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# The Role of Fiscal and Monetary Policies in Achieving the Economic Development in Egypt

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**Abstract:** The economic policies play an important and effective role in achieving the economic equilibrium. The fiscal policy by a way of the government expenditure and taxes affect the aggregate demand and hence the overall economic variables. The monetary policy plays an important role as well in achieving higher rates of economic growth by a way of changing the money supply and the interest rate. In the framework of the, Egyptian economic reform program, a package of fiscal and monetary policies was adopted to affect the government expenditure, tax revenue volume and the supplied amount of money and other means to affect the levels of the interest rate, the inflation and the unemployment. The first phase of the Egyptian economic reform program aims to realize the fiscal and monetary stabilization, whereas the second phase aims at rising up the economic growth rates. The state has faced several prominent problems that hindered the economic development such as: the general state budget's deficit, the increase of deficit in the balance of payments, the higher rate of inflation either by demand inflation or by production costs inflation, the higher rates of unemployment and in addition to the existence of structural defects between the fiscal and monetary policies. The study problem statement dwells on a main question related to the role of the applied fiscal and monetary policies' tools in achieving the economic objectives related to growth, stability and employment and to what extent could these policies implement the development plans with the required efficiency and effectiveness? Is it possible to achieve the economic stability, dominance on the structural defects and the general economic equilibrium? As such the research aims to know the extent of cooperation and interaction of the most influential national variables on the behaviour and the equilibrium of the Egyptian economy, through finding out the relationship among variables under the mechanism of the applied fiscal and monetary policies in the model framework of the general equilibrium. The research relies on the inductive method of economic analysis both: descriptive and quantitative. The research has made use of the simple linear regression analysis technique and "Simultaneous Equation" through the technique of "Three Stages Least Squares" (3SLS). Data were elicited from various sources during the (1990-2006) period. To clarify the extent of the fiscal and monetary policy's effectiveness on the Egyptian economy structure, the research has relied on the estimation of the General equilibrium model" i.e. "Liverpool Model", which is concerned with investigating the impacts of both fiscal and monetary policies on the overall economic variables in Egypt. In the light of the concluded results, certain recommendations related to the effectiveness of both fiscal and monetary policies were provided in order to achieve the general economic equilibrium, namely, (1) the implementation of an expanding fiscal policy based on the reduction of taxes in order to increase consumption, encourage the investments and, subsequently, increase and create further job opportunities and also increase the government expenditure in order to increase the aggregate demand and, hence, increase the production of goods and services necessary for pushing forward the economic development's wheel; (2) the implementation of an expanding monetary policy based on the reduction of the interest rate in order to encourage the investment necessary for pushing forward the economic development's wheel and (3) the linking necessity between the plans of socioeconomic, educational and training development in order to ensure the general structural equilibrium of the national economy.

**Key words:** Economic Development-Economic policies-Fiscal and monetary policies -General equilibrium model -Liverpool Model.

## INTRODUCTION

With intensified academic argument over the fiscal and monetary policies and which one is more effective in doing an impact on the ambitious economic targets, certain intellectual economic trends have appeared. In the monetary policy,

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some of them stand for the best solution to avoid economic problems, whereas the other trends prefer the priority of fiscal policy as its determinants are considered as more powerful and effective as compared to the monetary policy (Al-Nabolsi,S. M.1997). The starting point of treatment dwells, therefore, on the problem's origin. With the continuity of controversy, the problem has remained outstanding without crucial decision for the sake of either trend because of the partial discrepancy, on the one hand, between the targets of monetary policy and the overall discrepancy, on the other hand, between the targets of the two policies.

Regardless of the nature of these intellectual differences, the coordination and interaction, which have mutual influence between both fiscal and monetary policies, are necessary and inevitable for working under the umbrella of the state's economic policy that considers both policies as its main components. The one who believes that the economic theories are capable of providing an over-generalized, applicable and integrated model for the economies of various countries is mistaken, because of the special characteristics of developed and developing economies and their variety within the same entity such as the level of progress, growth and development at fiscal and monetary markets. Besides the different circumstances which the fiscal policy experiences from the circumstances in which monetary decisions are made either social or political circumstances or related to revenues and expenses. A matter which makes it, finally, inevitable to use specific, not other monetary and fiscal tools, so that the monetary and fiscal policies can achieve their targets (Al-shraa, M. & Kamowa,S. 1997).

The economic policies play the most important and effective role in achieving the economic equilibrium. Due to its various tools, the fiscal policy is considered as one of the most important management tools, which achieve the economic development's targets and eliminate problems, which may hamper the economic stability.

This could be done through the taxes and government expenditure that affect the aggregate demand and hence the overall economic variables. It is the policy entitled to use the overhead financial tools related to the state's revenues by a way of taxes and the expenditure pattern of these revenues represented in general expenses to activate the total economy variables such as gross national product, employment, saving, investment in order to achieve the economic development and firmly establish the economic stability (Radi, A.1986 ).

The monetary policy plays as well an important role in achieving higher-growth rates, full employment, elimination of unemployment, price stability at domestic markets, relationships balance with the outside world, which is known as the magic square. It could be said that the monetary policy is such a group of programs and ways that could influence the levels of interest rates and, hence, influence the level of national income. The central bank plans and enforces the monetary policy using the interest rate and the supplied amount of money. Such policies are related to money and the banking system and control the supplying of money, hence, the purchasing power volume as the central bank can increase or decrease the amount of money available at a certain society. Thus, the central bank can affect the credit size and the interest rates by using traditional tools(Bourai,K.,M.& Al-Safti,A.1994). They are such programs and procedures which the monetary authorities used to follow up in order to organize the money used in a society and achieve the economic development's targets.

In line with the Egyptian economic reform program, a package of fiscal and monetary policies has been followed up to affect government expenditure, taxes revenue volume, supplied amounts of money and other means to affect the interest rate, inflation and unemployment. The first phase of the Egyptian economic reform program has targeted the achievement of monetary and fiscal stabilization, while the second phase has targeted the increase of economic growth rates (Al-Saed, H. 1997). The state has faced several prominent problems that hinder the economic development such as: the state's general budget deficit, the increased balance of payment deficit, the rise of inflation rates, either demand inflation or production costs inflation, the rise of unemployment rates and the existence of structural defects between fiscal and monetary policies.

Since 1990 the fiscal and monetary reform include working out to reform the financial management, follow up the modernization of fiscal regulations and legislations in order to increase domestic resources, lower general budget deficit, follow up a monetary policy that preserves the exchange rate stability in accordance with the change into market mechanisms, making several important policies to handle the structural and monetary defects such as: the liberalization of the exchange rate, the interest rate, establishment of foreign exchange free market, implementation of privatization programs and the liberalization of the public sector and foreign trade.

Egypt has done several efforts to transfer from the managed economy into the free economy, a matter which reduces budget deficit and inflation rate to less than 3% and stabilizes the exchange rate. It helps as well liberalize its trade,

overcome the barriers and restrictions on investment, privatize more than 50% of the public sector companies, so as the growth rate increased to 5% (Kenawy,E.2001).During the period from 1991 till 1997, Egypt has succeeded in the economic reform program and the Egyptian economy has started to move towards further success. However, it has faced some difficulties due to the impacts that affected the world economy since 1997 because of the East Asian economic crisis which indulged the world economy in a slowdown period. Since that year the Egyptian economy has faced a collection of challenges represented in higher ratios of budget deficit, higher credit rates, reduced foreign exchange from oil revenues (Hashad,N.1998).Despite all such challenges, the Egyptian government has controlled the budget deficit through several economic procedures and legislative reforms in the field of customs, taxation and some important economic laws.

***Research Problem Statement:***

In recent years the state has faced several problems hampered the economic development, the most visible ones are the increased deficit of the state's general budget, the increased balance of payment deficit, the rise of inflation rates, either demand inflation or production costs inflation, the rise of unemployment rates and the existence of structural defects between fiscal and monetary policies. Besides, the economic deformations resulted from the difference between social and political targets, on the one hand, and the economic targets in managing and mobilizing the available economic resources.

Thus, the study dwells on a main question related to the interaction nature and relationship between the fiscal and monetary policies. What is the role of the implemented fiscal and monetary policy's tools in achieving the economic targets related to growth, stability and employment opportunities? To what extent were these policies able to implement the development plans with the required efficiency and effectiveness? Is it possible to achieve the economic stability, control over the structural defects and the equilibrium of public economy?.

***Research Objectives:***

The research aims to diagnose the status quo of the national economic variables' role affecting the Egyptian economic performance. It aims as well to know the cooperation and interaction of these variables and their influence on the behavior and equilibrium of the Egyptian economy's economic relationships by carrying out a quantitative measurement for the effects and results of some fundamental economic variables. They resulted from implementing the monetary and fiscal policies in the frame of general balanced model. The research aims as well to determine the nature of relationships and interaction between these monetary and fiscal policies and provide suitable recommendations, so as to improve the fiscal and monetary policy's effectiveness in Egypt in the light of the research-concluded results and indicators, which will help achieve the public economic equilibrium necessary for pushing forward the economic development wheel.

***Research Methodology and Data Collection:***

The research relies on the inductive method of economic analysis both: descriptive and quantitative. The research has made use of the simple linear regression analysis technique and Time series equation to measure the development of the most important economic variables in Egypt. The research has also used the "Simultaneous Equation" through the technique of "Three Stages Least Squares" (3SLS) (Zellner,A.&HenriT.1962,White, H..1982).The research has applied another model, i.e. "Liverpool Model", which is a "General equilibrium model" (GEM). It is concerned with investigating the fiscal policy's impacts by taxes and government expenditure and the monetary policy's impacts by the money supply and the interest rate (Minford,A.,K.&SpragueA.1984,Harris,R.1984,Dixon,P.,&PeterJ.1992).It helps clarify the cooperation and interaction range of these national economic variables with each other, so as to know the effectiveness range of such monetary and fiscal policies on the structure and performance of Egyptian economy.

Published and unpublished data were elicited from various government bodies and institutions such as the Central System for Statistics and Public Mobilization, Ministry of Economic Development, Annual Reports and Economic Journal of the Egyptian Central Bank, Economic newsletters of the Egyptian National Bank during the 1990-2006 period. Besides, other closely relevant references and scientific periodicals to the research topic have been also used. The nominal prices and values have been adjusted by the general consumer price index in Egypt, the base year (1999=100), to get rid of the price inflation impacts and to reflect the real money purchasing power.

***Research Assumptions:***

The research assumes that the fiscal policy is regarded as more effective in affecting the achievement of the economic policy's targets as compared to the monetary policy in Egypt.

***Research Plan:***

The research is divided into five parts in addition to the introduction. They are as follows:

- The relationship between fiscal and monetary policy and the nature of their interaction.
- The theoretical framework of the General Equilibrium "Liverpool Model".
- The economic status quo of the development of certain national economic variables in Egypt.
- Results of estimated measurement for "General equilibrium model".
- Results and recommendations.

***Part One***

***The Relationship between Fiscal and Monetary Policy and the Nature of their Interaction***

***First: The General Targets of Fiscal and Monetary Policy:***

The monetary policy plays an essential role in achieving the economic policy's targets, as it is described as a series of means and procedures adopted by the monetary authority represented in the central bank to control and supervise credit regarding either its available amount, its cost and requirements. The central bank makes the decision in this regard as money cannot manage itself. This means the inevitable interference of the monetary authority to manage such money (Al-Nagar, S. 1999).

The central bank carries out the implementation of this policy by controlling the money supply in accordance with the surrounding economic conditions aiming to achieve growth and working out to achieve monetary stability away from the inflation pressures. There has been a continued argument regarding the main target behind this policy. Is it the stabilization of money value? Or is it the fight against inflation factors regardless of any other factors? Or are they both targets together to achieve balanced development policies?

It is worth mentioning that the dominant trend, regarding the function of such a policy, dwells on achieving the monetary stability and fighting against inflation in order to achieve other socio-economic policies. The monetary policy's targets are various and widely expanding, a matter which often represents an essential problem for the authorities due the difficulty in determining the dividing line between this policy's targets and the means to achieve it. In this trend of mixing up targets, there is an emphasis on the monetary authorities' independence in order to achieve its fundamental targets represented in monetary stability and fighting against inflation. Furthermore, the monetary authorities in many countries has transferred from implementing the general monetary policy to special-targets monetary policy by adopting developed monetary means to enable the monetary authority of determining the targeted-allowed figure for inflation(Al-Nabolsi, S.M. 1997). Due to the consideration of the monetary policy as one of the economic policy's components, they share their general targets represented in achieving the economic stability, rising up the employment rates, stability of prices, exchange rate stability and achieving higher economic growth rate. In addition to the monetary policy's general targets, there are secondary-emanated targets related to sectors, economic activities and social categories.

It is necessary in this concern to differentiate between the strategy and the technique of monetary policy. Whereas the former indicates the selection of the best means to achieve the desired targets, the latter is concerned with accurate details and how to implement them.

As to the fiscal policy, it is related to changes occurred in the management and expenditure sides of the country in order to achieve the overall economic policy targets. Among the targets that the fiscal policy attempts to achieve is the target of narrowing the gap in income distribution, realizing the best allocation of resources, achieving economic stability and curbing inflation and unemployment. Similarly, the realization of such targets in the monetary policy is, perhaps, naturally inconsistent, because the realization of any of them could be the main reason behind the failure of other targets (Abdel Wahab, A. 2000).

Therefore, the main concern should be given to determine the priority of all these targets without scarifying any of them in order to avoid the occurrence of economic imbalance. In most cases, the priority might be given to meet expenditure needs, a matter which might not pay attention to the overall long-range targets of this policy. For instance,

the priority to pay attention to the realization of equal income distribution may contrasts to the achievement of higher long-range growth rates. Thus, it is imperative for the fiscal policy to formulate an integrated model that takes into consideration the total volume of the general budget and its changes in accordance with the sociopolitical circumstances.

In this context and due to the fiscal policy's efforts to get along with the economic developments, which focused recently on mechanisms of reducing the budget's deficit through determining targeted figure for the ceiling of budget's deficit, this policy have transferred from deficit-funding technique to budget adjustment technique that serves the overall economic targets. The posed question is: could the fiscal and monetary authorities think of moving the prices upward (less inflation) in order to achieve faster development rates?

To answer this question, there are several opinions. Some analysts believe that development could occur in the expense of inflation. In such a case, another question might be raised up: will this development be in favor of wealthy or poor people? (Al-Nabolsi, S. M. 1997).

In the interaction framework of the targets of both fiscal and monetary policies, discrimination should be done between minimal targets (fighting against inflation, preserving both pricing and monetary stability) and greater targets (the realization of development, growth and equal distribution) with necessary coordination between both fiscal and monetary policies on an integrated basis and in accordance with focusing on the fiscal and monetary planning.

***Second: the Relationship Between the Fiscal and Monetary Policies:***

It has been referred earlier in the targets related to the fiscal and monetary policies to possible contradiction between targets in certain cases. This contradiction is frequently related to technical and strategic reasons. It is well known that the target of fighting against inflation comes on top of the monetary policy's priorities which uses often interest-rate rising mechanism to handle inflation, a matter which curbs excessive economic growth.

This remedial followed-up mechanism may lead as well to create conditions of stagnation or depression. This contradiction clearly appears whenever such conditions affect the money markets and capital markets, particularly, the stock markets (The Arab Monetary Fund1996).In spite of the negative subsequent impacts of this mechanism, the majority of countries insist on using it even in countries where the central bank has higher extent of independence, a matter which poses difference between the monetary authority, on the one hand, and the government on the other because of the government's desire to achieve development targets related to investment, employment and increasing the growth rates.

The same problem may occur when the fiscal policy's targets conflict with each other. In the necessary case of financing the government deficit, the fiscal institutions may tend to short and medium term borrowings to cover the current expenditure without taking into consideration the stagnation condition and the slowdown growth which require necessary concentration on borrowing for the purposes of funding investments, increase the public demand, support the development endeavors and create further job opportunities. In this particular case, the fiscal policy priorities are irrelevant to the requirements of long term development.

The contradiction has sharply increased between the fiscal and monetary policies as the countries have tended recently to support and reinforce the tendency of traditional bodies towards independence. In addition, the absence of coordination between fiscal and monetary markets leads to fiscal fluctuations that influence the wished effects from the fiscal and monetary policies (Al-Nabolsi, S. M.1997).

In this context, it is important to point out that countries that could achieve a kind of coordination and follow-up between fiscal and monetary policies are the ones which started the programs of economic reform and restructure under the supervision of the world bank and the international monetary fund, in spite of knowing the requirements of such programs concerning economic decision making at all economic systems. However, following such requirements only occurs voluntarily but under the burden of sharp fiscal and monetary crises.

The posed question could be: are there future scenarios for the post economic reform stage when it achieves its targets? Will the matter remain dependent on new arrangements with the international monetary fund or the World Bank? Or will there be a trend to adopt a national continued strategy without depending on the Fund in order to avoid socio-political dangers resulted from that trend?

Some models, which have been implemented in several developing countries regarding the impact of the fiscal and monetary policies' effectiveness, have pointed out the superiority of the fiscal policy over the monetary policy in terms of effectiveness (Saint Louis Model). However, this model had contradictory results when applied in some Arab

countries (Jordan)(AlWazany, K.1997).The difference in results is related to the difference in the economic variables used in the model from one country to another, due to the different economic policies that each country follows up.

As to the belief in the monetary policy's dependence on the fiscal policy, it is a natural belief with the increased budget's deficit and the government relies on borrowing from the central bank to cover its deficit, particularly under the legislations that did not determine an exact ceiling or restriction on funding the deficit. Thus, this belief has become true because of the strong relation between the fiscal and monetary variables. A matter which is, finally, reflected in many aspects such as: the growth of money supply, the increased inflation rate and the deterioration of currency exchange rate.

On the other hand, the Egyptian legislation has determined restrictions on the government's loans from the central bank which do not exceed 10% of the general budget's revenues during the last three years with obligation to settle the loan within a year of its date(Matook, S. 1999).Since January 1990 and in an attempt to curb the government's borrowing from the central bank, funding was done by issuing short-term treasury bonds. This step proves that there is a dependence relationship between the fiscal and monetary policies. Thus, in order to achieve monetary stability and increase the control of liquidity supply, there should be a mainly controlled dominance over the general budget's deficit.

***Part Two***

***The Theoretical Framework of the Model***

***The Description of General Equilibrium Model: "Liverpool Model"***

The general equilibrium model structure consists of 12 - Behavioral equations and also 3 - Identitiy Equations, as follows:

First: 14 - Endogenous Variables.

$$GNP_t, GDP_t, NNP_t, Inv_t, Con_t, Ld_t, Ls_t,$$
$$Lpd_t, W_t, WL_t, Tax_t, Inf_t, Md_t, Ms_t.$$

Second: "8 - Exogenous Variables.

$$Exp_t, \mathrm{Im}p_t, IR_t, IR_t, Un_t, Tcn_t, Gov_t, Pop_t.$$

Third: "3 - Identitiy Equations:

$$GDP_t, GNP_t, NNP_t.$$

Structural Equations of GEM:

$$GNP_t = \beta_{10} + \beta_{11}Gov_t + \beta_{12}Inv_t + \beta_{13}Ms_t + \beta_{14}Exp_t - \beta_{1t}\mathrm{Im}p_t$$

$$GDP_t = \beta_{20} + \beta_{21}Ld_t + \beta_{22}Inv_t + \beta_{23}Tcn_t$$

$$Inv_t = \beta_{30} + \beta_{31}GNP_t - \beta_{32}IR_t - \beta_{33}ER$$

$$Con_t = \beta_{40} + \beta_{41}NNP_t + \beta_{42}WL_t + \beta_{42}Ms_t - \beta_{44}Tax_t$$

$$Ld_t = \beta_{50} + \beta_{51}GNP_t + \beta_{52}Inv_t + \beta_{53}Inf_t \pm \beta_{54}Tcn_t - \beta_{55}W_t$$

$$Ls_t = \beta_{60} + \beta_{61}Pop_t + \beta_{62}GNP_t + \beta_{63}W_t - \beta_{64}I_{wt}$$

$$W_t = \beta_{70} + \beta_{71} Lpd_t + \beta_{72} Inf_t - \beta_{73} Un_t$$

$$WL_t = \beta_{80} + \beta_{81} GNP_t + \beta_{82} Inv_t \pm \beta_{83} Tcn_t$$

$$Tax_t = \beta_{90} + \beta_{91} GNP_t + \beta_{92} WL_t$$

$$Inf_t = \beta_{100} + \beta_{101} WL_t - \beta_{102} MS_t - \beta_{103} Un_t - \beta_{104} IR_t$$

$$Md_t = \beta_{110} + \beta_{111} GNP_t - \beta_{112} IR_t$$

$$MS_t = \beta_{120} + \beta_{121} GNP_t + \beta_{122} IR_t$$

$$\text{Identity}: \begin{cases} GDP_t = Inv_t + Con_t \\ GNP_t = Inv_t + Con_t + Gov_t \\ NNP_t = GNP_t - Tax_t \end{cases}$$

Where:

| | |
|---|---|
| GNP= Gross National Product | Billion L.E |
| NNP= Net National Product | Billion L.E |
| GDP= Gross Domestic Product | Billion L.E |
| Inv= National Investment | Billion L.E |
| Con= National Consumption | Billion L.E |
| Gov= Government Expenditure | Billion L.E |
| Tax= Taxes | Billion L.E |
| Exp= Exports | Billion L.E |
| Imp= Imports | Billion L.E |
| Md= Money Demand | Billion L.E |
| Ms= Money Supply | Billion L.E |
| WL= Labor Wages | Billion L.E |
| W= Labor Wage | Thousand L.E. |
| Lpd= Labor Productivity | Thousand L.E. |
| Ld= Labor Demand | Million Labors |
| Ls= Labor Supply | Million Labors |
| Pop= Population | Million Persons |
| Un= Unemployment Rate | (%) |
| Inf= Inflation Rate | (%) |
| IR= Interest Rate | L.E / US $ |
| ER= Exchange Rate | (%) |
| Tcn= Technology | Time |

***The Economic Rationale of the Following Relationships' Nature in Liverpool Model:***

Below is an illustrative interpretation of the exogenous variables' impact on the endogenous variables in each equation:

- Gross National Product Function: the increase of government expenditure, investments, money supply and exports leads to the increase of Gross National Product, while the imports increase leads to decrease the Gross National

Product.

- Gross Domestic Product Function: the increase of labor demand, investments and level of technology advancement leads to the increase of Gross Domestic Product.
- Investments Function: the increase of Gross National Product leads to the increase of investments, while the rising of both interest rate and exchange rate decreases investments.
- Consumption Function: the increase of the net Gross National Product, labor wages and money supply leads to the increase of consumption, while the rising of taxes decreases consumption.
- Labor Demand Function: the increase of Gross National Product, investments and inflation rate leads to the increase of labor demand, while the rising of labor wage decreases the labor demand. In addition, the technology advancement level may increase or decrease the labor demand in the case of the existence of integrative or alternative relationship between business and capital respectively.
- Labor Supply Function: the increase of population, Gross National Product and labor wage leads to the increase of labor supply, while the inflation rate decreases the labor supply.
- Labor Wage Function: the increase of labor productivity and inflation rate results in the increase of labor wage, while the increased unemployment rate decreases the labor wage.
- Labor Wages Function: the increase of Gross National Product and investments leads to increase the wages value, while the increase of technology advancement level may increase or decrease the wages value.
- Taxes Function: the increase of Gross National Product and labor wages leads to the increase of taxes.
- Inflation Function: the increase of labor wages leads to the increase of inflation rate, while the increase of money supply, unemployment rate and interest rate decreases inflation rate.
- Money Demand Function: the increase of Gross National Product leads to the increase of money demand, while the rising of interest rate decreases money demand.
- Money Supply Function: the increase of Gross National Product and interest rate leads to the increase of money supply.

Revealing the measurement problems that face the model's estimation was taken into account. It is a problem of "Autocorrelation" by using "Box-Pierce-Ljung test"(Box,G.& Pierce D.1970,Greene, W.2003),which follows up the Chi-square test ($X^2$=3.84) and "Heteroscedasticity" by using "Engel test"(Engle, R.1982)withChi-square ($X^2$= 3.84), the "Non-Normality" by using "Jarque-Bera test"(Jarque,C & Bera A. 1987, Sadoulet, E. & Elain D. 1992) with Chi-square ($X^2$= 5.99). Such problems were handled whenever they exist by using the method of "Newey-West"(Newey,W.&KennethW.1987)in accordance with the method of "Generalized Method of Moments" (GMM).

In addition, the problem of "Multicollinearity" was handled by using the technique of "Ordinary Ridge Regression", which is characterized by handling the "Multicollinearity" without omitting the independent variables which characterize the "Multicollinearity" in accordance with the method of "Marquart Alogorithm" (Marquardt, D. & Snee R.1975).

***Part Three***

***The Economic Status of the of Certain National Economic Variables Trends in Egypt:***

The research in this section deals with the economic status of the development of certain national economic variables during the (1990-2006) period, as follows:

- Trend of Gross National Product: the Gross National Product consists of investments, consumption and government expenditure. Equation (1) in Table (1) indicates that the Gross National Product in Egypt has taken a generally increasing statistic significant trend reaches 20.81 billion L.E. with annual increase rate of 4.87% out of the average Gross National Product which amounted 427.31 billion L.E. when the study was conducted.
- Trend of Domestic National Product: the Gross National Product includes investments and consumption. Equation (2) in Table (1) shows the Domestic National Product has taken a generally increasing statistic significant trend reaches 18.52 billion L.E. with annual increase rate of 5.86% out of the average Domestic National Product which amounted 316.04 billion L.E. when the study was conducted.

**Table 1:** Equations of Time trends of some economic variables in Egypt during the (1990-2006) period.

| Dependent Variable | No. | Constant Term $\beta_0$ | Regression Coefficient $\beta_1$ | Determinati Coef. $R^2$ | Average of dependent variable | Annual change Rate% |
|---|---|---|---|---|---|---|
| Gross National Product | 1 | 240.1 | 20.81 | 0.95 | 427.31 | 4.87 |
| Billion L.E | | (19.0)** | (16.88)** | | | |
| Gross Domestic Product | 2 | 149.4 | 18.52 | 0.94 | 316.04 | 5.86 |
| Billion L.E | | (11.7)** | (14.88)** | | | |
| Net National Product | 3 | 220.5 | 20.17 | 0.97 | 402.04 | 5.02 |
| Billion L.E | | (21.7)** | (20.36)** | | | |
| National Investment | 4 | 44.1 | 2.70 | 0.58 | 68.43 | 3.95 |
| (Billion L.E | | (7.2)** | (4.53)** | | | |
| Government Expenditure | 5 | 124.8 | 16.46 | 0.95 | 272.88 | 6.03 |
| (Billion L.E) | | (13.1** | (17.65)** | | | |
| National Consumption | 6 | 71.2 | 1.64 | 0.62 | 86.00 | 1.91 |
| Billion L.E | | (21.2)** | (4.99)** | | | |
| Taxes | 7 | 19.5 | 0.64 | 0.14 | 25.28 | 2.53 |
| Billion L.E | | (4.6)** | (1.56)*** | | | |
| Population NO. | 8 | 52.2 | 1.09 | 0.98 | 61.96 | 1.76 |
| Million persons | | (140.9)** | (30.21)** | | | |
| Labor Supply | 9 | 14.0 | 0.47 | 0.98 | 18.17 | 2.59 |
| Million labor | | (72.0)** | (24.78)** | | | |
| Labor Demand | 10 | 12.9 | 0.41 | 1.00 | 16.56 | 2.48 |
| Million labor | | (242.4)** | (79.83)** | | | |
| Unemployment Rate | 11 | 8.3 | 0.05 | 0.02 | 8.78 | 0.57 |
| (%) | | (10.4)** | (0.62) | | | |
| Labor Wages | 12 | 54.7 | 5.13 | 0.99 | 100.89 | 5.08 |
| Billion L.E | | (47.7)** | (45.84)** | | | |
| Worker wage | 13 | 4.5 | 0.16 | 0.93 | 5.99 | 2.67 |
| Thou. L.E | | (37.0)** | (13.87)** | | | |
| Labor productivity | 14 | 12.9 | 0.64 | 0.90 | 18.69 | 3.42 |
| Thou. L.E | | (23.2)** | (11.73)** | | | |
| Export value | 15 | 22.8 | 6.30 | 0.62 | 79.55 | 7.92 |
| Billion L.E | | (1.8)* | (4.99)** | | | |
| Import value | 16 | 38.0 | 6.29 | 0.68 | 94.57 | 6.65 |
| (Billion L.E) | | (3.3)** | (5.64)** | | | |
| Money supply | 17 | 20.9 | 3.02 | 0.91 | 48.02 | 6.29 |
| Billion L.E | | (8.3)** | (12.34)** | | | |
| Money demand | 18 | 94.6 | 20.54 | 0.92 | 279.40 | 7.35 |
| Billion L.E | | (6.0)** | (13.27)** | | | |
| Inflation rate | 19 | 5.2 | -0.07 | 0.05 | 4.59 | -1.53 |
| (%) | | (6.8)** | (-0.93) | | | |
| Interest rate | 20 | 12.3 | -0.19 | 0.98 | 10.63 | -1.79 |
| (%) | | (170.8)** | (-26.35)** | | | |
| Exchange rate | 21 | 2.5 | 0.20 | 0.72 | 4.21 | 4.75 |
| L.E / US $ | | (7.7)** | (6.29)** | | | |

Numbers in brackets bellow the regression coefficients refer to the values of (t) calculated.
(*), (**), (***) refer to statistic significance at 0.05, 0.01 and 0.10 respectively.
Source: collected and calculated from data listed in table (1) at the appendix.

- Trend of Net Gross National Product: the Net Gross National Product contains Gross National Product minus taxes. Equation (3) in Table (1) indicates the Net Gross National Product has taken a generally increasing statistic significant trend reaches 20.17 billion L.E. with annual increase rate of 5.02% out of the average Net Gross National Product which amounted 402.04 billion L.E. when the study was conducted.
- Trend of National Investments: equation (4) in Table (1) shows the gross investments in Egypt has taken a generally increasing statistic significant trend reaches 2.70 billion L.E. with annual increase rate of 3.95% out of the average national investments which amounted 68.43 billion L.E. when the study was conducted.

In the second phase framework of the reform policy and the Egyptian economic liberalization, the privatization policy applied so as the state is no longer the only investor and its role is based on indicative planning and direct implementation of general investments necessary for the socioeconomic development, which mainly relies on the

infrastructure projects. As the privatization policy is considered as a main component of the economic reform's components, its program was based on special mechanisms aim to qualify the Egyptian economy for the process of privatization through the restructure of the economic institutions and the restoration of necessary equilibrium for the fundamental economic variables while adopting the policies that have contributed and paved the way for the private sector to reinforce its participation in the economic activity(The Egyptian National Bank1999, Al-Biblawy, H.1998).

The tax law imposed on the financial firms to encourage all types of investments through a large package of tax-exemptions, while deferring the completion of society's right to subject these firms income to the tax system for varied periods of time ranged from 5-20 years according to their geographic location. At the end of such periods of time, all such incomes will subject to the tax-system. In accordance with the world approach of attracting local and international investments, an overall development of the tax, imposed on the income of the firms' profits, was carried out with four fundamental dichotomies(Egyptian Association for Tax and Public Finance 2003): the facilitation of production and investments processes; the provision of successive resources of public revenues; the encouragement of technology transfer and the reduction of its cost and the easement of the firms' burden of providing the necessary funding and the activation of the tax equity principles.

- Trend of government expenditure: the government expenditure includes the purchases carried out by all government units. Such purchases contain the national sectors' military equipments and government employees' salaries. The government expenditure is often used in times of economic crises and economic stagnation periods. Equation (5) in Table (1) shows the government expenditure has t aken a generally increasing statistic significant trend reaches 16.46 billion L.E. with annual increase rate of 6.03% out of the average government expenditure which amounted 272.88 billion L.E. when the study was conducted.
- Trend of National Consumption: equation (6) in Table (1) indicates the national consumption has take a generally increasing statistic significant trend reaches 1.64 billion L.E. with annual increase rate 1.91% out of the average national consumption which amounted 86.00 billion L.E. when the study was conducted.
- Trend of taxes: equation (7) in Table (1) shows the tax system in Egypt has taken a generally increasing statistic significant trend reaches 0.64 billion L.E. with annual increase rate of 2.53% out of the average tax which amounted 25.28 billion L.E. when the study was conducted.

These results show tangible increase in the public revenues through taxes outcome and the replacement of general sales taxes to the consumption taxes and expanding its imposition on capital and intermediate goods. Thus, the government was able to multiple the taxes outcome for several times, because the large portion of its income is usually directed to the government in the shape of taxes. At the beginning of the economic reform program, the transformation into the general sales taxes to replace the specific consumption taxes, in a way that led to the tax system stability and implanted its concepts within the society.

As to the tax law no. 91effective since 2005 and its executive regulation, it reflects a new way of thinking in the relationship between the tax system and the financiers. The law represents a specific movement and new trend in the Egyptian economic policy as it contributes to the reduction of taxes categories to almost 50% or less. All public and those who work in the field of economic activity will benefit out of this law due to it privileges, particularly, tax exemption, tax reconciliation, elimination of administrative complications and establishment of mutual confidence bridges between the state and the financier so as to help encourage foreign and domestic investments in Egypt (the Tax Law No. 91, 2005).

- Trend of population: equation (8) in Table (1) indicates population number has taken a generally increasing statistic significant trend reaches 1.09 million person with annual increase rate of 1.76% out of the average population which estimated 61.96 million persons when the study was conducted.
- Trend of labor supply: equation (9) in Table (1) shows the labor supply in Egypt has taken a generally increasing statistic significant trend reaches 0.47 million worker with annual increase rate of 2.59% out of the average labor supply which estimated 18.17 million workers when the study was conducted.
- Trend of labor demand: equation (10) Table (1) shows the labor demand has taken a generally increasing significant statistic trend reaches 0.41 million worker with annual increase rate of 2.48% out of the average labor demand which estimated 16.56 million workers when the study was conducted.
- Trend of unemployment rate: equation (11) in Table (1) indicates the unemployment rate is almost fixed because of its statistic insignificance with the average of 8.78% when the study was conducted.

- Trend of labor wages: equation (12) Table (1) shows the labor wages have taken a generally increasing statistic significant trend reaches 5.13 billion L.E. with annual increase rate of 5.08% out of the average labor wages which estimated 100.89 billion L.E. when the study was conducted.
- Trend of labor wage: equation (13) Table (1) shows the labor wage has taken a generally increasing statistic significant trend reaches 0.16 thousand L.E. with annual increase rate of 2.67% out of the average labor wage which estimated 5.99 thousand L.E. when the study was conducted.
- Trend of labor productivity: equation (14) Table (1) shows the labor productivity in Egypt has taken a generally increasing statistic significant trend reaches 0.64 thousand L.E. with annual increase rate of 3.42% out of the average labor productivity which estimated 18.69 thousand L.E. when the study was conducted.
- Trend of National Exports Value: equation (15) Table (1) shows national exports value in Egypt has taken a generally increasing statistic significant trend reaches 6.30 billion L.E. with annual increase rate of 7.92% out of the average national exports value which estimated 79.55 billion L.E. when the study was conducted. In February a presidential decree was issued to reduce tariffs on 1114 customs items with the aim of easing the public's burdens and encouraging investments, so as to reduce the general tariffs average on goods. The simplification of customs procedures is considered as the most prominent economic reforms that was established during the current stage through a package of customs amendments, that aim to simplify the customs tax structure, encourage investments under the reduced customs on imports, equipments and spare pats, motivate the market and reduce prices with great increase in exports.
- Trend of National Imports Value: equation (16) Table (1) shows national imports value in Egypt has taken a generally increasing statistic significant trend reaches 9.26 billion L.E. with annual increase rate of 6.65% out of the average national imports value which estimated 94.57 billion L.E. when the study was conducted.
- Trend of Money Supply: It is also known as term of liquidity. It reflects the total money supply in the national economy; the money in circulation outside the banking system and the local-currency current deposits. Equation (17) Table (1) indicates money supply in Egypt has taken a generally increasing statistic significant trend reaches 3.02 billion L.E. with annual increase rate of 6.29% out of the average money supply which estimated 48.02 billion L.E. when the study was conducted. The increase of money supply is attributed to the government funding of the deficit of state public budget buy issuing new money.
- Trend of Money demand: it reflects the demand on the local liquid money which represents money supply in addition to near-money which consists of local-currency non-current deposits, foreign currency current and non-current deposits. The classical bankers believe that people hold money for transactions only and they ever hold more than what they need to narrow the gap between income and its spending. Keynes believes, however, that there are two reasons for holding money: reserve and speculation(Yousf,A.&Al-Anany,H.2004 ).Equation (18) Table (1) indicates money demand in Egypt has taken a generally increasing statistic significant trend reaches 20.54 billion L.E. with annual increase rate of 7.35% out of the average money demand which estimated 279.40 billion L.E. when the study was conducted.
- Trend of Inflation Rate: it means the general and continued rising of prices, and this does not mean that rising occurs in all prices as some of them may decline. The general trend must be continued and upwards. Under inflation a large portion of income goes to the government in the shape of tax revenues. Thus, inflation reduces the real individual income. It could be said that there are two sources of inflation(Radi,A.1986):the first is associated with demand as good consumption exceeds its production provided that there are full labor; the second is associated with supply as the increased demand on production elements results in the rising of wages. Subsequently, the increase of production cost will be a reason behind the occurrence of inflation. The economic development processes are often accompanied with labor transfer from one place to another. Hence, the rising of wages occurs. Generally, the supply inflation usually spreads among the developing countries since labors continuously demand the increase of their wages, in contrast to the developed countries where the labors wages are basically high and labors, subsequently, do not ask for increment that may lead to rising the cost and hence the prices. In this concern, the monetary policy may play an effective role to overcome such problem by raising the interest rate and, thus, consumption will lessen, prices will be reduced and inflation will decline. However in the case of stagnation, the interest rate that activates investments should be reduced and as a result there will be an increase in the consumption rate and labor demand.

Equation (19) in Table (1) indicates the inflation rate in Egypt is nearly fixed because of its statistic insignificance and its average when the study was conducted, estimated 4.59%. The fixed rate of inflation is attributed to the improvement of fiscal and monetary performance of the Egyptian economy, reduction of interest rate and the fiscal

policy has managed in reducing demand inflation but it helped activate costs inflation.

- Trend of Interest Rate: The interest means the sum that the limited-period money borrower must pay to the lender at the end of that period in addition to the loan amount. It is considered as a price or return of using the money and usually calculated as an annual percentage. Hence appeared, Keynes's well-known theory included in"The General Theory of Employment, Interest and Money" (Keynes,J.M.1936)where Keynes has paid attention to the role and impact of money on the economy, in other words, Keynes has given money a more important role in the economic activity. The country must intervene through the public expenditure and its utility of monetary policy tools such as the interest rate. Thus, the outlook of money and its role in the economic activity has been changed, particularly in the developing countries which take serious steps in the development process. The monetary theory's tools have witnessed development and modernization as the interest rate currently considered as a monetary phenomenon because it is defined based on money demand and supply.

Equation (20) Table (1) indicates the interest rate in Egypt has taken a generally decreasing statistic trend reaches 0.19% with annual decrease rate of 1.79% out of the average interest rate which estimated 10.63% when the study was conducted.

In accordance with the dominant economic condition, the monetary policy has used the interest rate in two fundamental directions: first, whether by rising up the interest rate which results in rising up the investment and production costs and subsequently the prices that will, in turn, hinder the export sector by reducing the competitiveness efficiency. A move that may create trade balance deficit and contribute to the occurrence of stagnation, unemployment, income reduction and subsequently growth decline. Second, or by reducing the interest rate which results in encouraging the investment-targeted borrowing and the increase of production, employment and income. It may contribute to domestic demand increase and export increase by the reduction of production costs. It can improve the trade balance condition and increase the growth rate. Since the national economic conditions differ from one country to another and the desired targets are different as well, therefore, there is no exact determination of the interest rate in a way which ensures the achievement of desired target such as: savings encouragement, investment encouragement, preservation of domestic capital, foreign capital attraction, preservation of the local fixed exchange rate and the influence on the volume of monetary masses to achieve relative stability of prices and control the inflation rate.

- Trend of the exchange rate: it means the unit value of the national currency (the pound) assessed by a foreign currency. The local currency's evaluation is often done by its U.S. dollar equivalent. Equation (21) Table (1) indicates the exchange rate in Egypt has taken a generally increasing significant statistic trend reaches 0.20 (pound/dollar) with annual increase rate of 4.75% out of the average exchange rate which estimated 4.21 (pound/dollar) when the study was conducted.

In the framework of banking system's reform in Egypt, the central bank has issued a new law 2003 which grants the banking system an adequate independence to freely and efficiently practice its functions with conducting necessary amendments to the monetary policy, in a way which increases the bank's resources of foreign exchange (Al-Biblawy, H. 2003).In this regard, the state gives considerable importance on the expedition of banks restructure program, expansion of merging processes and the increase of foreign contribution in the banking system. This sector has witnessed large-scale merging processes during 2006.Amatter which contributed to the liberalization of the exchange rate, activation of the market- transaction movement, the encouragement of investment and the increase of domestic liquidity value.

***Part Four***

***Results of Estimated Measurement for General Equilibrium Model:***

Table (2) indicates the criteria of correctness quality of the "General equilibrium model", namely determination coefficient ($R^2$) which shows the impact of independent variables on the explanation of changes happened to the

**Table 2:** Goodnes of Fit Criteria of and Tests of the general equilibrium model in Egypt.

| Endogenous Variable | Eq. | $R^2$ | $\bar{R}^2$ | F Test | LM - Tests | | |
|---|---|---|---|---|---|---|---|
| | | | | | LMa | LMh | Lmn |
| Gross National Product (GNP) | 1 | 0.971 | 0.958 | 73.7** | 0.31 | 3.48 | 0.25 |
| Gross Domestic Product (GDP) | 2 | 0.937 | 0.922 | 64.4** | 4.96* | 4.28* | 0.65 |
| National Investment (Inv) | 3 | 0.916 | 0.897 | 47.3** | 0.02 | 0.08 | 0.94 |
| National Consumption (Con) | 4 | 0.947 | 0.929 | 53.6** | 3.61 | 0.3 | 1.95 |
| Labor Demand (Ld) | 5 | 0.952 | 0.93 | 43.6** | 1.86 | 0.16 | 0.56 |
| Labor Supply (Ls) | 6 | 0.943 | 0.924 | 49.6** | 0.07 | 2.27 | 1.11 |
| Worker wage (W) | 7 | 0.892 | 0.867 | 35.8** | 1.71 | 0.01 | 1.34 |
| Wages of labors (WL) | 8 | 0.965 | 0.957 | 119.5** | 7.39* | 1.24 | 0.85 |
| Taxes (Tax) | 9 | 0.901 | 0.887 | 63.7** | 3.46 | 0.25 | 1.28 |
| Inflation (Inf) | 10 | 0.935 | 0.913 | 43.2** | 2.44 | 0.23 | 1.28 |
| Money demand (Md) | 11 | 0.922 | 0.911 | 82.7** | 3.4 | 0.3 | 1.74 |
| Money supply (Ms) | 12 | 0.911 | 0.898 | 71.7** | 0.08 | 0.04 | 2.87 |

Numbers in brackets bellow the regression coefficients refer to the (t) calculated values.
(**) refer to the significance of (f) calculated value at 0.01.
$R^2$ = determination coefficient.
$\bar{R}^2$ = adjusted determination coefficient.
(*) under (LM-Tests) refers to the existence of a problem in the equation.
Source: collected and calculated from the analysis results of general equilibrium model.

Endogenous variable. The table shows as well the adjusted determination coefficient ($R^2$) and (F-test) for each equation, which indicates the statistic significance of all model equation at 0.01.

The table shows (LM-Tests) for the revelation of the measuring problems, which indicate Autocorrelation between equations (2) and (8) regarding the function of Gross domestic product and labor wages. It shows as well the problem of Heteroscedasticity in equation (2) regarding the function of Gross domestic product. However, the "Non-Normality" problem does not exist in any of the model's equations.

Since the previous equations suffer from the measuring problems in line with Simultaneous integrated Model, the problems of Autocorrelation and Heteroscedasiticity were handled by using the (GMM) at the entire level of the Model according to the method of "Newey-West". It is noted that the Endogenous and Exogenous variables in each equation are less than the exogenous variables at the entire level of the Model. Therefore, all equations of the general equilibrium model are "Over Identification". Thus, the model was evaluated by using the "Three Stages Least Squares".

Table (3) shows the results of measuring estimation of the "General equilibrium model". The overall results came in accordance with the economic rationale. The most important economic results that have been concluded are as follows:

- Gross National Product Function: equation (1) in Table (3) shows the function estimation of the Goss National Product as the government expenditure, investment, money supply, exports and imports explain 97.1% of the changes happened to the Gross National Product according to the criterion of the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function.

The results show the billion L.E. amounted increase of government expenditure, investments, money supply and exports leads to the increase of Gross national product estimated 2.12, 3.83, 2.15 and 1.98 billion L.E. respectively. The elasticity of variables was 0.43, 0.61, 0.24 and 0.37 respectively. It also shows the billion L.E. amounted increase leads to the reduction of Gross national product estimated 2.11 billion L.E., while imports elasticity reached nearly 0.47.

Generally, the results indicate the fiscal policy's effectiveness; it shows the gross national product's response to government expenditure is higher than that of money supply. Thus, an expanding fiscal policy could be used to increase the government expenditure or reduce the taxes in order to increase the aggregate demand. Therefore, the gross national product and consumption will increase. Subsequently, there will be a treatment for the unemployment problem by creating new job opportunities.

The state has endeavoured in the recent years to reduce the general budget's deficit by rationalizing and controlling government expenditure, developing the public fiscal resources and achieving tax equity. Thus, the fiscal policy was led to be restricted on certain fundamental components that determine the gross national product and increase the unemployment rates.

**Table 3:** Results of Measuring Estimation of General Equilibrium Model by Three Stages Least Squares in Egypt during (1990-2006) Period.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Gross National Product | 1 | $GNP_t$= | 183.6<br>(0.08) | + 1.12 $Gov_t$<br>(3.46)$^{**}$<br>{0.23} | + 3.83 $Inv_t$<br>(4.79)$^{**}$<br>{0.61} | + 2.15 $Ms_t$<br>(2.36)$^{*}$<br>{0.24} | + 1.98 $Exp_t$<br>(4.14)$^{**}$<br>{0.37} | - 2.11 $Imp_t$<br>(-3.30)$^{**}$<br>{-0.47} |
| Gross Domestic Product | 2 | $GDP_t$= | 128.3<br>(0.92) | + 6.36 $L_t$<br>(2.56)$^{*}$<br>{0.33} | + 2.34 $Inv_t$<br>(3.06)$^{**}$<br>{0.51} | + 3.69 $Tcn_t$<br>(3.28)$^{**}$<br>{0.11} | | |
| Investment | 3 | $Inv_t$= | 315.8<br>(1.19) | + 0.38 $GNP_t$<br>(4.18)$^{**}$<br>{2.37} | -3.29 $IR_t$<br>(-0.88)<br>{-0.51} | - 5.53 $ER_t$<br>(-3.14)$^{**}$<br>{-0.34} | | |
| Consumption | 4 | $Con_t$= | 57.62<br>(1.09) | + 0.72 $NNP_t$<br>(3.11)$^{**}$<br>{1.06} | + 0.53 $WL_t$<br>(2.90)$^{**}$<br>{0.20} | + 0.77 $Ms_t$<br>(2.03)$^{*}$<br>{0.14} | - 1.12 $Tax_t$<br>(-3.38)$^{**}$<br>{-0.10} | |
| Labor Demand | 5 | $Ld_t$= | 14.31<br>(0.88) | + 0.11 $GNP_t$<br>(3.63)$^{**}$<br>{2.84} | + 0.25 $Inv_t$<br>(5.12)$^{**}$<br>{1.03} | + 0.14 $Inf_t$<br>(2.29)$^{*}$<br>{0.04} | + 0.50 $Tcn_t$<br>(2.89)$^{**}$<br>{0.27} | - 0.27 $W_t$<br>(-4.37)$^{**}$<br>{-0.10} |
| Labor Supply | 6 | $Ls_t$= | 6.01<br>(0.15) | + 0.10 $Pop_t$<br>(2.88)$^{**}$<br>{0.34} | + 0.02 $GNP_t$<br>(5.21)$^{**}$<br>{0.47} | + 0.71 $W_t$<br>(2.64)$^{*}$<br>{0.23} | - 0.23 $Inf_t$<br>(-2.58)$^{*}$<br>{-0.06} | |
| Labor Wage | 7 | $W_t$= | 5.45<br>(0.36) | + 0.24 $Lpd_t$<br>(3.81)$^{**}$<br>{0.75} | + 0.32 $Inf_t$<br>(3.47)$^{**}$<br>{0.25} | - 0.26 $Un_t$<br>(-2.17)$^{*}$<br>{-0.38} | | |
| Wages of Labors | 8 | $WL_t$= | 72.96<br>(0.81) | + 0.11 $GNP_t$<br>(3.78)$^{**}$<br>{0.47} | + 0.15 $Inv_t$<br>(2.24)$^{*}$<br>{0.10} | + 2.17 $Tcn_t$<br>(1.98)$^{*}$<br>{0.19} | | |
| Taxes | 9 | $Tax_t$= | 9.74<br>(1.43) | + 0.12 $GNP_t$<br>(2.89)$^{**}$<br>{2.03} | + 0.33 $WL_t$<br>(2.19)$^{*}$<br>{1.32} | | | |
| Inflation Rate | 10 | $Inf_t$= | 52.3<br>(0.23) | + 0.09 $WL_t$<br>(1.71)$^{***}$<br>{1.98} | - 0.35 $Ms_t$<br>(-3.21)$^{**}$<br>{-3.66} | - 0.77 $Un_t$<br>(-2.64)$^{*}$<br>{-1.47} | - 1.75 $IR_t$<br>(-3.44)$^{**}$<br>{-4.05} | |
| Money Demand | 11 | $Md_t$= | 433.4<br>(0.78) | + 1.36 $GNP_t$<br>(3.52)$^{**}$<br>{2.08} | - 32.47 $IR_t$<br>(-4.68)$^{**}$<br>{-1.24} | | | |
| Money Supply | 12 | $Md_t$= | 76.52<br>(0.74) | + 0.18 $GNP_t$<br>(3.77)$^{**}$<br>{1.60} | + 5.17 $IR_t$<br>(2.01)$^{*}$<br>{1.14} | | | |

(*), (**), (***) refer to statistic significance at 0.05, 0.01 and 0.10 respectively.
In brackets () numbers under the regression coefficients refer to the (t) calculated values.
In parenthesis numbers [ ] refer to flexibilities of the Sample Mean score.
Source: collected and calculated from data listed in table (1) at the appendix.

Remarkably, whenever the economy goes through a condition of stagnation, it is preferred in such a case to follow up an expanding fiscal policy by reducing taxes and increasing the government expenditure by way of circulated money or debt, because of the political difficulty on the part of government to reveal its desire to increase taxes or reduce its expenditure during the inflation.

It could be said that achieving full employment level entails an adequate rate of national government expenditure to absorb all goods and products available in the market. Whereas the declined government expenditure leads to the unemployment problem resulted from the weakness of economic boom, cases of depression and stagnation in the markets. On the contrary, the great increase of government expenditure means the pressure on the markets by increasing consumption and domestic demand, a matter which leads to the emergence of inflation problems. Here the state's role becomes prominent in facing these economic problems to ensure the realization of economic stability.

- Gross Domestic Product Function: equation (2) in Table (2), the function estimation of Gross Domestic Product, shows labour, investments and technology level explain nearly 93.7% of the changes happened to the Gross Domestic Product according to the criterion of determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function.

The results show the increase of labour and investments estimated a billion L.E. sum and the technology level by one unit leading to the increase of Gross Domestic Product by 3.63, 2.34 and 3.68 billion L.E. respectively. The elasticity of such variables reached 0.33, 0.01 and 0.11 respectively.

- Investment Function: equation (3) in Table (3), the estimation of investment function, shows the Gross domestic Product, the interest rate and the exchange rate explain almost 91.6% of the changes happened to investment, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function.

The results show the billion L.E. amounted increase of the Gross National Product leads to the increase of investments by a billion L.E. sum and the exchange rate by one unit leading to the reduction of investments by 5.53 billion L.E. sum. The elasticity of such variables reached -0.34. It also shows the exchange rate was statistically insignificant, a matter which indicates the fiscal policy's effectiveness and the monetary policy's ineffectiveness due to the weakness and the inelasticity of investments in relation to the interest rate. In deed, whenever the investment function is totally inelastic in relation to the interest rate, the monetary policy, then, has no effectiveness at all and the fiscal policy would be on the top of its effectiveness(Edgmand,M.1983). It is remarkable that prior to the beginning of the economic reform program, the central bank was in full control over the interest rate which was less than the inflation rate. This means that the real interest rate was negative and led to the continuity of public sector companies in getting loans at a reduced interest rate, thus, they continued in their economically losing processes.

Since the mid-1980s a diminished monetary policy applied by raising the interest rate, reducing the national currency value and using the credit ceilings. At the beginning of the economic reform program in January 1990, the interest rate was liberalized. The banks have the freedom to determine the interest rates on deposits, loans and borrowings. This step led to the interest rate increase, so as it almost approached the inflation rate. That is the initial emergence of the positive interest rate. It opened the field before the open market processes by a way of issuing short-term treasury bonds in order to finance the general budget's deficit, curb the monetary expansion and absorb liquidity. The reserve ratio was adjusted by not less than 15% of the total deposits, the liquidity ratio was adjusted by the minimum of 20% for the local currency (the Egyptian Pound) and 25% for the foreign currencies and the exchange rate was liberated and unified (Abdel Wahab,A.2000).

In the framework of planning various tax policies to activate investment such as reduction of companies' tax rates and provision of investment-tax exemption, several laws and decisions, which act on encouraging the private investment, have been reissued like law no. 8 for 1997. This law acknowledges the investor's right to possess lands and properties necessary for starting the agricultural activity. The law also stipulates tax-exemption for the agricultural projects in order to increase their exports and reduce their imports. The issuance of a unified law, for investment and companies, means that there is a unification of laws which organize investment in Egypt at the levels of private and public sectors. Thus, such laws pave the way for convenient investment environment for the Egyptian economy.

- Consumption Function: equation (4) in Table (3), the estimation of consumption function, shows the Net Gross national Product, the labour wages, money supply and the taxes explain almost 94.7% of the changes happened to consumption, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function.

The results show the billion L.E. amounted increase of the Gross National Product, labor wages and money supply led to the increase of consumption by 0.72, 0.53 and 0.77 billion L.E. sum. The elasticity of such variables reached 1.06, 0.20 and 0.14 respectively. The results also indicate the billion L.E. amounted increase of taxes led to the billion L.E amounted reduction of consumption. The elasticity of such a variable reached -1.10.

The results prove the fiscal policy's effectiveness as the increase of taxes has curbed consumption. Since the labor demand is, in fact, a derivative demand from goods and services demand, an expanding fiscal policy could be used by a way of reducing taxes in order to increase consumption and, subsequently, increase income and employment rates as a means of lessening the unemployment rates. It could be said that if consumption was less than income, an expanding fiscal policy could be used by a way of increasing the government expenditure and decreasing taxes as a means of activating the economy during the period of stagnation in order to increase the aggregate demand, incomes and job opportunities because the reduction of taxes leads to the increase of prices level and the decrease of the labor real wage.

Consequently, the increase of aggregate demand leads to the increase of Gross national product and labors' full employment. However, if the taxes reduction was little, there would be an increase of Gross national product and labors but not at a full employment rate. In addition, a diminished fiscal policy could be used whenever consumption is higher than income by a way of reducing the government expenditure and increasing taxes.

Labor Demand Function: equation (5) in Table (3), the estimation of labor demand function, shows the Net Gross national Product, investments, inflation, technology level and the labor wage explain almost 95.2% of the changes happened to labor demand, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function.

The results show the increase of both Gross national product and investments labor estimated a billion L.E. sum and the increase of inflation and the technology level by one unit leading to the increase of labor demand by 0.11, 0.25, 0.14 and 0.50 billion L.E. respectively. The elasticity of such variables reached 0.27, 0.04, 1.03 and 2.84 respectively. They indicate as well, the one-thousand annul increment of the labor wage leads to the reduction of labor demand by 0.27 million labor. The elasticity of such a variable reached -0.10.

Labor Supply Function: equation (6) in Table (3), the estimation of labor supply function, shows the population, Gross national Product, labor wage and inflation explain almost 94.3% of the changes happened to labor supply, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function.

The results show a million-person increase of population, the increase of Gross national product estimated a billion L.E. sum and a thousand-pound increment of labor wage lead to the increase of labor supply by 0.71, 0.02 and 0.10 million labors. The elasticity of such variables reached 0.23, 0.47 and 0.34 respectively. The results also indicate the increase of inflation by one unit leads to the reduction of labor supply by 0.23 million labor. The elasticity of such a variable reached -0.06.

Labor Wage Function: equation (7) in Table (3), the estimation of labor wage function, shows the labor productivity, inflation and the unemployment rate explain almost 89.2% of the changes happened to labor wage, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function.

The results also indicate a thousand increment of labor wage and the increase of inflation by one unit lead to the increase of labor wage by 0.24 and 0.32 a thousand-pound sum. The elasticity of both variables reached 0.75 and 0.25 respectively. They show as well the increase of unemployment rate by one unit leads to the reduction of labor wage by 0.27 a thousand-pound sum. The elasticity of such a variable reached -0.23.

Remarkably, the implementation of expanding fiscal policy by a way of government expenditure and taxes and the implementation of expanding monetary policy by a way of nominal money supply might be used as an effective means of curbing the delinquency of sharp structural unemployment, increasing the aggregate demand necessary for production increase and achieving the full employment. Unemployment usually emerges from inadequate demand; the structural economic changes resulted from the changing technology and the final demand composition on the goods and services. Consequently, the old functions and skills vanished due to the existence of new functions. If the labor, who was deprived of his work because of these circumstance, is able and qualified to meet the necessary skills and education of the new jobs' requirements and it is possible to place him in a new position if necessary, then the structural unemployment problem will be overcome.

Labor Wages Function: equation (8) in Table (3), the estimation of labor wages function, shows the Gross national product, investments and technology level explain almost 96.5% of the changes happened to labor wages, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function. The results show the increase of both Gross national product and investments labor estimated a billion L.E. sum and the increase of the technology level by one unit lead to the increase of labor wages by 0.11, 0.15 and 2.17 billion L.E. sum respectively. The elasticity of such variables reached 0.47, 0.10 and 0.19 respectively.

It is worthy to point out the increment minimization of the employees' salaries at the general state's budget and the diminishment of increasing wages' allocations by a way of reducing appointment rates, encouraging unpaid leaves and early retirement are among the aspects of the fiscal policy immediately after the economic reform. This fiscal policy helped reduce the general budget's deficit by decreasing the government expenditure, but at the same time led to the misdistribution of government expenditure between the rural and urban communities, a matter which negatively affected the labor market equilibrium through unsystematic employment and, consequently, led to increasing rates of internal immigration from the rural community to the urban community.

Taxes Function: equation (9) in Table (3), the estimation of taxes function, shows the Gross national product and the labor wages explain almost 90.1% of the changes happened to the taxes, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function. The results indicate the billion L.E. amounted increase of Gross national product and labor wages leads to the increase of taxes by 0.12 and 0.33 billion L.E. sum. The elasticity of both variables reached 2.03 and 1.32 respectively.

Inflation Function: equation (10) in Table (3), the estimation of inflation function, shows the labor wages, money supply, the unemployment rate and the interest rate explain almost 93.5% of the changes happened to the inflation, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function. The results indicate the billion L.E. amounted increase of labor wages leads to the increase of inflation by 0.09%. The elasticity of such a variable reached 1.98. The results also indicate the increase of both money supply by billion L.E. sum, the unemployment rate and the interest rate by one unit leads to the reduction of inflation rate by almost 0.35, 0.7 and 1.75 respectively. The elasticity of such variables reached -3.66, -1.47 and -4.05 respectively. The reduction of inflation rate is attributed to the improvement of the monetary and fiscal performance of the Egyptian economy and the decrease of the interest rate.

Money Demand Function: equation (11) in Table (3), the estimation of money demand function, shows the Gross national product and the interest rate explain almost 92.2% of the changes happened to money demand, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function. The results indicate the billion L.E. amounted increase of Gross national product leads to 1.36 billion L.E. amount increase of money demand. The elasticity of such a variable reached 2.08. The results also show the increase of the interest rate by one unit leads to the 32.47 billion L.E. amounted reduction of money demand. The elasticity of such a variable reached -1.24.

The results show a flexible money demand compared to the interest rate, a matter which clarifies that the fiscal policy in use is more effective than the monetary policy. In fact, whenever the money demand is more elastic as compared to the interest rate, the fiscal policy is, then, more effective than the monetary policy. However, whenever the money demand is inelastic as compared to the interest rate, the monetary policy in use is, then, more effective than the fiscal policy. On the other hand, whenever the money demand is fully elastic, then, the economy in such a case is facing liquidity trap(Yousf,A.&Al-Anany,H.2004). It is a case of preserving an additional amount of money at a low- fixed interest rate and it is not expected to have further reduction. Consequently, the fiscal policy is on the top of its effectiveness, on the contrary to the monetary policy which would be in its worst condition and does not have any form of effectiveness.

Money Supply Function: equation (12) in Table (3), the estimation of money supply function, shows the Gross national product and the interest rate explain almost 91.1% of the changes happened to money supply, according to the determination coefficient in Table (2), while other changes were associated to other immeasurable factors by the function. The results also show the billion L.E. amount increase of the Gross national product and the increase of the interest rate by one unit leads to the 0.18 and 5.17 billion L.E. amounted increase of money supply. The elasticity of both variables reached 1.60 and 1.14 respectively.

It could be said, whenever the changing rate of the Gross national product is less than that of the money supply, it is considered as an indicator of the fiscal policy's effectiveness and vice versa. The results show the annual changing rate of the Gross national product (5.86) - as it is included in equation (1) in Table (1)- was less than the annual changing rate of money supply (6.29) – as it is included in equation (17) in Table (1), a matter which clarify the effectiveness of the fiscal policy in use. The reason behind the increase of money supply is attributed to the issuance of new money by the side of the government or by the borrowing from the banks to finance the state's general budget's deficit. And because of the elastic money demand as compared to the interest rate, it emphasized that the applied fiscal policy is more effective than the monetary policy. Therefore, it is a must to apply an expanding fiscal policy by a way of reducing taxes and increasing the government expenditure. It is a must as well to apply an expanding monetary policy aims to encourage investment by a way of reducing the interest rate in order to activate the investments, subsequently, increase the Gross national product necessary for pushing forward the economic development's wheel.

## RESULTS AND DISCUSSION

The "Liverpool Model" of the "General equilibrium model" showed the fiscal policy's effectiveness in the function of Gross national product as the response of Gross national product to the government expenditure was higher than that

of money supply. Therefore, an expanding fiscal policy could be used by a way of increasing government expenditure or reducing the taxes in order to increase the aggregate demand. Subsequently, increase the Gross national product and consumption and, thus, create new job opportunities and handle the unemployment problem.

The results of investment function indicated the interest rate, in the investment function, was statistically insignificant, a matter which clarifies the fiscal policy's effectiveness and the effectiveness of the monetary policy, due to the weakness and inelasticity of the investments as compared to the interest rate.

In addition, the results of consumption function showed the fiscal policy's effectiveness, since the increase of taxes led to the curb of consumption. Therefore, an expanding fiscal policy could be used by a way of reducing the taxes in order to increase consumption, which in turn rose up the income, and increase the employment rates as a means of lessening the unemployment rates.

The results of the money supply function showed the effectiveness of the applied fiscal policy and clarified that the changing rate of the Gross national product is less than the changing rate of the money supply.

In the light of the concluded results, the research provides certain recommendations related to the effectiveness of the fiscal and monetary policies, in order to achieve the general economic equilibrium as follows:

- The implementation of an expanding fiscal policy based on the reduction of taxes in order to increase consumption, activate the investments and, subsequently, increase and create further job opportunities and also increase the government expenditure in order to increase the aggregate demand and, hence, increase the production of goods and services necessary for pushing forward the economic development's wheel.
- The implementation of an expanding monetary policy based on the reduction of the interest rate in order to encourage the investment necessary for pushing forward the economic development's wheel.
- The linking necessity between the plans of socioeconomic, educational and training development in order to ensure the general structural equilibrium of the national economy.
- The coordination necessity between the fiscal policy and the monetary policy and avoidance of their separation in order to achieve the economic policy's objectives in the framework of the state public plan.
- The clear determination of the relationship between the central bank and the government on how to make the monetary decision.
- Working out to adopt a clear strategy aims to increase exports, curb imports and encourage the domestic production.
- The expansion of domestic investment, further attraction of foreign investments to curb the exacerbation of employment and the increase of the economic growth rates.

## APPENDIX

**Table 1:** Trends of the variables included in general equilibrium model in Egypt during the (1990-2006) period.

| Labor Wages (Billion L.E) | Labor No Million labor | Labor supply Million labor | Govt. Expenditure (Billion L.E) | Consumption (Billion L.E) | Investment Product (Billion L.E) | Gross Domestic Taxes (Billion L.E) | Product (Billion L.E) | Net National Product (Billion L.E) | Gross National (Billion L.E) | Index No | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36.39 | 13.38 | 14.76 | 42.17 | 85.8 | 30.45 | 110.01 | 6.24 | 152.18 | 158.42 | 63.2 | 1990 |
| 41.31 | 13.74 | 15.14 | 47.56 | 112 | 32.4 | 131.06 | 13.35 | 178.61 | 191.96 | 66.1 | 1991 |
| 46.56 | 14.01 | 15.57 | 52.22 | 124.4 | 32.73 | 146.16 | 10.97 | 198.38 | 209.35 | 68.5 | 1992 |
| 53.16 | 14.44 | 16.01 | 56.26 | 138.9 | 40.01 | 162.97 | 15.94 | 219.23 | 235.17 | 72.4 | 1993 |
| 61.07 | 14.88 | 16.45 | 58.26 | 162.9 | 46.02 | 191.01 | 17.91 | 249.27 | 267.18 | 75 | 1994 |
| 69.67 | 15.34 | 16.81 | 63.89 | 187.8 | 54.89 | 214.19 | 28.5 | 278.08 | 306.58 | 78.7 | 1995 |
| 79.98 | 15.83 | 16.97 | 66.83 | 219.2 | 68.48 | 247.03 | 40.65 | 313.86 | 354.51 | 85.1 | 1996 |
| 87.73 | 16.15 | 17.28 | 70.78 | 225.6 | 61.35 | 266.76 | 20.19 | 337.54 | 357.73 | 90.4 | 1997 |
| 96.98 | 16.57 | 17.63 | 91.81 | 241.1 | 64.02 | 282.58 | 22.55 | 374.38 | 396.93 | 95.5 | 1998 |
| 107.83 | 17 | 18.23 | 97.67 | 273.6 | 64.45 | 315.67 | 22.38 | 413.34 | 435.72 | 100 | 1999 |
| 115.87 | 17.34 | 18.9 | 101.05 | 293.2 | 63.58 | 332.54 | 24.24 | 433.59 | 457.83 | 102.7 | 2000 |
| 124.59 | 17.67 | 19.34 | 104.04 | 310.7 | 67.51 | 354.56 | 23.65 | 458.6 | 482.25 | 106.2 | 2001 |
| 133.91 | 18.08 | 19.88 | 106.15 | 347 | 68.1 | 390.62 | 24.48 | 496.77 | 521.25 | 109 | 2002 |
| 144.76 | 18.51 | 20.36 | 108.65 | 403.1 | 79.56 | 456.32 | 26.35 | 564.96 | 591.31 | 113.1 | 2003 |
| 155.31 | 19 | 20.87 | 110.14 | 441.7 | 96.46 | 506.51 | 31.99 | 616.65 | 648.64 | 120.4 | 2004 |
| 166.74 | 19.54 | 21.79 | 111.92 | 502 | 115.74 | 581.14 | 36.56 | 693.06 | 729.62 | 123.7 | 2005 |
| 179.02 | 20.12 | 22.88 | 113.52 | 575.9 | 155.34 | 682.43 | 48.77 | 795.95 | 844.72 | 129.2 | 2006 |
| 100.05 | 16.56 | 18.17 | 82.52 | 273.23 | 67.12 | 315.97 | 24.4 | 398.5 | 422.89 | 94.07 | Mean |

**Table 1:** Continued

| Population Billion persons | Exchange rate L.E/ US $ | Interest rate % | Inflation rate % | Money demand Billion L.E | Money supply Billion L.E | Import Billion L.E | Export Billion L.E | Unempl-oyment Rate % | Labor productivity Thou.L.E. | Worker wage Thou.L.E. | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 54.44 | 3.28 | 12.28 | 4.66 | 91.53 | 17.78 | 39.8 | 30.9 | 9.38 | 8.22 | 2.72 | 1990 |
| 55.89 | 3.32 | 12.05 | 4.64 | 104.59 | 18.79 | 43 | 39.5 | 9.24 | 9.54 | 3.01 | 1991 |
| 54.45 | 3.35 | 11.83 | 3.52 | 121.75 | 21.06 | 46.7 | 40.1 | 10.02 | 10.43 | 3.32 | 1992 |
| 55.7 | 3.39 | 11.6 | 5.82 | 137.44 | 24.49 | 49.1 | 39.5 | 9.85 | 11.29 | 3.68 | 1993 |
| 56.9 | 3.4 | 11.38 | 3.56 | 152.58 | 28.26 | 56.5 | 46 | 9.56 | 12.84 | 4.1 | 1994 |
| 58.2 | 3.39 | 11.15 | 4.87 | 168.53 | 31.63 | 60.1 | 47.6 | 8.76 | 13.96 | 4.54 | 1995 |
| 59.44 | 3.39 | 10.93 | 8.14 | 193.9 | 35.06 | 66.2 | 50.1 | 6.74 | 15.61 | 5.05 | 1996 |
| 60.71 | 3.39 | 10.7 | 6.24 | 210.49 | 39.05 | 73.9 | 46.6 | 6.53 | 16.52 | 5.43 | 1997 |
| 61.99 | 3.4 | 10.47 | 5.67 | 234.57 | 43.59 | 71.7 | 46.3 | 6.02 | 17.05 | 5.85 | 1998 |
| 63.31 | 3.45 | 10.25 | 4.71 | 255.27 | 48.84 | 77.6 | 55.1 | 6.75 | 18.57 | 6.34 | 1999 |
| 64.65 | 3.85 | 10.02 | 2.72 | 284.87 | 49.74 | 80.1 | 62.7 | 8.26 | 19.18 | 6.68 | 2000 |
| 64.63 | 4.5 | 9.95 | 3.38 | 328.73 | 53.45 | 85.9 | 69.4 | 8.61 | 20.06 | 7.05 | 2001 |
| 65.77 | 6.03 | 9.87 | 2.6 | 384.26 | 59.81 | 101.8 | 91 | 9.05 | 21.61 | 7.41 | 2002 |
| 67.31 | 6.19 | 9.75 | 3.83 | 434.91 | 67.21 | 143.6 | 137 | 9.1 | 24.66 | 7.82 | 2003 |
| 68.65 | 5.77 | 9.62 | 6.45 | 493.9 | 77.61 | 175.6 | 163.4 | 8.95 | 26.65 | 8.17 | 2004 |
| 70 | 5.75 | 9.55 | 2.76 | 560.4 | 100.71 | 195 | 185 | 10.33 | 29.74 | 8.53 | 2005 |
| 71.35 | 5.69 | 9.33 | 4.38 | 662.5 | 102.72 | 254.6 | 230.6 | 12.06 | 33.92 | 8.9 | 2006 |
| 61.96 | 4.21 | 10.63 | 4.58 | 283.54 | 48.22 | 95.36 | 81.22 | 8.78 | 18.23 | 5.8 | Mean |

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