response of D(RGDPG,1): Period	RLIVGDP	RAGRICGDP	RINDUSGDP	ROTHGDP
1	0.000000	0.000000	0.000000	0.000000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	0.680125	-0.076124	0.011703	-0.041749
	(0.29382)	(0.21332)	(0.21534)	(0.26358)
3	0.112265	0.015366	-0.034092	-0.138987
	(0.22654)	(0.21396)	(0.18222)	(0.19122)
4	0.020838	-0.029820	0.093622	0.027499
	(0.12555)	(0.18888)	(0.11163)	(0.09367)
5	-0.051971	-0.040720	0.030211	0.009187
	(0.06715)	(0.16357)	(0.06755)	(0.04931)
6	-0.017689	-0.061889	0.023904	0.012550
	(0.05188)	(0.13832)	(0.04376)	(0.03688)
7	-0.015310	-0.056292	-0.002149	-0.003168
	(0.03560)	(0.11568)	(0.03232)	(0.02531)
8	-0.002163	-0.051647	-0.002958	-0.003648
	(0.02519)	(0.09504)	(0.02817)	(0.02016)
9	-0.002067	-0.041826	-0.007274	-0.006268
	(0.01922)	(0.07794)	(0.02363)	(0.01636)
10	0.000531	-0.034461	-0.005506	-0.004903
	(0.01522)	(0.06460)	(0.01949)	(0.01328)

Response of

D(RPRCONSGD

Period	RLIVGDP	RAGRICGDP	RINDUSGDP	ROTHGDP
1	0.000000	0.000000	0.000000	0.000000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	0.067730	-0.329862	0.354570	-0.164909
	(0.39526)	(0.30543)	(0.30173)	(0.36262)
3	-0.206158	-0.252785	0.118314	0.055661
	(0.25782)	(0.25126)	(0.20773)	(0.21623)
4	-0.060744	-0.354134	0.104838	0.036592
	(0.18779)	(0.29216)	(0.17703)	(0.14911)
5	-0.073982	-0.308886	-0.018038	-0.023310
	(0.14787)	(0.28806)	(0.14035)	(0.09336)
6	-0.009870	-0.282438	-0.016057	-0.021047
	(0.12224)	(0.29173)	(0.11655)	(0.07794)
7	-0.011965	-0.228383	-0.039487	-0.034169
	(0.10037)	(0.27992)	(0.09760)	(0.06183)
8	0.002655	-0.188571	-0.029667	-0.026514
	(0.08164)	(0.26572)	(0.08138)	(0.05311)
9	-1.61E-05	-0.149470	-0.029418	-0.024911
	(0.06541)	(0.24652)	(0.06767)	(0.04425)
10	0.002704	-0.119925	-0.022303	-0.019150
	(0.05199)	(0.22596)	(0.05530)	(0.03795)

Response of
D(RPRINVEST
GDP,1):

Period	RLIVGDP	RAGRICGDP	RINDUSGDP	ROTHGDP
1	-0.369778	-0.204019	0.552824	0.308969
	(0.41246)	(0.40871)	(0.40132)	(0.39261)
2	0.054921	0.179902	-0.298460	-0.360614
	(0.48442)	(0.37133)	(0.37233)	(0.45032)
3	0.278588	0.093967	0.126781	0.034592
	(0.29207)	(0.28147)	(0.23907)	(0.26278)
4	-0.038573	0.134815	-0.002015	-0.029845
	(0.15300)	(0.27774)	(0.15277)	(0.13131)
5	0.011109	0.059492	0.076215	0.043615
	(0.09602)	(0.23283)	(0.09898)	(0.08200)
6	-0.033748	0.049589	0.014032	0.009437
	(0.05678)	(0.20881)	(0.05593)	(0.04765)
7	-0.001914	0.022531	0.022591	0.015688
	(0.03392)	(0.17573)	(0.04131)	(0.03181)
8	-0.008672	0.018456	0.003633	0.003254
	(0.02013)	(0.14753)	(0.02907)	(0.02471)
9	0.000271	0.010703	0.006042	0.004419
	(0.01089)	(0.12091)	(0.02347)	(0.01891)
10	-0.001909	0.009011	0.001347	0.001238
	(0.00673)	(0.09876)	(0.01825)	(0.01575)

Cholesky Ordering: D(RGDPG,1) D(RPRCONSGDP,1) RLIVGDP
RAGRICGDP RINDUSGDP ROTHGDP D(RPRINVESTGDP,1)
Standard Error: Analytic

Table 21: Cumulative Impulse Response Functions (CIRFs) for model 2:

Accumulated
Response of
D(RGDPG,1):

Period	RLIVGDP	RAGRICGDP	RINDUSGDP	ROTHGDP
1	0.000000	0.000000	0.000000	0.000000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	0.680125	-0.076124	0.011703	-0.041749
	(0.29382)	(0.21332)	(0.21534)	(0.26358)
3	0.792390	-0.060759	-0.022388	-0.180736
	(0.42046)	(0.39457)	(0.32147)	(0.29434)
4	0.813227	-0.090578	0.071234	-0.153238
	(0.45846)	(0.55697)	(0.38898)	(0.29418)
5	0.761256	-0.131298	0.101445	-0.144051
	(0.45354)	(0.69334)	(0.41812)	(0.28741)
6	0.743567	-0.193187	0.125350	-0.131501
	(0.43542)	(0.80560)	(0.42175)	(0.27914)
7	0.728257	-0.249479	0.123200	-0.134668
	(0.42345)	(0.89900)	(0.41571)	(0.27646)
8	0.726094	-0.301126	0.120243	-0.138316
	(0.41840)	(0.97521)	(0.40759)	(0.27608)
9	0.724027	-0.342952	0.112968	-0.144584
	(0.41780)	(1.03723)	(0.40111)	(0.27773)
10	0.724558	-0.377413	0.107462	-0.149487
	(0.41901)	(1.08733)	(0.39663)	(0.27973)

Accumulated
Response of
D(RPRCONSGDP,1):

Period	RLIVGDP	RAGRICGDP	RINDUSGDP	ROTHGDP
1	0.000000	0.000000	0.000000	0.000000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	0.067730	-0.329862	0.354570	-0.164909
	(0.39526)	(0.30543)	(0.30173)	(0.36262)
3	-0.138428	-0.582646	0.472884	-0.109249
	(0.52414)	(0.51586)	(0.40440)	(0.34731)
4	-0.199172	-0.936781	0.577723	-0.072657
	(0.66201)	(0.78833)	(0.55339)	(0.44074)
5	-0.273154	-1.245667	0.559685	-0.095967
	(0.75836)	(1.04738)	(0.65400)	(0.48264)
6	-0.283024	-1.528106	0.543627	-0.117014
	(0.84108)	(1.31156)	(0.74274)	(0.53593)
7	-0.294989	-1.756489	0.504141	-0.151183
	(0.90660)	(1.56066)	(0.80662)	(0.57077)
8	-0.292333	-1.945060	0.474473	-0.177696
	(0.96127)	(1.79649)	(0.85873)	(0.60526)
9	-0.292350	-2.094530	0.445055	-0.202607
	(1.00588)	(2.01314)	(0.89807)	(0.63198)
10	-0.289645	-2.214455	0.422752	-0.221757
	(1.04253)	(2.21079)	(0.92932)	(0.65606)

Accumulated

Response of
D(RPRINVESTGDP,1)
:

Period	RLIVGDP	RAGRICGDP	RINDUSGDP	ROTHGDP
1	-0.369778	-0.204019	0.552824	0.308969
	(0.41246)	(0.40871)	(0.40132)	(0.39261)
2	-0.314857	-0.024117	0.254365	-0.051645
	(0.60248)	(0.51488)	(0.51653)	(0.57756)
3	-0.036268	0.069850	0.381146	-0.017052
	(0.72607)	(0.73050)	(0.62611)	(0.57042)
4	-0.074842	0.204665	0.379131	-0.046897
	(0.76433)	(0.93889)	(0.70291)	(0.58634)
5	-0.063733	0.264157	0.455346	-0.003282
	(0.76648)	(1.12416)	(0.73788)	(0.58032)
6	-0.097481	0.313745	0.469378	0.006155
	(0.76119)	(1.29376)	(0.75377)	(0.58696)
7	-0.099396	0.336277	0.491969	0.021843
	(0.76006)	(1.43842)	(0.75595)	(0.58767)
8	-0.108067	0.354733	0.495602	0.025097
	(0.76002)	(1.56250)	(0.75459)	(0.59220)
9	-0.107797	0.365436	0.501644	0.029516
	(0.76131)	(1.66499)	(0.75109)	(0.59446)
10	-0.109706	0.374447	0.502991	0.030753
	(0.76228)	(1.74967)	(0.74787)	(0.59766)

Cholesky Ordering: D(RGDPG,1) D(RPRCONSGDP,1) RLIVGDP
RAGRICGDP RINDUSGDP ROTHGDP D(RPRINVESTGDP,1)
Standard Errors: Analytic