Study of the effects of privatization of governmental companies Tehran Stock Exchange

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Abstract: Devolution of governmental companies to private sector is one of the most important problems in Iranian economy. This research studies the effects of privatization of governmental companies in Iran in Tehran Stock Exchange. Stock return was analyzed by an analytical-experimental method. Data was gathered through financial documents for stocks return of companies in the previous periods, private companies, and governmental companies for 1997-2005. Then non-parametric tests were applied on the data by SPSS software. It was found by statistical analyses that there is not a significant difference between stocks return of private and governmental companies. There is a significant difference between stocks return of private companies before and after privatization. There is a significant difference between stocks return of private companies in the five sub-periods. The most increment was in the first three years and the most decrement was in the fourth year after privatization.
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1. Introduction

Iran is classified into the developmental countries. One of the specific features of Iran is holding huge reserves like oil, gas, forest, agriculture, land, and juvenile workmanship. Therefore, the question is that "Why the Iranian economy has not enough growth? What strategies can help this economy to pace with the world developments?" [1]

Thus, there was a vast effort to attain solutions from 1970, and many actions were proposed to solve the dilemma in governmental organizations, including usage of private sector mechanisms in governmental companies in short and long term, and privatization of governmental companies.

Analyzing the effect of privatization on stocks return and comparison of stocks return of devolved companies with the other accepted companies in bourse market is a parameter that shows whether privatization was effective or not.

Governmental companies attain many goals such as more productivity, more quantity, and diversity of goods and services, supply of cash, etc by joining Stock Exchange Organization and devolving their stocks. Privatization and devolution of stocks follows many goals for governmental companies including promotion of efficiency and productivity, better administration of production and service departments through development of private possession, decrement of government commission in unnecessary economical and service activities, making economical equilibrium, and premium usage of state facilities [2]. In this regard, market space in stock exchange make the desirable devolution possible. Stock Exchange uses competition price of stocks as a discipline tool to punish economy of weak and inactive managers and to encourage powerful and innovative ones. Therefore, a loss company cannot financially supply itself by Stock Exchange. The goal of this research is to study the effects of privatization of governmental companies in Iran in Tehran Stock Exchange, to evaluate their success, and to find the reasons of unsuccessfulness of others. In this regard, at first we discuss about history and method of the research. Then, the data, the results, and conclusion are offered [2].

2. History of research

Almasi (2002) studied the effect of privatization on performance of companies accepted in Stock Exchange. This evaluation was done regarding accounting texts and privatization by three criteria of income of each stock, asset return, and special value return. The situations for five years before and after privatization were studied. The results showed that after privatization, the financial performances of companies had not changed significantly. Thus, privatization strategy couldn't help companies to attain their goals, namely efficiency and productivity improvement. The most important reason for unsuccessfulness of privatization was unfavorable economical conditions of Iran and lack of suitable bases to attain the goals [3].

Afshari (1996) studied the effects of privatization on the first state development program. This paper studied changes of operational performance, especially sale increment. The period of this research was 1990-93, and the performances of companies were evaluated for two years before and after privatization. The findings showed that the operational performances of private companies were improved, but not remarkably [4].

Aminimehr (1993) in his research titled "Comparison of economy privatization methods and privatization process of governmental companies in Tehran Stock Exchange," identified privatization as a way to decrease government problems, He studies privatization process from the execution of this law in 1988 to the end of 1992. Finally, he suggested that a general review was necessary in privatization in Iran, because experiences showed that firstly, privatization in Iran was not a thing unless exiting industries from their national forms; secondly, the method selected in bourse, namely supply of stocks regarding acceptance conditions of companies and general structure of Tehran Stock Exchange, was not a suitable one for devolution of companies [5].

Silvari (2000) studied the relationship between possession type and financial performance. In this research, a sample containing 62 companies from 6 industries (vehicle-making, financial investment, non-metal mining, food, chemical, rubber, and plastic) was selected. The goal of this research was "Whether changes of possession cause improvement of financial performance indices?" In this regard, financial ratios of these companies for 1998-1999 were investigated. The results showed that changes in (governmental or private) possession ratios had no relation with changes of financial ratios [6].

Miri (1993) in his research titled "The effect of privatization on efficiency of privatized production companies in Tehran Stock Exchange" believes that one of the goals of privatization in Iran is efficiency increment. The question is that "Whether privatization causes efficiency increment?" He based the assumption on two dimensions of efficiency: economical efficiency that was investigated by profitability ratios, and technical efficiency that was by production of companies. His study had two sections. Section 1 was done by descriptive statistical techniques. Section 2 was done by inferential statistical techniques. The results showed that firstly there was a significant difference between two periods of before and after privatization. Secondly, since the obtained domains contained positive numbers, the average of profitability ratios after privatization was increased [7].

Khoshnudi (2001) in a research about "Study the relationship between stocks supply in Tehran Stock Exchange and private investment in Iran (1989-2001)" investigated the subject. Since estimation of regression pattern by least square method requires stability of variables in the pattern, at first he studied stability of variables by Unit Root Test (extended Dickey Fuller Test). Then he fulfilled tests for pattern in order to study confidence and validity capabilities. The results show that firstly there is a significant relationship between stocks supply and private investment in Iran. Secondly, private investment in the current period is affected more from stocks supply in the previous period. Thirdly, the effect of private investment in the previous period on it in the current period is more than stocks supply [8].

Mandal (2000) in a research in privatization, studied 118 companies from 29 (developed and developing) countries and 28 industries by their financial and operational performances. Profitability indices (sale return, assets return, capital return), efficiency indices (real sale rate of each staff), and capital indices (capital cost to sale, capital consumption to total assets) were investigated in three years before and after privatization. The results showed that all indices in all industries were improved significantly [9].

Jones (2000) in his research titled "Strategies of capital market development through stock exchange" resulted that investment culture in stock exchange must be improved to develop capital market. To do this, strategies like continuous submission of financial and non-financial information of devolved companies in stock exchange can be used [10].

3. Research assumptions

The research assumptions are:

There is not a significant difference between the average of stocks return of companies before and after privatization.

There is not a significant difference between the average of stocks return of private companies and control group statistically.

4. Research method

The following model was used to calculate stocks return rate.

$$R_{it} = \frac{(P_{it} - P_{it-1}) + D_{it}}{P_{it-1}} \times 100 \qquad (1)$$

in which,

R_{it} : stocks return rate of company i in period t

P_{it} : price of stock of company i at the end of period t

P_{it-1} : price of stock of company i at the start of period t

D_{it} : cash profit of each stock and its non-cash benefits for company i in period t

Since stocks return is calculated annually, we take the difference of stock price at the start and the end of year as the difference of this rate. If this difference is positive, total return rate is the increment factor; if negative, total return rate is the decrement factor.

5. Research variables

Data include information about stocks return of privatized companies and control group during 1991-2005. In order to do suitable statistical analyses to test the assumptions, the data is divided into five 3-years groups: return before privatization, and returns for the first, second, third, and fourth 3-years after privatization. Since stocks return of privatized companies is studied, thus the return average comparison method for this variable or independence of samples in a statistical society must be used.

6. Statistical society and sample

In this research, the observations are for stocks return of privatized companies and control group. Since the goal of this research is evaluation of the difference of

exchange, then the companies with more than 50% of evolved stocks in 1994 were selected. By this criterion, 77 out of 218 evolved companies for 1991-1994 were selected. However, only 23 companies were active up to 2005, which were selected. Also,

the statistical sample also includes 25 control group companies that were belonged to government up to the end of 2005.

7. Data analysis and assumptions test

For the first assumption, namely "There is not a significant difference between the average of stocks return of companies before and after privatization", at first descriptive statistical indices for stocks return rates were calculated (table 1). The averages of stocks return before privatization, and returns for the first, second, third, and fourth 3-years after privatization were studied. As you see, the average of stocks return before privatization is 18.602, for the first 3-years after privatization is 94.444; for the second 3-years is 21.432; for the third 3-years is 34.188; and for the fourth 3-years is 31.334.

Therefore, it seems that the averages of stocks return during these five periods are different. In fact, the average of stocks return for the first 3-years has increased by 27.922%; for the second 3-year has decreased by 36.522%; for the third 3-years has increased by 7.2%; and for the fourth 3-years has decreased by 2.24%. Statistical tests should be used to become confidence about these results and extending them to the statistical society.

Table 1: Statistical indices for stocks return rates of devolved companies

Variable	Numbers	Average	Av. %	Median	Variance	S.D.	S.E.
Before privatization	99	18.602	9.3%	0.000	1699.017	41.2191	4.1427
First 3-years after privatization	99	94.444	47.222%	52.000	1913.206	138.3228	13.902
Second 3-years after privatization	97	21.432	10.17%	4.405	2897.561	53.8290	5.3829
Third 3-years after privatization	96	34.188	17.9%	16.885	4176.604	64.6267	5.7122
Fourth 3-years after privatization	95	31.334	15.66%	14.575	35498.941	188.4116	24.3238

Source: Calculations of researcher

The second assumption was "There is not a significant difference between the average of stocks return of private companies and control group statistically".

In this section, at first, statistical indices for stocks return rates were calculated. These indices (table 3). In this table, the averages of stocks return rates for privatized companies are compared with the averages of stocks return rates for control group.

Table 2: Distribution of statistical indices for stocks return rates of private and control companies

Variable	Numbers	Average	Median	Variance	S.D.	S.E.	Rank average
Return of private companies	486	40.825	11.000	11057.497	105.1546	4.7699	359.93
Return of control group	218	28.810	8.835	9284.676	96.3870	6.5261	335.94

Source: Calculations of researcher

As you see, the average of stocks return for private companies is 40.825, while this for control group in a 5-year period is 28.810.

7.1. Test of assumption by inferential method

Generally, parametric and non-parametric tests can be used to test the assumptions. However, for parametric tests, the variables should have a normal distribution, otherwise, non-parametric test

should be used. Independence of two samples tests in the form of Kolmogorov-Smirnov, Mann-Whitney, and Kruskal-Wallis tests are used to evaluate performance of periods before and after devolution. Also, Kolmogorov-Smirnov, and Mann-Whitney test are used to compare stocks return of privatized companies (Khorasanizadeh, 1996).

Table 3: Comparison of normalization of distribution of stocks return data for private companies by Kolmogorov-Smirnov and Mann-Whitney tests

Variable	K-S-Z	P
3-years return before privatization	2.225	0.001
First 3-years return after privatization	2.09	0.001
Second 3-years return after privatization	1.784	0.003
Third 3-years return after privatization	1.833	0.002
Fourth 3-years return after privatization	2.74	0.001

Source: Calculations of researcher

According to table 3 and Kolmogorov-Smirnov test, 3-years return before privatization, first, second, third, and fourth 3-years returns after privatization are significant at level 0.01. Thus, they have not a normal distribution. Therefore, the assumption is tested by non-parametric tests.

In order to test the first assumption, at first rank averages of stocks return of companies during the periods were calculated.

Table 4: Comparison of rank averages of stocks return before and after privatization

Variable	Rank averaged	Numbers
Before privatization	201.96	99
After privatization	234	387

Source: Calculations of researcher

According to table 4, rank averages of stocks return before privatization is 201.96 and after privatization is 234. Mann-Whitney test was used to find if there is a significant difference between these two values (table 5).

Table 5: Comparison of rank averages of stocks return before and after privatization by Mann-Whitney test

Z	-2.156
P	0.031

Source: Calculations of researcher

The calculated Z is significant (P≤0.05), thus there is significant difference between stocks returns before and after privatization. Stocks return after privatization is more. Therefore, generally, by confidence level of 95% we can say that if companies are privatized, their stocks returns will be increased.

The other question is: "Is there a significant difference between stocks returns of privatized companies during different years?" At first, we calculate rank average of stocks return during the periods.

Table 6: Comparison of rank averages of stocks return during the periods

Period	Rank average	Rank Av. %	Numbers
1	201.96	0.18	99
2	304.56	0.27	99
3	203.19	0.18	97
4	238.14	0.21	96
5	161.82	0.15	95

Source: Calculations of researcher

According to table 6, rank average for 3-years before privatization is 201.96; for the first 3-years after privatization is 304.56 (0.09 increment); for the second 3-years is 203.19 (0.09 decrement); for the third 3-years is 238.14 (0.05 increment); and for the fourth 3-years is 161.82 (0.06 decrement). Apparently, the most increment of stocks return was in the first 3-years after privatization and the least value was for the fourth 3-years after privatization. Therefore, the reason must be found.

Mann-Whitney test was used to find if there is a significant difference between these averages. Since this research is going to study the situation before and after privatization, at first we investigate the situations for 3-years before privatization, and for the first, second, third, and fourth 3-years after privatization by Mann-Whitney test (table 7).

Table 7: Two-by-two comparison of differences in stocks returns during the periods by Mann-Whitney test

Variable	Z	P
Before with first 3-years	-5.86	0.001
Before with second 3-years	-0.055	0.956
Before with third 3-years	-2.12	0.033
Before with fourth 3-years	-2.45	0.014
First with second 3-years	-5.31	0.001
First with third 3-years	-3.80	0.001
First with fourth 3-years	-5.98	0.001
Second with third 3-years	-1.88	0.233
Second with fourth 3-years	-1.95	0.912
Third with fourth 3-years	-2.61	0.001

Source: Calculations of researcher

From table 7 we see:
1. Stocks return rates for 3-years before privatization and first 3-years after privatization have a significant difference by confidence level 0.99. Therefore, regarding to table 6, the averages of ranks for the first 3-years is better than that before privatization.
2. Stocks return rates for 3-years before privatization and second 3-years after

privatization have not a significant difference. Therefore, regarding to table 6, the averages of ranks for 3-years before privatization (201.96) and second 3-years after privatization (203.09) have not a significant difference.

3. Stocks return rates for 3-years before privatization and third 3-years after privatization have a significant difference by confidence level 0.95. Therefore, regarding to table 6, the averages of ranks for the third 3-years is better than that before privatization.

4. Stocks return rates for 3-years before privatization and fourth 3-years after privatization have a significant difference by confidence level 0.95. Therefore, regarding to table 6, the averages of ranks for 3-years before privatization is better than that for the fourth 3-years after privatization.

5. Stocks return rates for the first 3-years and the second 3-years after privatization have a significant difference by confidence level 0.99. Therefore, regarding to table 6, the averages of ranks for the second 3-years is worse than that for the first 3-years after privatization.

6. Stocks return rates for the first 3-years and the third 3-years after privatization have a significant difference by confidence level 0.99. Therefore, regarding to table 6, the averages of ranks for the first 3-years is better than that for the third 3-years after privatization.

7. Stocks return rates for the first 3-years and the fourth 3-years after privatization have a significant difference by confidence level 0.99. Therefore, regarding to table 6, the averages of ranks for the first 3-years is better than that for the fourth 3-years after privatization.

8. Stocks return rates for the second 3-years and the third 3-years after privatization have not a significant difference. Therefore, regarding to table 6, the averages of ranks for the second 3-years (203.19) and the third 3-years after privatization (238.14) have not a significant difference.

9. Stocks return rates for the second 3-years and the fourth 3-years after privatization have not a significant difference. Therefore, regarding to table 6, the averages of ranks for the second 3-years and the fourth 3-years after privatization have not a significant difference.

10. Stocks return rates for the third 3-years and the fourth 3-years after privatization have a significant difference by confidence level 0.99. Therefore, regarding to table 6, the

averages of ranks for the third 3-years is better than that for the fourth 3-years after privatization.

Generally, there is difference between stocks return rates during the periods. H test or Kruskal-Wallis test are used to compare these five periods.

Table 8: Comparison of averages of ranks of stocks returns during the five period by Kruskal-Wallis test

Chi-square	57.398
df	4
Sig.	0.001

Source: Calculations of researcher

Regarding to table 8, there is a significant difference between stocks returns during the periods by confidence level 99%.

Regarding to the calculated rank averages, we can say that the average of stocks return for the first 3-years after privatization is more than that the others. Also, the rank average of stocks return for 3-years before privatization and that for the second and fourth 3-years after privatization are not significantly different. Therefore, we see a significant increment in the average of stocks return for the first 3-years and a significant decrement for the second 3-years. Also, there is a significant increment in the average of stocks return for the third 3-years and a significant decrement for the fourth 3-years. According to table 7, the average of stocks return before privatization, first, second, third, and fourth 3-years after privatization are significant at level 0.01. However, since there is no steady flow and there is a sinus form, we cannot conclude for successfulness of privatization through stocks exchange. According to table 7, the most return was for the first 3-years after privatization and the least return was for the fourth 3-years after privatization. Therefore, by confidence level of 99% we can say that there is a significant difference between stocks returns during the period.

Analyzing the date showed that the first assumption is in level 0.01 for before privatization and for the first 3-years after privatization (significant); for before privatization and for the third and fourth 3-years after privatization is in level 0.05 (significant); and for before privatization and for the second 3-years after privatization is in level 10% (not significant).

According to table 7, since chi-square value is significant (P≤5%), thus the rank averages of stocks return for private and governmental companies are significantly different in long term.

To test the second assumption, since variables should have a normal distribution, we first use

Kolmogorov-Smirnov test. This test shows normality of a distribution.

Table 9: Comparison of normalization of distribution of stocks return data for private companies by Kolmogorov-Smirnov test

Variable	K-S-Z	P
Stocks return	58.512	0.001

Source: Calculations of researcher

According to table 9, K-S-Z statistic is significant by level 99%, thus the distribution is not normal. So we use non-parametric test. Therefore, we calculated rank averages for privatized companies and that for control group.

Table 10: Comparison of rank averages of stocks return for private companies and control group

Variable	Rank averaged	Numbers
Private companies	359.93	486
Control group	335.94	218

Source: Calculations of researcher

To test if there is a significant difference between these groups, we use Z non-parametric test or Mann-Whitney test (table 11).

Table 11: Mann-Whitney test to compare rank averages of stocks return for private companies and control group

Variable	Z	P
Mann-Whitney	-1.449	0.147

Source: Calculations of researcher

Since the calculated Z in not significant ($P \leq 5\%$), therefore, there is not a significant difference between rank averages of stocks return for private companies and control group. Thus, the second assumption is not rejected by confidence level of 99%.

8. Conclusion

There is a significant difference between private companies in the five periods. There is a significant difference between stocks return of private companies before and after privatization. The most increment is for the first 3-years and the most decrement is for the fourth 3-years after privatization. There is not a significant difference between stocks return of private companies and control group. Therefore, we conclude that privatization has not a desirable effect on stocks return of companies. Thus the first assumption is not rejected. The reasons are:

1. Inactive money and capital market: Adjusting money and capital market is one of the most economical activities today. The process of this market and strategies of governments are coordinate all around the world, which one of them is determination of bank tariffs. Unfortunately, this share is neglected in Iran.
2. Technical problems such as high price of stocks: Low price of stocks means a plentiful profit for stockholders, and high price stops devolution process. At the early of devolution program, the prices were very low and at the end, the prices were very high, which this is one of the reason for depression of bourse.
3. Not enough assignment: There is not an efficient force to execute privatization program in Iran. Thus, there is not enough economical studies, and exercise of methods is selected for devolution.
4. Lack of an integrated program: It seems that lack of an integrated program for privatization is one of the unsuccessfulness of this program.
5. Unreal goals: Strategy-makers and planners had an incorrect estimation from the required time for planning of privatization.
6. Problems of capital market: Perhaps the most important reason for unsuccessfulness of privatization program is a non-developed capital market and inefficiency of stock exchange in Iran. Bourse is efficient when it can attract a continuous process of financial sources and offer it to demanders.

**this paper is extracted from thesis of Ms nushin bagheri zamani

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Appendix 1
Table 1: Privatized and devolved companies to the private sector

Row	Company	Date	Row	Company	Date
1	Iran Pump-making	Aug. 1991	18	Pars Products International Co.	Jan. 1968
2	Aluminum Mill	Mar. 1992	19	Neishabur Block Sugar	Oct. 1996
3	Iran Card Board	Sep. 1977	20	Toos Wool-weaving	Apr. 1999
4	Mashad Card Board	Jun. 1993	21	Iran Weld and Oxygen	Aug. 1993
5	Iranbook Wool-weaving	Jul. 1972	22	Osveh Pharmaceutics	Oct. 192
6	Ghohestan Block Sugar	Feb. 1990	23	Hakim Pharmaceutics	Jul. 1991
7	Tehran Wool	Jan. 1993	24	Firuza Co.	Feb. 1995
8	Iran Glass Wool	Nov. 1976	25	Shomal Cement	Feb. 1968
9	Steel Parts Mill	Aug. 1992	26	Pars Battery	Jan. 1976
10	Payam Industrial Factories	Jul. 1994	27	Qazvin Glass	Dec. 1970
11	Amin Pharmaceutics	Sep. 1995	28	Lamiran Co.	Oct. 1977
12	Iran Brake Lining	Sep. 1991	29	Isfahan Tile	Jul. 1989
13	Bamdaru	Jan. 1990	30	Arj Co.	Sep. 1973
14	Iran Form	Feb. 1990	31	Tim Production	Jun. 1993
15	Margarine	Aug. 1991	32	Borujerd Textile	Sep. 1982
16	Pars Minoo	1974	33	Kerman Cement	Oct. 1972
17	Yazd Gerdbaf	1991			

Table 2: Not privatized companies (1991-2005)

Row	Company	Row	Company
1	Sa'di Tile	14	Iran Khodro
2	Azmayesh	15	Charkheshgar
3	Artificial Filaments	16	Jam-e Jahannama
4	Saipa Diesel	17	Iran Radiator
5	Iran Textile Industries	18	Tractor Casting
6	Offset	19	Saipa
7	Iran Automobile Parts	20	Rena Investment Co.
8	Iran Spring	21	Vitana
9	Pars Home Appliances	22	Arak Machine-making
10	Nab Plant Oil	23	Pars Block Sugar
11	Iran Combine	24	Alborz Card Board
12	Tractor Forgery	25	Mellin Industrial Group
13	Iran Aluminum		

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