A survey of the relation between stock offering and private investment in Iran

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Abstract: As funding is an important stage in development of companies, the identification of funding methods is of great importance. Stock exchange market by absorbing saving and liquidity in private sector and guiding it to manufacturing and service sectors plays important role in using investment opportunities and improvement of economic condition of society. This study evaluates the relationship between stock offering and private investment. Thus, methodology based on ordinary least square and vector auto regression (VAR) model is used. The equation is used as logarithm to use the coefficients as elasticity. The results of study show that there is a positive and significant association between stock offering and private investment. BY increasing stock offering in stock market, private investment is increased. By increasing interest rate, private investment is reduced and interest rate is considered as a reducing factor of private investment.

Key words: Private investment; Stock offering; Iran economy; Vector auto regression method; Ordinary least squares

1. Introduction

As funding is an important stage in development of companies, the identification of funding methods is of great importance. Stock exchange market by absorbing saving and liquidity in private sector and guiding it to manufacturing and service sectors plays important role in using investment opportunities and improvement of economic condition of society. Thus, one of the external funding methods of firms is their stock offering in stock exchange market. Based on the relationship between private investment and stock market and as development of stock market is effective on increasing private investment, we should identify the contradictions and barriers in stock trading and offering and other probable barriers regarding stock market development and eliminate them to facilitate stock offering of firms in stock market as regular and efficient. In addition, financial markets as regional stock market in provinces can be improved and this major purpose is investigated. The first purpose is the evaluation of the relation between stock offering and private investment and it is the most important purpose of this study. The second purpose is the evaluation of the relationship between interest rate and private investment in Iran. Also, development of financial markets and regional stock market and funding and private investment via stock offering in countries is one of the applied purposes of the study.

2. Private investment and effective factors

Investment as economic development driving force in all countries is of great importance. The requirement of economic growth is high production and increased investment. In recent decades, averagely about 12% of GDP of the country is dedicated to investment and it is little compared to some countries including South Korea, Turkey and Pakistan. Indeed, one of the most important effective factors on economy of countries is investment and relevant affairs. This issue is a factor for production, employment and motivating economic affairs of each country and it is one of the unavoidable issues. Investment is made via various methods as investment in stock of firms via stock exchange market. Stock market can provide required mechanism for investment in stock of the firms offering stock to people can play important role in dynamics of firms and economy. Thus, by offering stock via stock exchange market by firms and purchasing stock and investment in firms by investors, they can participate in economic development and consider themselves as useful in economic progress and development.

There are two important and different features in investment as time and risk. The significance of these two issues is as in investment, spending money is considered in present time and its amount is definite and the relevant reward is achieved in future and is with the lack of reliability.

Sometimes, risk is on priority in terms of significance (common stock call option) and in other times both of them are important (e.g. common stock). One of investment theories is q-Tobin theory. James Tobin (1969) presented a dynamic investment theory based on this idea that investment depends upon replacement cost in ratio to market value of

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financial assets. This ratio is called q. For example, if market value of existing assets is denoted by MU and replacement cost is denoted by RC, q ratio is defined as follows:

q = Mu/Rc

Tobin believes that the enterprises should invest when q>1, if q<1, investment has no economic justification.

3. The relationship between stock offering and private investment

The results of researcher's evaluation show that the activity of state sector regarding costs control is weak. Private sector with its reactions to this issue can by corrective policies without disturbance in general performance of state sector can limit the problems or eliminate them. According to the results of Megginson and Netter (2000) studies, the governments consider stock offering the best method for privatization of big institutions as owned and to do this, they create fully political conditions to achieve their own goals. The studies of some of researchers show that by stock issuing, positive long-term and abnormal returns in private investment can be created.

Stein (1996) model regarding stock offering in market and its relation with investment as target function is shown as follows:

$$\text{Max } Z = \frac{f(k)}{1+r} - k + e$$

$$\text{S.T: } e + w - k\,(1 - \overline{D}) > 0$$

$$0 < e < e\,\text{Max}$$

Where f(k) is gross investment return, k net investment in basic year and r market interest rate. NPV is net present value achieved by - k NPV = $\frac{f(k)}{1+r}$ equation.

In funding of firms, deviation of price of offering with stock exchange market price is denoted by eδ and issued stock is denoted by e in range $0 < e < e$ max. Stock offering and investment are associated with another limitation (pressure leverage) as shown by $e + w - k\,(1 - \overline{D}) > 0$. In this term, w is initial capital (firm input), $\overline{D}$ is debt capacity regarding new

assets and in latter limitation can be equal or less than $\overline{D}$. According to the results of Stein, if a firm stock is offered below market p rice, it increases the effective costs on stock and investment is threatened by other firms funding via stock issuing and offering.

4. Study model

The data of this study are evaluated during 22 years (1989-2011). The applied data in this study are annual extracted from Iran statistics center, Iran central bank and TSE. The study model and investment function of private sector for Iran economy is as follows:

IP = f(CR , GDP , IG , R)   (1)

IP: Private sector investment in Billion RIs

CR: Composite risk index calculated by IBC institution

GDP: Real gross domestic production in billion RIs

IG: Fixed governmental investment in Billion RIs

R: Average on-accounting profit in various sectors of industry and mine, agriculture, transportation, housing, export and import (interest rate)

The year 1990 is considered as basic year (1990=100).

The main purpose of the study is evaluation of the relationship between issued stock offering in stock exchange market and private investment in Iran. Thus, stock offering in current period enters the function. Also, some variables as composite risk index and fixed governmental investment are removed from the model and offered stock variable in stock market is entered into the model:

IP = f(SC, GDP , RIR)   (2)

As on common regression model, the co-linearity relation between some of model variables is created. The models of study are considered as two logarithmic sides:

LIP = f(LnSC, LnGDP, LnRIR))   (3)

$$LIP = \beta_0 + \beta_1 LnSC + \beta_2 LnGDP + \beta_3 LnRIR)$$ (4)

5. Stationary test of variables

Table 1: The result of unit root test of augmented dickey-fuller test (ADF)

Variables	At level		First rank differentiation		Result
	Statistics	Probability	Statistics	Probability	
LnIP	-1.6755	0.4260	-7.3001	0.0001	Stationary with one differentiation
LnGDP	0.6171	0.9868	-3.04939	0.047	Stationary with one differentiation
LnRIR	-1.6448	0.4440	-4.5866	0.0017	Stationary with one differentiation
LnSC	-2.5582	0.1164	-4.2030	0.0041	Stationary with one differentiation

According to the result of Table 1, the data of the study are stationary by once differentiation. Thus, we can say estimation of private investment function by variables can have spurious estimation problem. The evaluation of statistics values and their acceptance probability shows that H_0 regarding non-stationary of variables is rejected at confidence

interval 95% and all variables have unit root and cointegrated of first rank.

6. Model estimation

In the first stage, estimation of private investment function is performed by Ordinary least squares (OLS).

Table 2: The results of Ordinary least squares (OLS) for model variables

Coefficients	Coefficients value	S.D.	t-statistic	Probability	R²	Durbin- Watson
0	34.701	6.924	5.011	0.001		
1	0.287	0.070	4.083	0.001	0.6359	1.9252
2	1.484	6.290	5.115	0.001		
β_3	-0.0167	1.040	-3.412	0.002		

As shown in Table 2, the coefficients are consistent with the economic theories and principles.

To estimate model 4 by vector auto regression model (VAR), at first the number of suitable lags for model is defined by Akaike or Schwarz criteria. The lags shouldn't be considered very large. The lag should be selected as there is no sequential correlation problem. Normally, the higher lags are insignificant statistically. The extracted results of Eviews software for suitable lag are shown in Table 3.

Table 3: The number of suitable lags for model

Number of lags	1	0	2
Akaike statistics	8.203166	15.07550	8.317792
Schwarz-Bayesian statistics	9.195023	15.25498	10.10840

The results of determining the number of cointegration vectors are shown in Table 4 and 5.

Table 4: The test of trace matric (λtrace) to determine the number of cointegration vectors

Hypotheses		Second model			Third model			Fourth model		
H_0	H_1	Statistics (traceλ)	Critical value	Probability value	Statistics (traceλ)	Critical value	Probability value	Statistics (traceλ)	Critical value	Probability value
r=0	r 1	112.65	54.079	0.001	92.115	47.856	0.001	104.602	63.876	0.001
r 1	r 2	40.448	35.192	0.0124	32.567	29.7970	0.0234	44.017	42.915	0.038
r 2	r 3	15.928	20.261	0.177	14.262	15.4947	0.0760	22.444	25.872	0.126
r 3	r 4	5.4868	9.164	0.234	4.185	3.8414	0.0408	7.5435	12.517	0.291

Table 5: The test of trace matrix (λMax) to determine number of cointegration vectors

Hypotheses		Second model			Third model			Fourth model		
H_0	H_1	Statistics (Maxλ)	Critical value	Probability value	Statistics (Maxλ)	Critical value	Probability value	Statistics (Maxλ)	Critical value	Probability value
r=0	r 1	72.210	28.588	0.001	59.547	27.584	0.001	60.584	32.118	0.001
r 1	r 2	24.520	22.299	0.0241	18.305	21.131	0.118	21.573	25.823	0.165
r 2	r 3	10.441	15.892	0.2958	10.076	14.264	0.207	14.900	19.387	0.199
r 3	r 4	5.4668	9.164	0.2342	4.185	3.841	0.040	7.543	12.517	0.291

It can be said that general rules of OLS and vector auto regression model can supported each other but are different in terms of elasticity value.

Table 6: Comparison of elasticity

	OLS	vector auto regression model
Investment elasticity to stock offering	0.28	0.66
Investment elasticity to GDP	1.48	0.13
Investment elasticity of interest rate ratio	-0.016	-0.026

As shown in Table 6, private investment elasticity to GDP in ordinary least squares are bigger than vector auto regression model. However, regarding to private investment elasticity to interest rate and private investment to stock offering in ordinary least squares is smaller than vector auto regression model.

7. Study results

The most important results of the study include:
Ordinary least squares method

1- By increasing stock offering in stock exchange market for 1%, private investment is increased as 0.287 and it has positive impact on private investment.

2- By increasing GDP as 1%, private investment in Iran is increased as 1.484.

3- By increasing interest rate in Iran, private investment is reduced as 0.016 and it has negative impact on private investment in Iran.

    Vector auto regression model method

1- For one percent change in value of offered stock in stock market, private investment is changed as 0.66.

2- For one percent change in interest rate, private investment is changed as -0.026% and private investment is reduced.

For one percent change in GDP, private investment is changed as 0.13%. According to the results, we can say there is a positive and significant association between stock offering and private investment. By increasing stock offering in TSE, private investment is increased. BY increasing interest rate, private investment is reduced and interest rate is considered as reducing factor of private investment.

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