

## **Investigating the Effect of Foreign Aid and Investment on Economic Growth in Iran**

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*In this paper, long term relation of five variables (gross domestic product, private investment, public investment, foreign loan and imports) and also their influences on each other in Iran and for years 1972-2007 has been analyzed. For this purpose model of vector autoregressive (VAR) has been used. First, stability of variables by using dickey-fuller test has been examined. Next, analysis of Johnson test has been used for considering the convergence among five variables. The results of this research show that the foreign loan has a negative effect on gross domestic product and positive effect on private investment. Also public investment has a negative relation with private investment. So in economy of Iran public investment could not make private sector increase its activity. That can be for such reason, like lack of necessary infrastructure for efficient activity in private sector. Also government infrastructure's investment leads to widest participation of private sector in economic activity. It should be noticed, in public investment, the construction investment, should be received more attention to make preparation for future widest activity of private sector. This can be for optimum volume of using loans wasn't base on country. So because of this extra resources have entered the speculation channels. So that with an augmentation of loans, investments has been accomplished more. And also extra resources enter the speculation channels. For this it can have inverse effect on economic growth.*

**Keywords:** Foreign Aid – Private Investment – Public Investment- Growth Economy-Vector Autoregressive Model (VAR).

### **1. Introduction**

Economic growth and affective elements of it has been the center attention of economists and economical and political programmers. Although the primary models of growth knew gap saving as limitation of growth, from 1960's and afterwards, gap of foreign exchange and also government's financial gap was added to barriers of growth.

After world war II little by little this notion improved that foreign aids can remove mentioned limitation and lead to growth. But with an augmentation in lender in 1970's and then crisis of debt in beginning of 1980's effect of foreign debt on economic growth Was hesitated in spite of this statistics and data show reduction of foreign debt burden of developing countries in second half of 1980's and beginning of 1990's.

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Investment is one of the most important matters in each country economic and in the field of foreign investment it has a specific importance. Since, usually, required capital for investment is supplied in two ways. First, it is Country internal saving which created in different part of economic.

Second, it is external saving which transfer from foreign country to have country as flow of capital's transformation in physical form (machinery) and financial flow. One of chief point for developing countries which are most times host for foreign investment is determination of effect of such transformation of capital on economic of these countries. Which in this field there are different views at present, investment in social overhead projects like, construction of dam, power-station, road, and air port and similar cases and also direct productive projects have specific importance. For executing such projects, foreign investment is required and there are different ways for supplying foreign capital which is consists of foreign borrowing from international institution and governments credit foreign investment (portfolio foreign investment) direct foreign investment.

The purpose of this article is investigation of effect of such investment especially foreign Borrowing upon some variables of macroeconomic consist of economic growth in Iran.

Considering that effect of foreign aids on economic growth is vague and also considering in different countries it has been different effect on economic growth. That is because of adopting policy making. First hypothesis is devoted to relation of foreign aids and economic growth. And also we put second hypothesis as relation of public investment and private investment as following.

1. There is appositive and significant relation between foreign aids and economic growth.
2. Public Investment has the positive effect on private investment.

The rest of the paper is organized into four main sections: Section 2 analyses previous studies. Section 3 describes the data, the econometric methodology. Section 4 discusses the results that emerge from the estimations. The conclusions of this paper are then presented in section 5.

## 2. Literature Review

Amanja, D, Morrissey, O, (2005) investigated the effect of foreign debt on economic growth within 1964-2002 in Kenya. Results of this investigation by using VAR-VECM method showed that share of private and government investment and import in gross domestic product have a powerful beneficial effect on per capita income in Kenya. Private investment depends on government investment and import negatively and has a positive relation with foreign aid.

Asiedu (2009) in an article, with this title "Does foreign aid mitigate the adverse effect of expropriation risk on foreign Direct investment?" And also he studies 63 countries by using of GMM method during 1983-2004.

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Results indicate risk has a negative effect on foreign direct investment, and foreign aid can not eliminate inverse effect of risk. It is suggested that aid should be increased and aids can have an enormous effect on reducing risk of countries.

Asteriou (2008) , in an article with this title, “Foreign aid and economic growth: New evidence from a panel data approach for five South Asian countries”, has investigated long term relation between foreign aids and economic growth by using panel data method also use five south Asia countries in a 23 period. Results show a positive relation between aids and growth.

Chatterjee and Turnovsky(2007) in their article, with this title “Foreign aid and economic growth: The role of flexible labor supply” examined the link between foreign aid, economic growth, and welfare in a small open economy. External transfers impinge on the recipient's macroeconomic performance by affecting resource allocation decisions and relative prices. The endogeneity of the labor–leisure choice plays a crucial role in the propagation of foreign aid shocks. The efficacy of foreign aid also depends on externalities associated with the public good that it helps finance. The impact of tied and untied aid on the recipient governments intertemporal fiscal balance is examined.

Irandoost and Ericsson (2005) studied in the article with the title “Foreign aid, domestic savings, and growth in LDCs: An application of likelihood-based panel Cointegration”. The results show that the variables contain a panel unit root and they co integrate in a panel perspective. The findings show that foreign aid and domestic saving enhance economic growth for all countries in the sample. The economic implication of their results is that foreign aid has a potential to play a key role in boosting developing countries' economic growth. That is, there is a positive Relationship between aid and economic growth because it not only augments domestic resources, but also supplements domestic savings, assists to close the foreign exchange gap, creates access to modern technology and managerial skills, and allows easier access to foreign markets.

Moreira and Bayraktar(2008) studied about Foreign aid, growth and poverty. This paper extends the dynamic macroeconomic framework. As in the original model, linkages between foreign aid, public investment (education, infrastructure, and health) and growth are explicitly captured, but this time in a fixed nominal exchange rate regime. Although the nominal exchange rate is Fixed, the relative price of domestic goods is endogenous, thereby allowing for potential Dutch disease effects associated with increases in aid. The impact of policy shocks on poverty is assessed by using partial growth elasticity.

Kimura and Todo (2009) in an article, with this title” Is Foreign Aid a Vanguard of Foreign Direct Investment? A Gravity-Equation Approach” investigated whether and how foreign aid facilitates foreign direct investment (FDI) flows into less developed countries. They employ a large data set of source-recipient country pairs and conduct gravity equation-type estimation. Their Methodology enables them to examine an effect, through which aid from a donor country promotes FDI from the same donor in particular. They found that foreign aid in general does not have any significant effect on FDI. However, they found robust evidence that foreign aid from

Japan when they allow to participate the size of foreign aid in their model, particular has a vanguard effect, i.e., Japanese aid promotes FDI from Japan but does not attract FDI from other countries.

Ouattara (2006) in his article, with this title "Foreign aid and government fiscal behavior in developing countries: Panel data evidence" examined the impact of foreign aid flows on public sector behavior in developing countries. It contributes to the fiscal response literature on two main fronts. Firstly, it provides a new fiscal response model. Secondly, on the estimation front, it departs from the existing literature by using panel data technique to test the model in the context of a, relatively, large sample of aid recipient countries over the period 1980–2000. The results derived from this study suggest that: (1) public investment is positively related to aid flows; (2) aid flows exert a positive impact on government developmental expenditure and a negative significant impact on non-developmental expenditure; (3) aid does not discourage revenue collection effort. Finally, borrowing and aid are found substitute.

### 3. Data and Methodology

We use this data from 1972 to 2007 of Iran. We found them in Central Bank of Iran. At first we estimate the VAR model,. Finally, we present Cointegration test by using of Johnson test in this paper. When there is a Cointegration relation, the VAR model can be reformulate into a vector error correction model (VECM). After we determine the number of long run relationship model, we estimate vector error correction model (VECM), if we don't have long run relationship we estimate the VAR for short run. Before estimate VECM we should determine appropriate lag length, therefore we use Akaike information criteria and Schwartz criteria.

#### 3.1. Theoretical Principles

In this section we investigate the model that employed with gorji (1999). Model, in which to study the impact of foreign aid and investment on economic growth is considered, is defined as follows:

$$\frac{dy}{y} = B_0 + B_1 \frac{IP}{Y} + B_2 \frac{I_g}{Y} + B_4 \frac{dm}{m} + B_5 \frac{ddeb}{deb}$$

Where:

$\frac{dy}{y}$ : GDP Growth Rate

$\frac{IP}{Y}$ : ratio of private investment to GDP

$\frac{I_g}{Y}$ : ratio of public investment to GDP

$\frac{ddeb}{deb}$ : growth rate of foreign loans

$\frac{dm}{m}$ : nominal growth rate of imports of goods and services

#### 4. Findings/Discussion

In order to fitness of VAR pattern first, it's necessary to investigate the persistent of variables. One of the common examinations which nowadays use for recognition of persistent of one time series process is unit root test; we can do this examination in two ways: Dickey Fuller's Test, Dickey Fuller's generalized Test.

Which in this article, this examination is done Base on Dickey Fuller's generalized Test. Which it is results are reported in following table. As the table shows, quantity of calculated static of ADF for Debt1, Pinv1, Gdp1, Impo1, Ginv1 variables from perspective of absolute value in level of 5 percent is larger than critical values. Therefore all variables are I (0)

**ADF tests for unit roots**

Variable	ADF	Critical Value			Lag
		%1	%5	%10	
PINV1	-2.88	-3.62	-2.95	-2.61	0
GDP1	-3.91	-3.62	-2.95	-2.61	2
GINV1	-3.11	3.62	-2.95	-2.61	0
IMPO1	-4.03	3.62	-2.95	-2.61	0
DEBT1	-4.68	3.62	-2.95	-2.61	0

After investigation of persistent of variables, one of the important stages in evaluation of vector regression model is choosing rank of pattern (magnitude of inhibition should be inserted in equations).

For choosing optimum rank of pattern, we can use criterion of Akaike or Schwarz. The most inhibition which is given to model is 2, and considering this table, the least quantity of Schwarz, Akalk statistic is prepared in second inhibition, we can indicate that the optimum inhibition of VAR model is equal to 2.

**Determination of magnitude of inhibition of VAR model**

Schwarz information	Akaike information	lag
-9.25	-10.07	0
-10.00	-12.45	1
-10.24	-14.32	2

Now, we evaluate VAR model with two inhibitions for each variable. And we take step towards improving estimated equations. Since adding inhibition of variables usually have not much improving in removing problems like: serial auto correction, abnormal deranging sentences, NON homoscedasticity or specification of function's shape. Especially that higher inhibition of variables is meaningless from statistical perspective. So we can use figurative variables for improving model.

Therefore we add livestock's variables of revolutions process and petrol crisis of 53 and war to model. Entering these variables don't create problem of auto correction and co linearity.

It is clear that many economic time series variables are non stationary so when these variables are used in a pattern, it is necessary to determine their accumulated

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position. But it is not necessary that all variables of accumulated pattern have equal position.

It is possible that when variables of pattern are collection of variables  $I(0)$ ,  $I(1)$ ,  $I(2)$  their linear combination be  $I(0)$ .

And therefore accumulation is concluded. On other hand Johansson's method also is designed for maximum variables of  $I(1)$ . So if in pattern we face variables which are bigger than  $I(1)$ , we have to transform them into  $I(1)$ . So it is necessary to specify accumulated position of pattern in a proper way for preparing vectors or accumulated vectors. In this article we follows vectors and accumulated vector among variables of gross domestic product, import, public investment, private investment and foreign debt by the use of Johansson's method. Considering stationary test, variables which are under consideration are  $I(0)$ . In Johnson's method after doing necessary calculations for studding existence of convergence we use two criterions consist of  $\lambda_{max}$  and  $\lambda_{trace}$ . If existence of convergence among variable is verified, we can say that balance and long term relation among variable is established. The examination put maximum specific values of existence accumulated  $r$  vector opposite to  $r+1$  of examined accumulated vector;  $r$  accumulated vector is accepted when static quantity of examination is smaller than critical value. Examination examines the effect existence of maximum accumulated  $r$  vector opposite to maximum existence of  $r$  accumulated vector.

Results which are concluded from effect's examination and examination of maximum specific values for determination of accumulated vectors among model's variables are presented in following tables.

Results of maximum of specific values for determination magnitude of accumulated vector

**Test Statistics for Co integrating rank (Trace tests)**

Null	alt	Critical value	$\lambda_{trace}$	Prob
$r=0$	$r \geq 1$	95.75	177.05	0.000
$r \leq 1$	$r \geq 2$	69.81	98.77	0.001
$r \leq 2$	$r \geq 3$	47.86	61.96	0.0014
$r \leq 3$	$r \geq 4$	29.79	35.80	0.0090
$r \leq 4$	$r \geq 5$	15.49	16.96	0.029

**Test Statistics for Co integrating rank (Max tests)**

null	alt	Critical value	$\lambda_{max}$	Prob
$r=0$	$r \geq 1$	40.07	78.28	0.000
$r \leq 1$	$r \geq 2$	33.87	36.81	0.0217
$r \leq 2$	$r \geq 3$	27.59	26.15	0.0752
$r \leq 3$	$r \geq 4$	21.13	18.83	0.1016
$r \leq 4$	$r \geq 5$	14.26	14.99	0.0384

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The magnitudes of vectors which are prepared by statistic of examination effect matrix are equal to five vectors and magnitudes of vectors which are prepared statistic of maximum specific values are equal to 2. Considering that examination of maximum specific values is stronger than examination of effect matrix. Therefore for determination of magnitude of accumulated vector, examination of maximum specific values is used. considering results of above tables in level of probability of 90 percent magnitude of long term relations among variables compatible pattern with economic theory is equal to  $(r=2)$  is determined.

As Harris (Harris, 1995) indicate, estimated vectors, which present accumulated space, have no information about economic long term relations. So finding a collection of unique vectors in this space limitation should be exerted which is because of economic analysis. In other words, Johnson's method determines only rank of matrix effect of  $\beta\alpha$ . But for examining existence of specific elements in  $\alpha$ , we require exertion of limitation. (Dickey and et al, 1995)

Therefore it's necessary to exert limitation base on economical theoretical principles or any kind of previous information out of pattern of coefficient of Cointegration vectors, to presented balance long term of relations to be recognized.

Under this circumstance (existence of 2 accumulated vectors) we require two independent limitations for exact recognition for each of these relations.

Exerted limitation according to theoretical principles are consist of estimating of accumulated equations

$$B(1, 1) = 1, B(2, 1) = 0$$

$$B(2, 2) = 1, B(1, 6) = 0$$

**Co integrating vectors**

variables	Vector 1	Vector 2
GDP(-1)	1.0000	0.0000
PINV(-1)	-2.42 (-14.3)	1.0000
IMPO(-1)	0.58 (2.33)	0.458 (2.72)
GINV(-1)	-2.98 (-4.1)	4.004 (8.35)
DEBT(-1)	0.25 (2.03)	-0.44 (-5.48)
DUM3(-1)	0.000	0.21 (11.31)
C	0.87	-0.92

In above table, number inside parentheses are statistic of accounting t. estimated coefficients of all variables in a meaning full level, 5 percent are significant from statistical aspect.

Considering prepared results within investigated period, variables of ratio of private investment to GDP, and ratio of public investment to GDP, had positive effect on

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growth rate and variables of import rate and rate of foreign debt have a negative effect on growth rate. And also variable of rate of foreign loans has a positive effect on ratio of private investment to GDP, and variables of import rate and ratio of public investment to GDP have a negative affect on ratio of private investment to GDP.

According to results, with an augmentation of one percent in ratio of private investment to GDP and ratio of public investment to GDP in order growth rate will be increase 2.98, 2.42 percent and with an augmentation of one percent in rate of import and foreign loan in order growth rate will be decreased 0.25 , 0.58 percent. And with one percent augmentation 0.44 percent and with an augmentation one percent import growth and ratio of public investment to GDP in order ratio of private investment to GDP will be decreased 4.004 0.458 percent.

In estimated marginal model of growth, coefficients of investment of private and government sector GDP ratio, which is presenter of marginal productivity of investment in this two sector, in order are 2.98 and 2.42 which considering statistics of t in level of 5 percent are significant from statistical perspective and therefore investments of these two sector have influenced on per capita rate growth of GDP, this shows investment of private sector and activities of private sector in spite of some problems had effect on economic growth of country.

### 5. Conclusion

Generally, in this article relation between foreign aids and investment and their effect on growth rate in Iran investigated. In this article, first we presented a model and estimated this model, in order to fitness of VAR pattern we used unit root test, then the magnitude of inhibition of VAR model was determined after that by using of Johansson's and existence of accumulated vectors showed long term relations among variables. After certainty about existence of long term relation, we estimated this relation and then interpreted these coefficients. Results of research reject first and second hypothesis. The first hypothesis of research indicates there are a positive relation between foreign aids and economic growth. and second hypothesis indicate public investment has a positive effect on private investment. So there are not a direct relation between foreign aids and economic growth and public investment has a negative effect on private investment.

Results show foreign loans has a negative effect on economic growth and also a positive effect on private investment and this can be for that optimum volume of using loans wasn't base on absorptive capacity of country. So because of this, extra resources have entered the speculation channels. So that with an augmentation of loans, investment is accomplished more, and also extra resources enter the speculation channels, for this, it can have inverse effect on economic growth. Another reason is that, loans must be invested in parts of economic which have a higher return than interest rate of loan. And be able to supply enough exchange for repayment of loan. If interest rate of loan be more than efficiency of investment, this loads to accomplishing of investment but it's unsuccessful, also considering coefficient of investment of economic of Iran, government investment couldn't increase the activities of private sector and leads to economic growth, it can be for some reasons like, lack of necessary infrastructure for proficient activities of private

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sector, lack of necessary infrastructure for proficient activities of private sector, lack of supporting of private sector in productive activities, created monopolies by government and non government institutions in economic of Iran, lack of safe competition in society, formation of induced growth resulted from income of exporting petrol in country and lack of enough attention to exporting.

Importing of consumer, intermediate semi finished goods lead private sector can't compete with these goods as well. And show no tendency for doing activities in this field. Therefore importing here, leads to reduction's activities of private sector.

In this article, it is suggested that, by correct management of foreign loans, growth and economic development are possible. This management includes allocation of receipt loans for removing requirement of recipient country and spending on projects, economic and social schemes and avoiding of wasting receipt loans.

And also comparison of whole accomplished investment by government and private sector in economic of Iran shows private sector in comparison with government sector hadn't a better and noticeable operation. While in other part of world private sector is the first stage for much entrance of private sector to economics' field of country and success in privatization (making-private) program.

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