

CHAPTER 3 – METHODOLOGY OF THE RESEARCH

3.1. Framework and Hypotheses

The principal concept behind the privatization is that the privatized companies' performance should be improved and at the macroeconomic level countries economy would be reinforced by privatization.

To evaluate this concept, many researches have been conducted and the outcomes show different results. Some studies like Bevan, Estrin, & Schaffer (1999) suggest that the privatization has no significant effect on firms' performance and some conclude that privatization affects positively the firms and improve the performance (Megginson & Netter, 2001). By the way, there are also other finding like Djankov & Murrell (2002) and Shirley & Walsh (2000) that prove confidential privatization effect on performance improvement.

The data set which used by different studies varies across different researches and this data variation may cause the incomparability of the outcomes. Moreover, most of them did not examine the change in ownership and board structure.

Theoretically, increasing revenue, spreading out the ownership, improving investment by use of foreigners' resources, reducing the bureaucracy burden of the state over firms and leaving the investment responsibility to private hands are some of the reasons that the government

on the basis of them try to privatize government linked companies (Nellis, 1991).

Most of the researches on privatizing state owned firms are related to the evaluation of performance proxies and financial indicators of privatized companies but, more recent studies evaluate the impact of governance change on efficiency improvement. This effect may be internal or external. Another aspect of studies examines the significance of liberalization economic reforms indicators on performance improvement after privatization.

The objectives of privatization in Iran as mentioned by the government include enhancing economic efficiency, reducing the burden of running non-profitable operations and increasing the firm's ability to perform efficiently. Hence, based on government objective and previous empirical studies, we employ Financial Ratio Analysis (FRA) and Partial Factor Productivity (PFP) methods to examine significant change in performance measures of efficiency, output, profitability, leverage of firms whether increase or decrease.

This expectation about the efficiency improvement of privatized firms is supported by Megginson et al. (1994) and other comprehensive studies like Antoncic & Hisrich (2003) and Boubakri (1998) that support the increase in the profitability indicators consist of return on sales and assets ratios for privatized firms. Thus, based on the purposes of Iran privatization program and literature, the first hypothesis is proposed as follow:

H1.Privatized firm's profitability increases after share issue privatization (SIP).

The fact that previous SOEs cannot rely much on government subsidies after privatization, plus tight competition in Market, push privatized companies to perform more efficiently and employ all their technological, financial and human resources to overcome successfully the market pressures (Kikeri, Nelly, & Shirley, 1992; Boycko et al., 1993). Improvement of firm's efficiency which is the most reason stated by the governments to privatize the SOEs has supported by several studies like D'Souza et al. (2005), Sun & Tong (2003) and D'Souza & Megginson (1999). As a consequence we propose the second hypothesis:

H2. Privatized firm's efficiency increases after share issue privatization (SIP).

Strongly desiring to be more successful than other firms, Higher motivations in compensation program and the financial opportunities in capital market may lead to output increase in privatized companies as suggested by Wei, Varela, D'Souza, and Kabir (2003) in their study on privatization in china, Boubakri et al. (2005) in their research on several developing countries, and La Porta and López de Silanes (1999) which examined the performance of privatized firms in Mexico. By the way, the support of government for those of product and services which are not economically reasonable and are subsidized only for political purpose, do not exist anymore after privatization. This Reduction in the government support may cause a fall in companies' output (Boycko et al., 1993) hence the third hypothesis is:

H3. Privatized firm's output increases after share issue privatization (SIP).

Government linked companies can rely on government supports and state financial assistance when they face any strains or difficulties (Faccio, 2006). Megginson et al. (1994), Bortolotti, et al. (2001) in their studies describe that, after privatization the government guarantees in debt payment will no longer exist and if the previous SOEs encounter financial distress, it is more likelihood to become bankrupted. To prevent from bankruptcy risk companies may change their capital structure any consequently the reduction of leverage level in firms' capital could be expected. Based on above argument we propose the four hypotheses as follow:

H4. Privatized firm's leverage decreases after share issue privatization (SIP).

3.2. Sampling Design and Data Resources

The samples are selected from the companies that are listed in Tehran stock exchange due to availability and reliability of accounting data and financial report. the standard to select the government linked companies are based on the list of GLCs which obtained from Iran privatization Organization bulletin and website² issued in 2001, 2002, 2003 and 2004. From 2001 to 2004, 141 firms are listed in Tehran stock market (TSE) and 54 of them which were banks and financial firms have excluded from the list. Therefore, the sample consist of 62 Non-GLCs and 25 GLCs, which are listed in Tehran Exchange Stock during this time horizon as showed in Appendix A. Hence, for all test of Non-GLCs and GLCs performance comparison we use the full-size sample of 87 companies. The time horizon for test runs from 2000 to 2008.

² <http://www.en.ipo.ir/>

The before IPO accounting data for selected companies collected from their accounting reports bulletin issue by the companies. The after listing market and financial data are mainly retrieved from Financial Database of TSE. The firms' accounting data that were not available in the above resources are complimented from the companies' annual reports. Consumer price index (CPI) and gross domestic product (GDP) annual data are acquired from the Central Bank of the Islamic Republic of Iran and World Bank websites.³ By the way, firms' financial data for one to two year before listing are collected from the Tehran Stock Exchange (TSE) data base and the required complementary information has captured from companies' annual reports and other sources.

3.3. Selections of Measures

Based on this assumption that the private companies run efficiently, we argue that If GLCs relatively perform well in case of efficiency and profitability; their performance proxies should be comparable to those of private firms (Non-GLCs) performance measures. In addition, if the objectives of privatization of GLCs are not related to efficiency enhancement, burden reduction of running non-profitable operations and increase of the firm's ability to perform efficiently, their performance improvement should be insignificant after SIP. Hence, base on this assumption we run our test to evaluate the change in GLCs performance. Basically, at first we test the GLCs'

³ [orgwww.cbi.ir/category](http://www.cbi.ir/category), <http://web.worldbank>.

performance change after SIP and then compare the before and after listing performance indicators of GLCs with those of non-GLCs.⁴

To compare the before and after listing performance change of GLCs, we followed MNR methodology which first used by Megginson, Nash and van Randenborgh (1994). By this approach we compare three-year average of performance measures of selected companies in post-listing period to the three-year average of those in pre-listing period.

Definitely, we examine performance changes by using the profitability, efficiency, output and leverage proxies. Three accounting ratios measured the Profitability: 1. return on equity (ROE): net income divided by total equity, 2. return on sales (ROS): net income divided by total sales, 3. return on assets ratio (ROA): net income divided by total assets; output proxy is Real sale (RS): Nominal total sales adjusted for inflation; The efficiency measures are: 1. total asset turnover ratio (TS/TA): total sales divided by total asset, 2. earning per employees ratio (NI/EmPLY): net income divided by number of employees, 3. Output per employee ratio (RS/EmPLY): real sales divided by number of employees and the leverage ratios are: 1. Debt to equity (TL/TA): total liability divided by total asset 2. Long term debt to equity (LTDE) which is long term debt divided by total equity (see Table 3.1).

⁴ All 25 went through partial share offering. Listing date and the state ownership portion on average are presented in Appendix A Panel A.

Table 3-1: Summary of testable prediction

Variables Table	Predicted Relationship
H(1) Profitability	
Real Net Income (NI) = Net Income ÷ CPI	$NI_A > NI_B$
Return on sales (ROS) = Net income ÷ Total Sales	$ROS_A > ROS_B$
Return on assets (ROA) = Net income ÷ Total assets	$ROA_A > ROA_B$
Return on equity (ROE) = Net income ÷ Total Equity	$ROE_A > ROE_B$
H(2) Efficiency	
Sales efficiency (SALEF) = Real Sales ÷ Employees	$SALEF_A > SALEF_B$
NI efficiency (NI/Emphy) = Net income ÷ Employees	$NI/Emphy_A > NI/Emphy_B$
Asset Turnover (TS/TA) = Total Sales ÷ Total Assets	$TS/TA_A > TS/TA_B$
H(3) Output	
Real sales (RS) = Nominal sales ÷ CPI	$RS_A > RS_B$
H(4) Leverage	
Debt to assets (TD/TA) = Total debt ÷ Total assets	$TD/TA_A > TD/TA_B$
Debt to equity (LTDE) = Long-Term Debt ÷ Equity	$LTDE_A > LTDE_B$
Times Interest (TIE) = EBIT ÷ interest expense	$TIE_A > TIE_B$
Operating Cash Flow/total debt = (OCF ÷ TD)	$OCF/T_A > OCF/T_B$

The hypotheses showed in first column (Hypotheses H(1)–H(4)) of the table. The second column shows definitions of variables. The third column details the predicted changes after privatization based both on theoretical background and the asserted objectives of every privatization program. Consumer price index showed by CPI. The index symbols A stands for after and B stands for before of privatization.

Share issue privatization raises complexity in some of the proxies and many companies in Asian countries involve in this issue and among them Iran is no exception. The Capital rising just before SIP is supported by Sun and Tong (2002, 2003) for Malaysia and China. ROA and ROE are two of those ratios that affected by this primary capital rising during privatization and make pre- and post-listing comparison of GLCs' profitability measures insensible. Therefore, for the GLCs pre-, post-privatization profitability comparison, we drop the ROA and ROE ratios and use only two other profitability proxies: the real net income (NI) and the return on sales.

The total debt to asset ratio (TD/TA) and long term debt to equity ratio (LTDE) which are classical proxies for leverage also affected by the primary

capital rising and encounter underestimating problem while ROE and ROA face with overestimating problem.

The primary capital raisings which happen in initial public offering (IPO) cause an increase in asset and equity of the firms. Hence, a decrease in classical ratios of total debt to total asset and long term debt to equity will be the adverse consequence. These reductions in leverage ratios underestimate the firms' debt after privatization. To reduce this problem, we use another two ratios (TIE and OCF/TD) that are relatively unpopular but used as a proxy for debt measurement. TIE, the interest expense ratio as declared by Gibson (1995), indicates the company's capability to cover its long term liabilities and OCF/TD, the operating cash flow to total debt ratio point out that the company has this ability to pay its total debt by annually generated cash flow. Long term and total debt ratios indicate the leverage reduction when they become lower and show the firm's leverage increase when get higher; on the contrary to these ratios, OCF/TD and TIE show better debt state when get higher. Due to above mentioned reasons TS/TA ratio is dropped too and we use RS to employee and NI to employee ratios as efficiency proxies.

3.4. Data Analysis Techniques

At first, base on company listing year (year 0), we have chosen three years before and three years after IPO as sampling period then we calculated all performance measures for each company in every year as showed in table 4.2; then we computed each variable's mean of before listing and after listing period (before- listing: years -3 to -1 and after-listing: years +1 to +3). Note

that the listing year is excluded due to this reason that, the company listing year includes both private and government ownership states.

We examined the significant change in performance indicators before and after SIP by employing the t-test for mean and Wilcoxon signed-rank test for median changes. The privatization effect may appear with some lag in time. Hence, we extended the post privatization time horizon up to five years to mitigate this problem. Furthermore, this time extension can also improve the robustness of our test.

As we hypothesized, we should have improvement in all firms' performance indicators of profitability, efficiency, output and leverage. The rejection of each hypothesis shows some evidence that the GLCs performed well in those areas before SIP or the effects of privatization on those performance measures were null.

Conversely, if the hypothesis is not rejected, there is some evidence of efficiency improvement in GLCs performance after IPO, but the debate of in what extent this improvement can be contributed to the privatization, is the issue which needs intense scrutiny.

In macroeconomic level there are several systematic factors which may affect the firms' performance and this problem can arise when we use the univariate test as explained by Dewenter and Malatesta (2001). Because, this kind of test can not eliminate the impact of economic factors and privatization effect on firms' performance changes and the change in performance measures may attribute much to those factors rather than privatization.

Hence, we run the following ordinary least square regression addressing above issue:

$$\Delta PP_i = \alpha + \beta_1 \Delta GDPGR_i + \beta_2 GOV_i + \varepsilon_i \quad (1)$$

This method also should be used to examine the changes in firms' performance as an alternative to the mean and median differences test. In equation (1), PP stands for performance measure while ΔPP , the average of three years post-listing minus the average of three years pre-listing of each indicator, show the difference in performance indicator and used as dependent variable. As usual the intercept captures the pre- and post-listing performance proxies' mean difference. Additionally, another two variables (ΔGOV , $\Delta GDPGR$) take into account. $\Delta GDPGR$ stand for change in gross domestic and capture the economic factors effect on performance change and ΔGOV is change in ownership of firms after privatization and control the ownership effect on performance. Again, we hypothesize that the firms' performance increases significantly after SIP. This hypothesis will be proved when both intercept, α , and the coefficient, β , in regression equation show significant different from zero.

The significant positive change after privatization shows only firm's performance improvement, but whether privatized GLCs perform efficiently after privatization or not and also if they were efficient even before SIP? To find an answer to these questions, we also run two another tests, with the same average of market indicators and the comparison of GLCs performance measures with the same average of industry measures. Explicitly, in first step we calculate the market average for all performance proxies corresponding to

pre- and post-listing period of all sample companies for each year then select all firms in the same industry that each GLCs is belong to and then calculate the industry average for all proxies corresponding to the company pre- and post-listing year in all periods. To do the comparison test, we compare pre- and post-listing average of firms' proxies with the average of market and industry indicators. If significant negative difference found between market- (industry-) average and GLCs before listing we conclude that GLCs are already inefficient in pre-listing. Furthermore, if the GLCs perform efficient after privatization, the difference between indicators in post-listing period will be no significant.

We run another test to compare Non-GLCs' and GLCs' performance after IPO. At first we select Non-GLCs Company that mach in listing years with GLCs and then compare the performance proxies. At this step we add another performance measure; market to book ratio (MBR) that is firm's market value to firm's book value, as Tobin's q proxy; then we compare post-listing GLCs performance indicators with those of Non-GLCs. To do this, we run a pooled regression as follow:

$$PP_{i,t} = \alpha + \beta_1 DUM_i + \beta_2 GDPGR_i + \varepsilon_i \quad (2)$$

Where $PP_{i,t}$ stand for the performance measures for firm i in year t , in time horizon of up to 7 which start after listing year to 2008. The dummy variable (DUM) is set to capture the difference in performance. DUM variable value is 1for GLCs proxy and 0 otherwise. If the dummy coefficient is significantly positive the GLCs' performance in period of post-listing

outperform the Non-GLCs'. GDPGR_t variable is the GDP growth for year *t*, which is control variable to eliminate the possible general economic impacts.

Next, we test the stock price return as a performance measure. The under pricing similarity in share issue privatization and private initial public offering is reported in Jones et al. (1999) and Dewenter and Malatesta (1997). To examine the share price performance, In a study across various countries Megginson et al. (2000) and Boardman and Laurin (2000) report positive stock price return in long run for privatized companies. Hence, we compare the GLCs' post-listing stock returns with those periods of Non-GLCs and market stock price return from one to five years. The annual return of stock price is computed by averaging the monthly compound returns and then we run the following equation to calculate the market-adjusted returns:

$$CR_{i(a,b)} = \prod(1 + R_{i,t}) - \prod(1 + MR_{i,t}), a=1 \text{ \& } b=1 \text{ to } 5 \quad (3)$$

Where market proxy that used is (EWMR); CR stands for cumulative return adjusted by market return; R is monthly stock return; MR is the monthly market return; *i* = GLC stocks and *t* is the time period up to five years.

To examine superiority return of privatized GLCs, Barber and Lyon (1997) suggest the method of GLCs' stock price return comparison with a control sample stock return. Hence, in our test we select Non-GLCs as control sample and use following pooled regression to run our test:

$$ER_{i,t} = \alpha_i + \beta_1 DUM_i + \beta_2 SIZE_{i,t} + \beta_3 LEVERAGE_{i,t} + \varepsilon_{i,t}. \quad (4)$$

The excess annual stock price return is showed by $ER_{i,t}$ where i stand for firms and t for year. DUM is the GLC dummy variable as defined before, is used to take the probable GLC and Non-GLC stocks difference. The insignificant difference shows that the GLCs efficiency are as well as Non-GLCs. SIZE = $\ln(TA)$, is used to eliminate probable impact of size as suggested by Fama and French (1992). The explanatory power of debt to equity ratio over stock returns is also documented by Barbee et al. (1996) and Bhandari (1988). Hence, we introduced the debt–equity ratio (LEVERAGE) to control such a one effect.