THE IMPACT OF FOREIGN CAPITAL INFLOW ON SAVINGS, INVESTMENT AND ECONOMIC GROWTH RATE IN EGYPT: AN ECONOMETRIC ANALYSIS

Mohamed Abdel-Wahed Mohamed
College of Management Sciences and Planning
King Faisal University

Abstract :

This paper examines the effect of foreign capital inflow on savings, investment and economic growth rate in Egypt. Regression results showed that foreign capital inflow has a significant positive effect on savings and investment and in turn on the economic growth rate. Also, the complementarity between foreign direct investment (FDI) and domestic investment was established. The results indicated a strong positive effect of investment on economic growth rate in Egypt. The paper demonstrates the importance of foreign capital in improving savings, investment and growth performance in Egypt.

1. Introduction

The transformation of a poor country with a low or stagnant growth rate into one capable of sustaining its economy is the core of the development problem. Most developing countries are constrained in their domestic resources (e.g. development funds). They also lack the very foundations of material development (skilled human resources, infrastructure, stable administrative institutions and stable political structure). In addition, Egypt, as one of the developing countries, has mostly relied on primary commodity exports, facing highly unstable markets, and long periods of deteriorating terms of trade. It has also little capacity for generating rapid export growth from the natural resources it possesses, and little resistance to external shocks. Also, Egypt's agriculture was ignored in the last three decades in favor of industry so that the government invested little in the agricultural sector. As a result, Egypt shifted from a net exporter of food to a net importer, and it became the largest recipient of food aid in the world in 1995 [Mohamed, 1998].

By the late 1980s, Egypt was beset by chronic macroeconomic problems. Inflation exceeded 20 percent; the current account was in deficit to the tune of 8 percent of GDP, large external arrears had accumulated, and confidence in the economy, reflected in rising dollar holdings, had ebbed. Underlying these imbalances were chronically large fiscal deficits (averaging more than 15 percent of GDP) and a loose monetary policy (Subramanian, 1996]. As a result, Egypt's growth performance over the late 1980s and early 1990s has been disappointing. Real per capita growth of GDP averaged 0.2 percent per annum during the 1986-93 period. This rate of growth was a significant decline from Egypt's performance through much of the 1970s and early 1980s. Accompanying the modest growth have been low levels of investment, and even lower levels of savings. In 1993, investment was 18 percent of Egypt's GDP, and savings, only 6 percent. [World Bank, various issues].

All the above factors have left Egypt without major attractions to private foreign investors, and it has been heavily dependent on aid for foreign capital to close the gap between savings and investment. Loans and grants to Egypt starting from 1974 were realized as a result of establishing relationship with both multilateral and bilateral donors after October war and Camp David treaty with Israel in 1974. The total amount of aid was increasing over time (although with fluctuations) and reached its peak during the Gulf war in 1990 and 1991, when Egypt received $US 5,439 and $US 5,025 million, respectively. Afterwards, the total aid to Egypt witnessed a downturn especially from 1992 to 1995 [OECD, various issues]. From these trends, one can judge that the total flows of foreign aid have been heavily tied to political links.

However, aid when given in debt creating loans has the potential danger of plunging the country into enormous debt problems and this is what has happened to Egypt. Its external debt increased dramatically during the period (1970-95) and reached its peak in the late 1980s, where the external debt amounted to $US 51,497 million (152 percent of GDP) in 1989. Afterwards, the figures declined to reach $US 34,116 million or 73 percent of GDP in 1995 because of the cancellation of some debts by some donors during the Gulf war preparation. Moreover, the country's capacity to

service the rising debt, measured by export earnings was far from being impressive [World Bank, various issues].

Due to the severe debt crisis the country faced in the late 1980s, as indicated above, the government started to take serious measures towards down-sizing the public sector. Starting in 1991, the government embarked on a World Bank and IMF-assisted economic reform and structural adjustment program (ERSAP) which included many elements relevant to the public sector. First, a new law governing the operations of public enterprises (Law No. 203/1991) was issued. It stipulated that public enterprises are to be treated as private economic units. Second, the policy of administrated social prices is to be phased out. Third, the privatization program is recognized as a vehicle of public policy. Also later on in 1996, the government liberalized investment procedures and passed a new investment law reaffirming basic guarantees for investors and unifying and rationalizing the framework for investment incentives. This is to encourage foreign direct investment.

As a result of the above measures and structural reform efforts, and the ensuring improvement in the credibility of the economy, the financing possibility set has been enlarged, which is consistent with some equilibrium appreciation of the exchange rate. This has been vindicated by the experience of the foreign direct investment inflows, which over a 17 year period (1977-95) has been about $US 14 billion or about $US 738.4 million per annum [World Bank, various issues].

The purpose of this paper is to focus on the relationship between foreign capital inflows (i.e. foreign aid and foreign direct investment) and domestic savings and investment. There has been a large amount of empirical investigation of economic growth, foreign aid, foreign direct investment, savings and domestic investment in recent years. The theme of this paper is to extend some of these new empirical literature to Egypt's experience of foreign capital inflows, savings, investment, and economic growth.

The paper is organized in the following manner. Part two (after introduction) will review the theoretical framework on the relationships among savings, investment, foreign aid, foreign direct investment and economic growth. In part three, econometric specifications and data will be

presented. Part four will give the empirical findings of the econometric analysis. Part five will offer general discussion about the results. Finally, part six contains summary and some concluding remarks.

2. Theoretical Framework

Savings, investment and growth have been at the heart of economic development since the beginning of the discipline. This is not surprising because in practice the three are closely associated. Across countries and over time higher economic growth rates are associated with higher investment, higher investment with higher savings, and higher savings with higher economic growth rates. Moreover, countries with higher levels of per capita income tend to save and invest a larger fraction of national income. While these empirical relationships are well established, there is little agreement among economists about how to interpret them. The facts are consistent with different theories or models, and it is difficult to sort out the exact inter-relationship and directions of causality.

The lack of clarity is not a problem for some policy issues. For example, it is clear that high inflation retards all three: savings, investment and economic growth. A policy maker does not need to know the exact mechanism through which this works to know that a monetary policy that generates high inflation is bad. For other policy issues, however, the directions of causality are important. Some policies affect savings directly: for example, introduction of a fully funded pension system. One would need to have confidence that savings cause 'investment and economic growth in order to believe that such a policy would accelerate a country's growth and development.

For the purpose of this study, the best way to review the inter-relationships among savings, investment and economic growth, from the point of view of economic theory, is to start with the Harrod-Domar growth model. The Harrod-Domar growth model states that the growth of output is equal to the rate of savings divided by the incremental capital-output ratio as follows:

$$g = s / v \text{.....(1)}$$

where g is the rate of economic growth, s is savings ratio and v is the incremental capital-output ratio (defined as i/change in y; where i is investment and change in y is the change in output).

According to this model, the government objective is to achieve a target rate of growth of the net national product. For example, assuming the government target rate of growth is 5 percent per annum and its capital-output ratio is 4: 1, then for the government to achieve its objective of 5 percent of growth, it requires a rate of investment of 20 percent. So if the average or marginal rate of domestic savings is less than the rate of investment (20 percent), then obviously domestic saving by itself cannot sustain the desired rate of growth of 5 percent per annum. This is a common problem in the developing countries.

In the light of the Harrod-Domar growth model, governments faced with low savings have a number of alternatives. They can adjust the growth rate downwards so that the domestic saving rate exactly balances the rate of investment required to sustain the modified rate of growth. The other alternative can be to raise domestic savings (e.g. through taxation). Finally, they can go for commercial borrowing both domestically and abroad.

Given the desire for fast growth and attainment of better standards of living in Egypt, it is very difficult for the government to reduce the desired rate of growth. Also, given the extreme inequalities in income and wealth and majority of the population living below subsistence level, government may be reluctant to raise domestic savings because that would mean pushing up taxation effort. Because of the low standard of living of the bulk of the population, imposing taxation (whether direct or indirect) would only place the burden on the few rich people by reducing their growth in consumption.

The chief appeal of the Harrod-Domar model perhaps lies in its simplicity. Given a target growth rate, g* and the incremental capital-output ratio, v, it is easy to find out the level of savings that must be realized to attain g*. Again, if sufficient level of domestic savings are not forthcoming to match a certain level of investment (i) to attain g*, then the model states the required amount of capital flows which should be borrowed from abroad. The model also predicts that the higher the savings, the higher the rate of economic growth.

This model can be criticized for being too aggregative and not providing the basis for detailed quantitative study and also for failing to highlight structural and regional problems. Further, the problem of estimation of capital stock is not easy in many countries and is particularly difficult in LDCS.

Other economists have attempted to assess the macroeconomic impact of foreign capital flows on economic growth using the dual-gap model. This model implicitly assumes the existence of two resource gaps - a "saving" gap and a "trade" gap - which needs to be estimated when establishing the level of foreign assistance required. If we assume that goods and services in an economy come from two sources - domestic output (y) and imports (m) and that they are put into three uses - consumption (c), investment (i) and export (x), then a model can be algebraically derived as follows:

$$y + m = c + i + x \quad \text{.....(2)}$$

$$y = c + i + x - m \quad \text{.....(3)}$$

but y gives rise to income which is either saved (s) or consumed (c) so that:

$$y = c + s \quad \text{.....(4)}$$

combining the last two equations:

$$s = i + x - m \quad \text{.....(5)}$$

$$i = s + m - x \quad \text{.....(6)}$$

the (m - x) indicates the country's trade balance. When the planned investment is greater than the saving (i.e. i>s), a saving gap exists; when the planned imports are greater than the planned exports (i.e. m>x), a trade gap exists. The gap need not be equal ex-ante except by chance. Usually one of the gaps would be greater than the other. According to this model, the deficit must be met by the net capital inflow (k):

$$m - x = k \text{.....(7)}$$

from above:

$$i - s = m - x \text{.....(8)}$$

so that:

$$i - s = m - x = k \text{.....(9)}$$

From the above model, it is clear that the net inflow of foreign capital plays a dual role in the national accounting sense, the saving gap being identical with the trade gap. However, the volume of domestic savings and the amount of investment need not necessarily be equal. Investment can exceed domestic savings to the extent that the latter is supplemented by saving from abroad. The total invested resources available at any one period of time are the sum of domestic savings and foreign savings, which flows into the economy in the form of foreign capital.

While using this model, Chenery and Stout [1966] found that foreign aid acted as a supplement for domestic savings. In their argument they assert that it is the increase in savings that caused the growth rate to rise. According to them foreign aid promoted development by adding to domestic savings as well as to foreign exchange availability, thus assisting to close either the saving gap or the trade gap.

Their findings have been criticized by some economists who argue that there is an inverse relationship between foreign aid and domestic savings [see, Griffin, 1970. This substitute hypothesis of aid has been based on the traditional argument that there is a causal relationship running from aid to domestic savings.

This hypothesis was tested by Griffin [1970] who used cross-section data for 32 developing countries covering the period 1962-64. He estimated the equation below:

$$s / y = f(a / y) \text{.....(10)}$$

where s/y is saving ratio and a/y is foreign aid as a proportion of GDP. His findings were different from those of Chenery and Stout. He established a negative correlation between aid and savings. His findings were supported by many other researchers. For example, Papanek [1972] used cross-section data covering the 1950s and 1960s while Mosley [1980] conducted from his cross-section data study covering the data of the 1970s that the negative correlation between aid and savings was still strong and significant. Also, the previous studies of Rahman [1968] and Bowless [1987] have used a single equation model of the form:

$$s / y = \alpha + \beta k / y \text{.....(11)}$$

where s/y is domestic saving ratio, k is foreign capital inflow and y is gross domestic income. The results showing substitution effects have been criticized by some authors among them Weisskoff [1972] and Gersoritz [1982].

Rana and Dawiling [1990] blames the previous models for failing to account for all the factors which influence domestic savings pointing out that by using single equation models, these studies have also failed to account for the two way causality which may exist between variables. They point out that failure to account for these factors could lead to biased and misleading results and casts doubt on the reliability of the results. They attempted to estimate the impact of foreign capital on savings using a simultaneous equations model. Their structural model contained two equations, which are summarized below:

$$S = f(A, P, X, Y, G) \text{.....(12)}$$

$$G = f(A, P, S, X, L) \text{.....(13)}$$

where S is savings as a percentage of GDP, A is foreign aid as a percentage of GDP, P is a foreign private investment as a percentage of GDP, X is the change in exports, Y is per capita income, G is economic growth rate, L is labor force growth rate.

Rana and Dawiling model fails to account for investment function. Investment is a function of aid and growth, and failing to include this variable in the simultaneous regression equations may throw some doubts on the reliability of the results. The model also assumes that foreign trade has a direct influence on the domestic savings. The export sector is a complex one and plays multiple roles in an economy. For instance, foreign trade can expand production possibilities through its effect on such factors as access to new knowledge, technology and ideas. Foreign trade provides a vent for surplus commodities which bring otherwise unemployed resources into use. Exports also enable countries to specialize in the production of commodities in which they have a comparative advantage. The impact of foreign trade would be strong in the growth function rather than in the structural saving function. So, it is more reasonable to assume that the performance of export industry would influence the saving rate via the rate of economic growth.

In the traditional neoclassical models of the Solow [1956] type, the extent to which FDI affects output growth is limited, given that, with diminishing returns to physical capital. FDI can only affect the level of income, leaving the long-run growth rate unchanged. The potential impact of FDI on growth is confined to the short-run, the magnitude and duration of which depend on the transitional dynamics to the steady-state growth path. However, FDI can be shown to affect growth endogenously in so far as it generates increasing returns in production via externalities and productivity spillovers. The possibility of FDI being growth-enhancing in the long run has motivated a growing theoretical and empirical literature.

Growth empiric is concerned chiefly with the estimation of cross-country and time series growth equations, and the conventional methodology used is based on standard growth accounting, pioneered by Solow [1957] and Denison [1962, 1967]. FDI is considered to be an additional input in an augmented production function, and different hypotheses concerning the association between FDI and economic growth can be tested either by conventional measures of FDI or by incorporating ancillary variables in the estimating equation, such as exports, imports, institutional dummies, etc.

Dropping the time indices for simplicity, the basic augmented production function from which estimating equations are derived in a growth-accounting exercise is:

$$Y = A\phi(K, L, F, v).....(14)$$

where Y is output, K is capital, L is labor, F denotes FDI inflows, A captures the efficiency of production, and v is a vector of ancillary variables.

The inclusion of FDI flows in an augmented production function such as equation (14) presents an immediate problem. All other explanatory variables are stock variables, so that, it would not be correct to include FDI as a flow variable. Instead, an index of foreign-owned capital stock, constructed by, for instance, the perpetual inventory method, should be used in equation (14). An alternative option is to consider the investment ratio as a proxy for capital stock (K), which is a flow variable, and hence compatible with the inclusion of FDI flows as an additional input. In this case, other ancillary variables should also be defined as flows, rather than stocks. By standard growth accounting, taking logarithms and time derivatives of an augmented Cobb-Douglas approximation of equation (14) yields the following equation:

$$g_y = g_A + ag_k + bg_f + cg_w.....(15)$$

where gi is the growth rate of i = y, A, k, f and w, (lower-case variables are defined in per capita terms), and a, b, c are, respectively, the elasticities of output with respect to physical capital, FDI and the ancillary variables.

In equation (15), $g_A = g_y - ag_k - bg_f - cg_w$ defines total factor productivity or the Solow residual, which is a conventional measure of technological change. If disembodied changes in technology are expected to depend on time only, a time trend can be added to the right-hand side of equation (15), in which case the residual can be interpreted as embodied technological change.

Despite the simplicity of the growth accounting methodology, a lot of attention in the literature on growth empiric has been focused on explaining the high estimates of the elasticities of output with respect to capital in equation (15) obtained in cross-section and time series regressions. Although the conventional neoclassical growth model in the Solow tradition predicts that the elasticities of output with respect to capital should be equal to the share of capital in total output, cross sectional estimates point to a much higher value. Recently, those high estimates have been interpreted as evidence of the importance of endogenous growth [Romer, 1990], and explained on the grounds that capital should be understood in a broad sense to incorporate additional inputs (for instance, human capital and R & D spending) without diminishing returns [Mankiw, Romer and Weil, 1992].

On econometric grounds, however, the high elasticity estimates in equation (15) can be attributed to omitted variables and simultaneity biases. This is because it is well known that, in the case of cross-country and time-series estimations, the capital stock can hardly be considered as an exogenous variable and the error term (total factor productivity) will be correlated with the regressors in standard growth accounting-based production function estimations. The correlation between the per capita capital stock and technological change captured by the error term then leads to capital elasticity estimates that are well above capital's share in output [Young, 1992, 1995].

In addition, there is an argument in theoretical models that a degree of complementarity or substitution exists between FDI and domestic investment. It is assumed that the total stock of knowledge in the recipient economy depends on domestic and foreign-owned physical stocks [Dunning, 1981]. The importance of assessing the extent of complementarity and substitution between domestic investment and FDI lies in the fact that a simplistic Schumpeterian view of FDI-related innovative investment, which emphasizes creative destruction through substitution, may overlook the scope for conmplementarity between FDI and domestic investment. Under complementarity, innovations embodied in foreign investment may create, rather than reduce, rents accruing to older technologies [Young, 1993]. Also, if FDI is expected to affect growth positively, it may be argued that it requires some degree of complementarity

with domestic investment, given that the existing factor endowments in the host country act as a FDI determinant.

Moreover, the previous studies do not prove causality or temporal precedence between growth rates and FDI. The direction of causation may run either way. For instance, FDI may take place in a developing economy because its growth prospects have made it more attractive to foreign investors. As a result, unobservable factors related to the growth dynamics of the recipient economy may have a stronger association with FDI and hence stimulate larger inflows.

To test for temporal causality the technique of Granger-causality can be employed. FDI inflows can be said to Granger-cause output growth, if better predictions of output growth can be made by including lagged values of FDI in the conditional information set, in addition to lagged values of output growth rates, than vice versa [Enders, 1993].

Briefly speaking, this part provides general theoretical models of the complex interaction between foreign capital flows, savings, investment and economic growth. It is timely now to benefit from the above literature and its critics to construct our models and test them using Egypt's case. This will be the subject of the following section.

3. Econometric Specifications and Data

Several socio-economic factors affect the long term trend in the domestic savings in Egypt. Among those one may mention political conditions, domestic price levels, expectations of a rise or fall in prices and the nature of financial institutions. Others may include the general attitude of the people towards the acquisition of wealth and work, the capacity and willingness to provide for future, and the desire to maintain or raise the standard of living.

The complexity of the interactions of the above factors has been a major constraint in the formulation of a savings model in Egypt. According to Morisset [1989] the most severe limitation of the previous studies is that they do not make any serious attempt to specify a savings model which underlies the foreign capital inflow-domestic savings relationship. He argues that the procedure used in previous works is wrong and may

seriously affect the results, since the omission of relevant explanatory variables in the regression may bias the estimates of the parameters of the remaining variables.

In this study, an attempt made to remedy this deficiency by developing a more comprehensive model containing potential explanatory variables, which could determine domestic savings in Egypt. The economic growth rate may not be an exogenous determinant of domestic savings. This argument was followed in developing a recursive system of equations. The reason behind this is that foreign capital can influence the economic growth rate via investment and so the observed impact of foreign capital on savings in the single equation model cannot be fully attributed to foreign capital alone, but to change in rate of economic growth as well. So, some of the variations in the savings which ought to be attributed to foreign capital would be attributed to economic growth via the effect of foreign capital on investment. To capture both the direct and indirect effect of capital inflow on savings, a single equation model may not be appropriate.

In this paper, however, a single savings function with a number of potential explanatory variables augmenting the foreign capital was estimated empirically as a first approach to test the traditional domestic savings hypothesis, that there is a substitute or complement effect between domestic savings and foreign capital inflow. A second approach, based on a system of recursive equations, consisting of an investment and economic growth rate functions is developed. Assuming that investment and economic growth rate are embedded in a recursive system then the total effect of various exogenous variables as measured by a system of equations could be quite different from the direct effect alone which the previous studies estimated.

Domestic savings were defined as that part of gross domestic product (GDP) which was not spent on consumption (i.e. $s = y - c$). As an attempt to provide the best estimate of domestic savings in Egypt, gross domestic savings are preferred to gross national savings. This is justified on the ground that the larger interest payments due on the country foreign debt must be financed from domestic savings and so excluding domestic savings would result in underestimating the domestic resource mobilization. In his

study on saving-foreign capital relationship, Begley [1978] suggests that savings could further be separated into public and private savings. This separation is not possible in this study due to data limitations. The use of aggregate savings is supported by Leff and Sato [1986] who argue that, analysis of aggregate savings is valid because public and private savings are substitutes and/or respond to the same economic stimuli.

3.1 Single Equation Model

The traditional hypothesis that foreign capital inflow is a substitute for domestic savings was originally put forward by some economists in 1963. Since then, many theoretical and descriptive approaches have been developed and justified with the argument that foreign capital inflow could be used to increase consumption rather than investment. This hypothesis is tested using time-series data for 26 years (1970-1995) and a single equation model. A number of variables that might affect savings in Egypt are included. The simple theoretical model, which is to be estimated using ordinary least squares (OLS) technique, is specified below:

$$S_t = \pi_0 + \pi_1 A + \pi_2 F + \pi_3 Y + \pi_4 G_{t-1} + \pi_5 S_{t-1} + \pi_6 R + \pi_7 N + E \quad \text{.....(16)}$$

$$(\pi 1?)(\pi 2?)(\pi 3 > 0)(\pi 4>0)(\pi 5>0)(\pi 6>0)(\pi 7<0)$$

where S is savings/GDP ratio, A is foreign aid/GDP ratio, F is foreign direct investment/GDP ratio, Y is real per capita GDP, Gt-1, is real economic growth of income lagged one year, St-1 is savings/GDP ratio lagged one year, R is real savings interest rate, N is inflation rate, and E is the stochastic error term of the equation.

The priori expectation for the parameters were determined on the basis of theoretical arguments and given in parenthesis below each equation. The greater than (>) and less than (<) signs being used to indicate positive and negative effects respectively. It is normally assumed that the per capita gross domestic product (Y), rate of economic growth (G), and rate of interest (R) have positive effects on savings made by both public and private sector of the economy. The theoretical argument is that increase in income (Y) increases the individual propensity to save. A (?) indicates that the

empirical work evidence in the literature prove no agreement on the contribution of foreign capital (aid and FDI) on savings as illustrated above. Thus, the exact relationship of foreign capital and domestic savings is essentially an empirical one. The negative correlation between inflation rate and savings was expected on the assumption that individuals view high inflation rate as a heavy taxation on money. So, if faced with high inflation people will save less or consume more.

In fact, the introduction of many independent variables into the model intensifies the multicollinearity problem among these variables. This will lead to the standard errors of the coefficients being overstated and consequently lead to insignificant estimates. However, following a rule of thumb, multicollinearity does not actually pose an estimation problem if the measure of correlation among the independent variables is not greater than the measure of correlation between the dependent variable and independent variables [Ogbu, 1993]. This was the case with Egypt's data.

3.2 Recursive Equations Models

A recursive system with two equations is developed in an attempt to capture both the direct and indirect impact of foreign capital inflow on savings. Although this system of equations might seem simultaneous, it is actually recursive, where the endogenous variable (I) in equation (17) is an exogenous variable in equation (18). The analysis is done using the OLS technique, which is the appropriate estimation procedure of a recursive model of this sort. The structural model that is to be analyzed is specified below:

$$I = \pi_8 + \pi_9 A + \pi_{10} F + \pi_{11} S + \pi_{12} R + \pi_{13} N + V \quad \text{.....(17)}$$

$$(\pi 9 > 0)(\pi 10 > 0)(\pi 11 > 0)(\pi 12 < 0)(\pi 13 > 0)$$

$$G = \pi_{14} + \pi_{15} I + \pi_{16} X + Z \quad \text{.....(18)}$$

$$(\pi 15 > 0)(\pi 16 > 0)$$

where I is gross domestic investment/GDP ratio, X is exports/GDP ratio, V and Z are stochastic error terms.

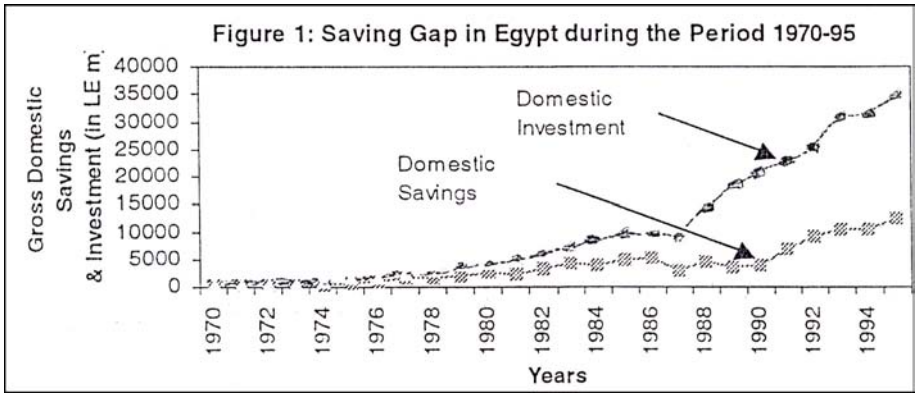
In the investment function, all the parameters except that of the rate of interest are expected to be positive. The argument is that the more the inflow of foreign capital and the higher the domestic savings, the more the availability of funds to finance investments. Foreign capital inflow helps to overcome the limits on the domestic capital formation and permits a rate of investment in excess of the rate of national savings. The positive relationship between inflation rate and investment is expected on the assumption that when people are faced with high inflation rate they may avoid holding money balances in form of bank deposits and may prefer physical assets (productive or non-productive). These are additions to investment. The negative relationship between interest rate and investment is hypothesized on the assumption that people may view high interest rate as cost of borrowing money or even as a cost of capital.

In the economic growth function, both investment and exports are expected to be positively related to the rate of growth. The level of investment is an indicator of the level of productive capabilities of an economy and hence the growth of output. Exports also constitute stimuli to growth as well as providing the vital foreign exchange. For instance, when exports are in excess of imports, the country will have a favorable balance of trade and would be accumulating claims against foreign countries, which, in effect would be the same as additions to investment.

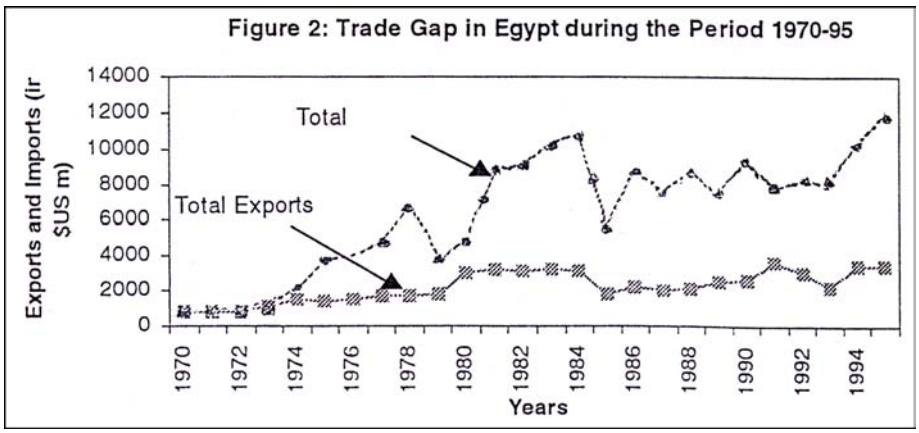
To neutralize the effects of population variation on domestic savings, income is reduced to a per capita basis. This transformation is usually made, however, only when the data set covers a number of years, since population figures do not usually show sharp fluctuations from year to year. The result of adjustment is to leave changes in income attributable to factors other than population changes.

The data were collected for Egypt and covered the period between 1970 and 1995. The data on aggregate domestic savings, domestic investment, exports and imports, were computed from IMF's International Financial Statistics and World Bank's World Tables (various issues). The data show,

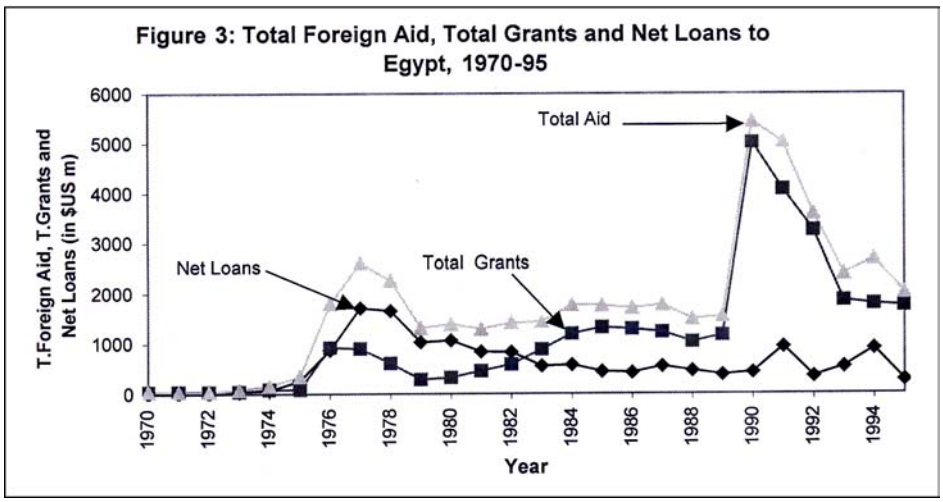
as indicated in Figure (1), the savings gap Egypt faced during the study period (1970-95). The savings gap was narrow from 1970 to 1977 and started to be wider as one approaches the 1980s and 1990s.



Also, as shown in Figure (2) the trade gap was narrow from 1970 to 1972. In 1973 the balance of payments realized a $US215 million surplus. After 1973 the trade gap started to be wider (although it was fluctuating) as one approaches the late 1970s, 1980s and 1990s. It reached its peak in 1984, where the deficit was $US7,626 million and in 1995, where the deficit was $US8,304 million.



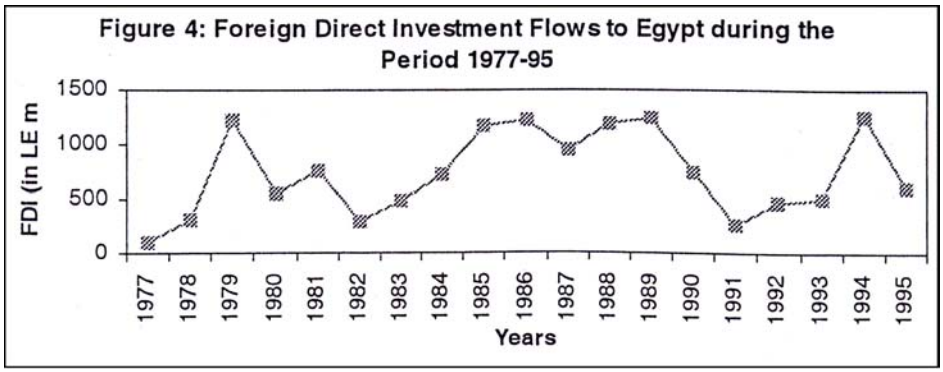
Data on total foreign aid, net loans and total grants were collected from OECD's Geographical Distribution of Foreign Capital Flows in Developing Countries (various Issues). As shown in Figure 3, the total amount of aid has been increasing over time (although it fluctuates) and was nearly divided between loans and grants during the 1973-82 period.



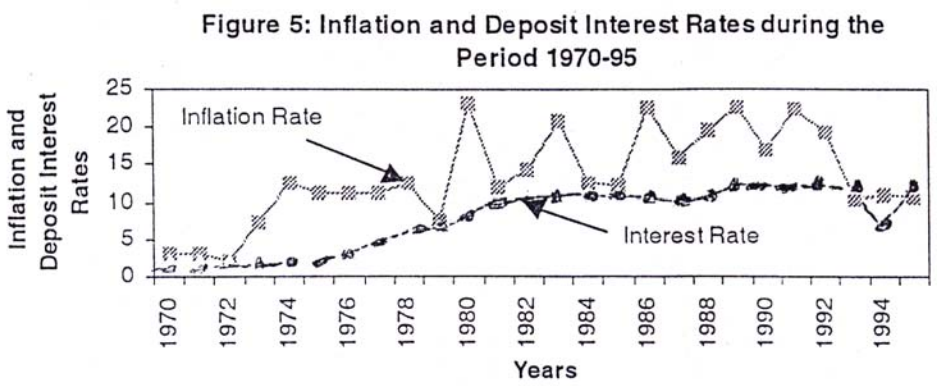
Starting from the year 1983, a systematic inclination of donors towards provision of aid to Egypt in grant form instead of loans is shown. For example, in 1992 the grants accounted for 90.4 percent of the total aid disbursed to Egypt. The general trend depicted in the figure is a rising one through the 1970-95 period and the peak of aid flows in the 1970s was reached in 1977. As can be seen from Figure 3, total aid declined significantly after 1978. This was partly caused by the queries raised by donors pertaining the way aid was utilized and partly by the failure of the Egyptian government to enter into an agreement with the IMF. However, the figure shows an upturn in the flow of aid beginning 1989 following the readiness of Egypt to reach an agreement with IMF. Also, the figure shows the peak period of aid flow to Egypt in 1990 and 1991 before and after the Gulf war.

Afterwards, the total aid to Egypt witnessed a downturn especially from 1992 to 1995. From the above trends, it is clear that the total flows of foreign aid are heavily tied to political reasons.

Data on foreign direct investment were collected from World Bank's World Debt Tables (various issues). As shown from Figure (4), the FDI fluctuated during the period 1977-95 where the data were available. FDI reached its peak in 1979 (LE 1216 million), 1986 (LE 1217 million), 1989 (LE 1250) and 1994 (LE 1256 million). This reflects the fact that these flows are vulnerable.



Data on savings, investment rate, inflation rate, economic growth rate and per capita GDP were computed from World Bank's World Tables and World Bank's Development Report. As shown from Figure (5), Egypt was beset by macroeconomic problems. Inflation exceeded 20 percent in 1980 and fluctuated afterwards ranging between 12 percent and 23 percent in the period 1981 and 199 1, and decreased after. that to reach 7 percent in 1994.



Deposit interest rate increased after 1973 to reach its peak in the period 1990-93 (12 percent).

4. Empirical Findings

The results of the OLS estimation of the below equations (single and recursive) are listed below. Estimations were carried out using the SAS statistical package. The test indicates that there is no positive serial correlation in the model. With regard to the functional form of the models, the results suggest that there is no problem with the use of a linear functional form. However, experimentation with simple alternatives, such as a logarithmic, square root, and semi-logarithmic functional form, did not produce any apparent improvement in the diagnostic test results.

4.1 Single Equation Model

The specific model presented below consists of fewer variables than the general theoretical model outlined in section 3. The other variables (real per capita GDP, growth rate lagged one year, savings rate lagged one year and inflation rate) were found to be insignificant at 10 percent level of significance and they were dropped.

The results of the estimated linear model are summarized below.

$$S_t = 0.06 + 0.29A + 0.32F + 0.007R \text{.....(19)}$$

$$(0.01)^* \ (0.09)^* \ (0.22)^{**} \ (0.001)^*$$

$$R2 = 0.74 \qquad F = 24.39 \qquad DF = 22$$

where the figures in parentheses represent the standard errors of the estimators, and * represents significance at one percent level, ** represent significance at 10 percent level).

As hypothesized, savings interest rate had the right sign and the estimated coefficient was statistically significant at one percent level of significance. Both aid and FDI had positive signs. The estimated coefficient of foreign aid was highly significant at one percent level, while

the estimated coefficient of FDI was statistically significant at 10 percent level. The proportion of explained variation was 74 percent.

4.2 Recursive Equations Models

The results are summarized using the two equations below. The figures in parentheses represent the standard errors of the estimators.

a) Investment Function

$$I = 0.13 + 0.21A + 1.51F + 0.66S - 0.01R + 0.004N \text{.....(20)}$$

(0.04)* (0.24) (0.48)* (0.44)*** (0.004)** (0.002)**

R2 = 0.47 F = 5.48 DF = 20

All the variables (foreign aid (A), FDI (F), savings (S), interest rate (R) and inflation rate (N) had the expected signs. The estimated coefficients of FDI was highly significant at one percent level of significance. The estimated coefficient of both the savings interest rate and inflation rate were statistically significant at 5 percent level. The estimated coefficient of savings was significant at 10 percent level. However, the estimated coefficient of foreign aid was only significant at 25 percent The overall relationship was relatively reasonable with 47 percent of the variation being explained by these variables.

b) Growth Function

$$G = 3.08 + 65.30I + 0.26X \text{.....(21)}$$

(5.16) (18.83)* (22.16)

R2 = 0.32 F = 6.97 DF = 23

The change in investment and exports had the right sign. The estimated coefficient of the investment was highly significant at one percent level of significance. However, the estimated coefficient of exports was not

significant. The proportion of the growth variable which was explained by the regression was 32 percent and this was relatively weak.

5. Discussion

5.1 Substitution Effects

The relationship between foreign capital inflow and domestic savings has long been thought of to be strong and negative. The reasons why it was found to be so remain only partially explained. The traditional hypothesis that foreign capital inflow is a substitute for domestic savings was empirically tested in this paper. There was no evidence to support this hypothesis. The simple model showed that foreign capital inflow (aid and FDI) was positively related to domestic savings. The relationship was statistically significant at one percent and 10 percent level of significance for aid and FDI, respectively (eq. 19). Also, the relationship between domestic savings interest rate and savings was positive and highly significant.

It is very important for Egypt, which has a very low level of domestic savings to have a better understanding of all the factors that determine its domestic savings. Since the level of savings is low, the problem is not one of regulating the level of savings but one of creating and promoting it. So encouraging foreign capital inflow (especially FDI) to Egypt is very important to enhance domestic savings which is vital in accelerating capital formation that is a necessary condition for economic development.

5.2 Recursive Effects

The use of a recursive system of equations supported an earlier argument that the relationship between foreign capital inflow, domestic savings, investment and economic growth is a complex one. Foreign capital inflow was hypothesized to affect other predetermined variables, particularly the economic growth rate. The results from a single equation model, therefore, do not show anything conclusive.

The empirical findings obtained from the recursive equations model need some discussion. The results to be discussed are summarized in equations 19, 20 and 21. There was some evidence that the effect of foreign

capital inflow on domestic savings follow a complex process. For example, it was established that foreign capital inflow supplements domestic investment (see eq. 20). Therefore, investment, if productive, will increase the productive capacity of an economy and hence national income. The argument is that foreign capital plays a significant role on investment and that productive investment raises the level of growth. This increase in the level of national income finally affect domestic savings. So the hypothesis that the rate of economic growth was not an exogenous variable and that it is influenced by the level of investment could not be rejected.

The weak relationship between investment and foreign aid (eq. 20) may need some extra discussion. The result is perhaps not very surprising given the different types of foreign aid (bilateral and multilateral) reaching Egypt and the political and economic structures existing in Egypt. For example, much of the bilateral aid is usually tied politically and economically. There is a lot of evidence that aid tying raises the cost of investment and mainly where such tied aid may bias the recipient investment towards excessive capital intensity [see Cassen et al., 1986]. In addition, there is the argument on the fungibility of aid or the switching of the foreign savings into uses, which are in some sense unproductive. The argument raised here is that aid finances not the high-priority investment it was initially intended for, but the more marginal investments (or even consumption) which aid permits the recipient to finance. One should also keep in mind that in Egypt the bulk of foreign aid still goes to support basic infrastructure in power, transport, health, army and education. Where aid finances a large share of productive investment, the fungibility may not hold. The problem as has been observed in Egypt is that many projects are large and complex e.g. the power stations and the agriculture and irrigation schemes to mention a few. The projects are therefore incompatible with the local scales and technology and may fail retarding the rate of growth.

However, the positive strong relationship between domestic investment and FDI, indicated by the results, confirms the earlier argument related to the degree of complementarity required between both variables to improve the growth rate. Also the positive strong relationship between investment and economic growth rate confirms the theoretical background discussed earlier. All of this bears the policy-maker attention to the importance of

foreign capital, especially FDI, and investment as vital determinants of economic growth in Egypt.

5.3 Exports and Growth

Foreign trade has a respectable record as an "engine of growth'. Most of the developing countries that pursued export-led growth policies in 1970s showed spectacular success [Cassen et al., 1986]. There was an empirical evidence to support that exports have a positive influence on the rate of economic growth. This supported earlier arguments that external trade sector plays a significant role in the accumulation of domestic savings, but the process of interaction is quite complex. It was established that one of the connections is through the impact of trade on the growth of income. The importance of foreign trade development is therefore beyond dispute.

It can be argued that if the foreign capital function to support the productive activities in the export sector and even promote exports, then it is possible to achieve self-reliance on the long run. In fact the transfer of foreign resources should, in the long run, enable recipient countries to build up their productive capabilities, so that they can finance their investments and imports through the normal commercial channels. This is the essence of self-reliance, which should receive a major attention in Egypt.

6. Summary and Concluding Remarks

The aim of this paper was to empirically examine the effect of foreign capital inflow on economic growth in Egypt through savings and investment. In the past, it has been argued that foreign capital inflow is a substitute for domestic savings in less developed countries. The substitute or complement hypothesis was empirically examined using time-series data covering 26 years (1970-95) of Egypt's economy. No evidence was found to support this traditional argument when Ordinary Least Squares technique was executed.

It was established that the previous studies may have misrepresented the impact of foreign capital inflow on domestic savings, at least in some developing countries. The relationship between foreign capital inflow and domestic savings may not be a simple one as has been assumed in the past.

It could be a complex process involving a feedback effect between foreign capital and the rate of economic growth.

From this paper's findings it can be concluded that variables that determine the rate of growth of an economy can also determine the rate of savings. Failure to recognize the behavioral effects among the variables could be a probable reason why it has been difficult for one to interpret the traditional results properly, because they were either positively or negatively biased. From the evidence available, it can be argued that without adequate theorizing, it cannot be assumed that the inflow of foreign capital is the cause of low savings. At least there was no evidence to support this assumption. It can also be concluded that the impact of foreign capital on domestic savings will depend on how much the rise in investment raises savings through raising the rate of economic growth.

The problem of low savings in Egypt may most probably be associated with other factors and not foreign capital inflow. For example, there is a general failure of the government to generate large savings. This could be done if it widened the taxation base e.g. through consumer goods or taxation of the informal sector, which is large in Egypt. These are taxation policies, which if adopted would affect a high proportion of the population, hence widening the public savings margins. The government has also failed to channel its domestic savings into productive investment and reduce levels of consumption.

Lastly, Egypt has failed to take advantage of the foreign trade, especially in fields in which she has a comparative advantage such as clothes and textiles. Foreign trade constitutes large source of additional savings. A high ratio of foreign trade to national income is helpful to realize larger savings. This is because foreign trade is easily subjected to state control for revenue and other purposes. But, though export earnings form a substantial portion of the national income, it has not been able to exploit fully this source of savings. Its inability to fully take advantage of the foreign trade sector has largely been associated with the underdeveloped nature of Egypt, the type of goods it exports (mainly agricultural produce or simple manufactured goods) and its inferior bargaining power. By suitable export and import measures, the government can help in improving the terms of

trade which would increase the foreign earnings of each unit of goods delivered in foreign markets. What is equally important is to adopt suitable measures by which export earnings can be profitably used for the importing of capital goods and other materials necessary for domestic investment.

In conclusion, a high rate of savings is possible if people are prepared to put forth effort to maximize output even with the resources available and are willing to keep expenditure within reasonable limits. Also foreign capital can boost domestic savings if put into investments which can improve the rate of growth. The results hold the importance of foreign capital in improving savings, investment and growth performance in Egypt. Therefore, attracting foreign capital inflow, especially FDI, to the country is an important issue in order to increase savings and investment that are essential in improving growth. This could be done by accelerating the structural, fiscal and trade reform especially in the areas of privatization, trade liberalization, real exchange rate devaluation along with other macroeconomic reform, which affect foreign capital inflow to Egypt.

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أثر تدفق رأس المال الأجنبي على الادخار والاستثمار والنمو الاقتصادي في مصر تحليل قياسي

محمد عبد الواحد محمد

كلية العلوم الإدارية والتخطيط - جامعة الملك فيصل

الملخص :

يهدف هذا البحث إلى توضيح أثر تدفق رأس المال الأجنبي على الادخار، والاستثمار، والنمو الاقتصادي في مصر. لقد أوضحت نتائج تحليل الانحدار، المستخدم في هذه الدراسة، الأثر الإيجابي لتدفق رأس المال الأجنبي على الادخار والاستثمار وبالتالي على معدل النمو الاقتصادي. أيضا أوضحت النتائج العلاقة التكاملية القائمة بين الاستثمار الأجنبي المباشر والاستثمار المحلى. كذلك أوضحت النتائج الأثر الإيجابي القوى للاستثمار على معدل النمو الاقتصادي في مصر. وأخيرا أوضح البحث أهمية رأس المال الأجنبي في تحسين أداء الادخار والاستثمار والنمو الاقتصادي في مصر.