Fondazione Eni Enrico Mattei

The Performance of State-Owned Enterprises and Newly Privatized Firms: Empirical Evidence from Egypt

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NOTA DI LAVORO 73.2002

SEPTEMBER 2002

PRIV – Privatisation, Regulation, Antitrust

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Summary

Even though it is well documented that privatization leads to an improvement in the performance of state-owned enterprises (SOEs) following divestiture, it is argued that the existing literature suffers from a misspecification measure because it does not consider the performance of control firms of similar pre-privatization situations, i.e. the performance of SOEs.In this study, I use accounting-based performance measures to evaluate the performance of newly privatized Egyptian firms versus the performance of SOEs. I document significant improvements in profitability, efficiency, and dividends, and insignificant decreases in leverage, employment, and risk, whereas capital expenditure and output show insignificant decreases following privatization. Matching sample firms (privatized) to control firms (SOEs), I document that privatized firms do not witness any significant improvement in their performance, which questions the benefits of privatization in Egypt.

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1. Introduction

Privatization has been a major phenomenon over the past few decades, and researchers are still targeting it for both theoretical and empirical work. Given that most socialist and communist economies from every region in the world -Eastern Europe, the ex-Soviet Union, China, Latin America, Africa, and the Middle East- have recently started adopting several economic reform programs, namely privatization, which have helped pave the way for capitalism. The reduction in size of the public sector through privatization has therefore been an important part of such economic reform programs in developing countries and countries in transition.

Numerous empirical studies investigate the economic consequences of privatization on a firm's performance, in particular, their financial and operating performance. Since many previous studies cover the literature extensively, I will limit my review to several comprehensive studies that look at the performance of firms following privatization[1]. In this context, I will start with the Megginson, Nash and Randenborgh (1994) large scale, comprehensive study, which compares the pre- and post-privatization performance of 61 firms in 32 industries that experienced full or partial privatization through public share offerings in 18 developed and developing countries from 1961 to 1990. The results of this study indicate that for most firms in the sample there was a significant increase among newly privatized firms in terms of profitability, efficiency, capital investment spending, output, employment, and dividend payout, while a significant decrease in leverage is documented. Following the same methodology, Boubakri and Cosset (1998) in another comprehensive study, examine the financial and operating performance of 79 privatized

[1] For a complete list of recent works in privatization, see Megginson and Netter (2001).

firms from 21 developing countries during the period from 1980 to 1992. Using both unadjusted and market-adjusted measures, they document significant improvement in profitability, operating efficiency, capital investment spending, output, employment level, and dividends, while a decline in leverage was observed but significant only for unadjusted measures.

D'Souza and Megginson (1999), follow the same methodology again but for a sample of 85 firms from 28 countries (industrialized countries only) that were privatized through public share offerings for the period from 1990 to 1996. Their results confirm, mainly, the last findings for all proxies but not for employment, which shows an insignificant decline. It is clear that empirical findings for large-scale countries have similar results, even though they use different data sets (Megginson et al (1994), Boubakri and Cosset (1998), and D'Souza and Megginson (1999)).

However, the above-mentioned studies, in addition to other related empirical studies focus on comparing pre- and post-privatization performance of former SOEs without considering how such performance could be attributed to the privatization process itself. Boubakri and Cosset (1998) try to take into account that some performance might be related to economy-wide factors; in turn, they use market-adjusted accounting performance measures by deducting the market median accounting performance measures of a given country from the accounting performance measures of a firm that works in the same country. Since the paper does not consider industry performance benchmark nor does it match privatized firms to control firms, this might, perhaps, arise the need for using such methodology to ensure that a firm's financial and operating performances are related to privatization and not to some other factors apart from privatization.

My study tests the performance changes in SOEs following privatization in Egypt. This paper could contribute to the existing literature in two dimensions: (i) Firstly, it looks at another part of the world (the Middle East and North Africa "MENA" region), which seems to have been neglected in the earlier literature, and it targets Egypt to represent the region since it has the most experience (around 10 years) regarding privatization compared with other MENA countries. This paper could be considered as an extension of the work by Omran (2001) who examines the impact of privatization on 69 SOEs, which witness partial and full privatization in Egypt from 1994 until 1998. He concludes that there is a significant improvement in profitability, operating efficiency, capital expenditure, and dividends, and a significant decrease in employment, leverage, and risk, whereas output shows an insignificant decrease following privatization. However, his study does not take into consideration the structural break in the Egyptian economic environment following the economic reform in late 1990. (ii) Secondly, data from Egypt is unique compared with other data sets in previous empirical studies because privatization is underway, so the government still controls more than 50 per cent of its SOEs. In turn, I evaluate the performance of the newly privatized Egyptian firms after analyzing the performance of the SOEs. Given this fact, the analysis is not limited to privatized firms only but is extended to measure the performance changes in SOEs versus privatized firms of the same sizes and industry in order to better understand the performance of privatized firms in light of the performance of SOEs. However, since privatization took place as a response to Egypt's new economic climate (the country adopted a program of economic reform by late 1991), it is important to take into consideration the structural break in the economic environment prior to- and after adopting this program. Comparing pre- versus post-privatization performance

without considering changes in economic policies would generate misleading results. In addition, I need to determine a benchmark against which to measure actual performance of the sample privatized firms. As Barber and Lyon (1996) indicate that matching sample firms to control firms on the basis of a sample firm's industry, size, and past performance will lead to well specified test statistics, I chose 54 SOEs to serve as a control group for privatized firms, based on industry[2], size[3] and past performance. However, I could not consider matching firms based on past performance because of the limitation of the data, but an advantage of using SOEs is that their pre-privatization conditions are identical to privatized firms conditions as both samples were operating under the same polices, regulations, and management. Such a process allows me to evaluate the relationship between privatization and performance by focusing on comparing the performance of SOEs and privatized firms operating under identical economic environment at the same time and of course, in the same market. This Harmonic approach will allow for better understanding of the performance of privatized firms relative to the performance of SOEs. However, to overcome the problem of different past performances between privatized firms and SOEs, I develop some simple equations to adjust the data for such differences to make the

[2] The industry-matched method is based on the fact that all SOEs prior to privatization are grouped in 14 holding companies according to their type of industry. In turn, for each individual privatized firm, a matched SOE is chosen from the same holding company.

[3] As for the size-matched method, to select matching firms for the 54 privatized firms, I measured size as the book value of assets. Each privatized firm is matched to other SOEs with the same industry firstly and then with book value of total assets within 70 % - 130% of privatized firms. According to Barber and Lyon (1996), the 70 % - 130% size filter was selected because it yields test statistics that are well specified. However, over 85 % of firms are matched within the range of 90 % - 115%.

comparison between pre- and post-privatization performance so as not to be misleading. Such analysis allows an examination of the real impact of privatization and shows whether, if any, the performance changes in privatized firms are due to privatization or to the change in economic climate as a whole, which reflects in positive performances of all firms regardless if they are privatized or are still SOEs.

By using 54 privatized firms with a matched number of SOEs, I show that both kinds of firms experience significant improvements after the date of privatization in most operating and financial indicators. Moreover, I consider the specific-firm-history performance and utilize several methods, i.e., normalization, relative performance change, and real privatized firm-performance. For the first two methods, I report that there are no significant differences in performance between privatized firms and SOEs. For the third method, I point out that privatized firms did not witness significant improvement in their performance as shown in the first type of analysis before adjusting the data. These results, however, will question the benefit of privatization and open the door for researchers to reconsider the previous results in the light of the empirical findings of this paper.

In Section 2, the data set employed in this study is introduced. I discuss the methodology and test statistics and then present several models to adjust the accounting performance measures of privatized firms by matching them to control firms in Section 3. Results are presented and discussed in Section 4, while conclusions are given in Section 5.

2. Data Set

The data set for this study was determined by analyzing Egyptian firms that had been privatized by 1998 and had at least 2 years of both pre- and post-privatization data. As seen in Table 1, the total number of privatized firms reached 184 firms in February 2001.

However, excluding some types of privatization, namely: liquidations, asset sales and leases, this left only 111 firms. Since the financial year for SOEs ends on June 30th, firms that were privatized after June 1998 were excluded because they do not have 2 years post-privatization data. At that point, the sample contained 76 firms: 58 firms had been fully privatized and 18 firms partially privatized. Two fully privatized firms witnessed mergers after privatization with other private firms; in turn, it was appropriate to exclude them from the analysis. On the other hand, for each individual privatized firm, a state owned enterprise (SOE) was selected to serve as a control firm. The criteria of selection for such SOEs were based on matching each industry and size to each privatized firm in the sample. This in fact, generated 54 SOEs, as there is a sector that had been totally privatized (Agricultural Development). In addition more than 60% of the mill sector had been privatized, which left us with less firms eligible for use in the matching control group. In turn, the final sample is comprised of 108 firms: 54 privatized firms, in which 37 firms experienced full privatization and 18 firms partial privatization, and the other 54 firms represent the SOEs matching control group.

The Public Sector Information Center was the source of data for firms prior to privatization, as well as for the SOE matching control group. The Egyptian Capital Market Authority provided data for the privatized firms as they are listed on the stock exchange and government regulations require that such firms disclose their annual reports including financial data, of course.

3. Methodology and Empirical Model

The intention of this paper is to test whether privatized firms perform better after privatization. To achieve this goal, my methodology and empirical model consider many

variables to allow for comparison between pre-and post-privatization performances. Since the objective of any privatization program is to increase the ability of firms to achieve their goals, it is expected that privatization will increase profitability, operating efficiency, capital expenditure, and output. Moreover, privatization might affect the level of employment, leverage, and dividend policy. From selected literature, in particular Megginson et al. (1994), Boubakri and Cosset (1998), and D'Souza and Megginson (1999), initial checklists of possible variables, together with hypothesized increases or decreases in key variables, as predicted, are given below:

Profitability

Real net income (NI): (Increase) Net profit after tax is deflated using the appropriate consumer price index (CPI) values taken from the IMF's International Financial Statistics, and then deflated values are normalized to equal 1.00 in year 0 so other year figures are expressed as a fraction of net income of the year of privatization. Sales efficiency, net income efficiency, real capital expenditures, and real sales are computed similarly.

Return on sales (ROS): (Increase) Refers to net profit after tax divided by sales.

Return on assets (ROA): (Increase) Refers to net profit after tax divided by assets.

Return on equity (ROE): (Increase) Refers to net profit after tax divided by equity.

Operating Efficiency

Sales efficiency (SALEFF): (Increase) Refers to sales per employee.

Net income efficiency (NIEFF): (Increase) Refers to net profit after tax per employee.

Capital Expenditure:

Real capital expenditure (CE): (Increase) This variable has been calculated using the normalized method after deflating the data for inflation.

Capital expenditure to sales (CESA): (Increase) Refers to capital expenditure divided by sales.

Capital expenditure to total assets (CETA): (Increase) Refers to capital expenditure divided by total assets.

Output:

Real sales (SAL): (Increase) This variable has been calculated using the normalization method after deflating sales for inflation.

Employment:

Total employment (EMPL): (Decrease/Increase?) Refers to total number of employees.

Leverage:

Total debt to total assets (TDTA): (Decrease) Refers to total debt divided by total assets.

Long-term debt to Equity (LTDE): (Decrease) Refers to long-term debt divided by equity.

Dividends:

Dividends to sales (DIVSAL): (Increase) Refers to cash dividends divided by sales.

Payout ratio (PAYOUT): (Increase) Refers to cash dividends divided by net profit after tax.

Even though, all variables listed above have been examined in the literature, one might be interested in looking at the financial risk of privatized firms. The financial risk would reflect the ability of the firm to meet its financial obligation, i.e., how many times the firm is able to cover its paid interest from its profit before tax and interest. Of course, since greater coverage reduces financial risk, an increase in this ratio is expected following privatization. In sum, the following variable will be considered:

Risk

Inversed time interest earnings (ITEE): (Decrease) Refers to paid interest as a percentage of net profit before tax and interest. Originally, time interest earnings have to be calculated, but for calculation reason I replaced it by inverse time interest earnings[4].

For each individual firm, I calculate the mean performance for each variable prior to and after the date of privatization for each individual privatized firm and its matched SOE as long as I have at least 2 observations window prior to and after privatization date, excluding the year of privatization; in turn, the minimum time interval data for each firm is five years (from at least year –2 to year +2). It should be mentioned that I exclude the year of privatization (year 0) because it includes both the public and private ownership phases of privatized firms. Then I run the T test[5] for the significant changes in means, the Wilcoxon signed-rank test to investigate for significant changes in medians, and lastly I use a proportion test to determine whether the proportion (P) of firms experiencing changes in a given direction is greater than what would be expected by chance, typically testing whether $P = 0.5$.

[4] If the paid interest is zero, this means that the outcome of calculating time-interest earnings would yield infinite. Since the sample size contains many cases where paid interest is zero, it was sensible to consider the inverse ratio in order to avoid losing observations; hence, I calculate it by dividing paid interest by net profit before tax and interest.

[5] Any statistically significant difference between standard deviations of means prior to and after privatization will violate one of the important assumptions underlying the difference in means. In turn, I run a test for variance check, and when I perform the T test it produces results under two assumptions; one if equal variances are assumed and the other if equal variances are not assumed. I, however, chose the result, which is consistent with the previous findings of variances check.

However, to measure the performance of privatized firms in the context of SOEs' performance, adjusting the data to allow for such measurement is very important. The methodological problem is to determine whether the whole changes in privatized firms are attributed to privatization or to other exogenous variables, and if so, how much is attributable to privatization and how much to other factors. In other words, it is of interest to understand what would have been the performance of SOEs following privatization had they not been divested. To answer this question, an approach of matching sample firms to control firms on the basis of a sample firm's industry and size is utilized. In turn, 54 SOEs have been chosen to serve as the control group for privatized firms. However, to overcome the problem of different past performance between privatized firms and SOEs, I specify three methods to measure variables as follows:

1- Normalization:

To test for the significant difference in performance between privatized firms and SOEs, I have to adjust the data to allow for making such comparisons so as not to be misleading. One way to measure the post-privatization performance is to consider the privatization year (year 0) as the base year for each firm and then to calculate its post-privatization performance relative to that year by normalizing every figure of each individual variable to equal 1.00 in year 0, so other years figures are expressed as a fraction of the year of privatization. The benefit of this method is that it makes the post-privatization performance of all firms relative to their performance in the same year (the year 0 or the year of privatization); in turn, the comparison would then reflect the real performance of firms relative to their performance at the year of divestiture. Of course, for the SOEs, I calculate

their real performance by considering that the date of privatization of privatized firms is the base year (year 0) for SOEs, so, other years figures are expressed as a fraction of this year[6]. After completing this process, I employee the T test for the significant difference in means and the Mann-Whitney[7] test for the significant difference in medians.

2-Relative Performance Change:

By looking at the normalization method, one could understand that the assumption underlying this method is to consider the divestiture year as the benchmark to calculate the post-privatization performance. However, it is important to take into consideration the history of each firm's performance by calculating the post-privatization performance relative to the pre-privatization one. Accordingly, I calculate the relative performance change for each firm as follows[8]:

$$RPC = (P_{i,t} - P_{i,t-1}) / P_{i,t-1} \qquad \text{Equation (1)}$$

Where

RPC = Relative Performance Change

$P_{i,t}$ = Mean performance post-privatization period

$P_{i,t-1}$ = Mean performance pre-privatization period

[6] Note that, year 0 for each SOE is determined by looking to the year of privatization of the sample matched privatized firm.

[7] Results reported for Mann-Whitney test are corrected for ties.

[8] The same equation is applied to calculate the relative performance change for SOEs by considering year 0 for each SOE is the year of privatization of the sample matched privatized firm, so we will have mean performance prior to the date of this year and mean performance after the date of the same year.

After calculating the RPC for each variable and each individual firm, I use the same statistical techniques mentioned in the normalization method.

3-Real and Relative Privatized firms' Performance:

Since I have a control matched SOE for each privatized firm (54), I could then calculate the real performance of privatized firms using two methods as follows:

A- The assumption behind the first method is to consider the SOEs' performance when determining the real performance of privatized firms. To do such comparison, I need to add the performance of each benchmark firm to the pre-privatization performance of its matching privatized firm, or to deduct such performance from the post-privatization performance as follows:

Firstly, I compute the expected performance of a given privatized firm and then deduct that from its actual performance, and the difference then added to the pre-privatization performance to get the real post-privatization performance. The expected performance of a given privatized firm is set to be equal to its past performance multiplied by one plus the relative change in benchmark performance:

$$E(P_{i,t}) = P_{i,t-1}[1 + (PS_{i,t} - PS_{i,t-1}) / PS_{i,t-1}] \qquad \text{Equation (2)}$$

Where:

$(PS_{i,t} - PS_{i,t-1})$ = The benchmark performance, i.e., SOEs

and then real post-privatization performance would be:

$$R(P_{i,t}) = [A(P_{i,t}) - E(P_{i,t})] + P_{i,t-1} \qquad \text{Equation (3)}$$

Where:

$R(P_{i,t})$ = Real post-privatization performance.

$A(P_{i,t})$ = Actual post-privatization performance

However, another formula could be applied by considering that the real post-privatization performance should be set to equal the difference in relative change in performance between a given privatized firm and its benchmark SOE plus one multiplied by the pre-privatization performance; as follows:

$$R(P_{i,t}) = P_{i,t-1}\{1 + [(P_{i,t} - P_{i,t-1})/P_{i,t-1} - (PS_{i,t} - PS_{i,t-1})/PS_{i,t-1}]\} \quad \text{Equation (4)}$$

Hence, I could be able to make a comparison between pre- and post-privatization performance after adjusting the data, i.e., taking into consideration the control group performance.

B- On the other hand, I could also consider another way of comparison by looking at the relative performance of privatized firms compared to the performance of SOEs prior to and after privatization. This could be done as follows:

$$PRPRD = (P_{i,t-1} - PS_{i,t-1})/PS_{i,t-1} \quad \text{Equation (5)}$$

Where:

$PRPRD =$ The pre-privatization relative difference between privatized and control firms.

$$POPRD = (P_{i,t} - PS_{i,t})/PS_{i,t} \quad \text{Equation (6)}$$

Where:

$POPRD$ = The post-privatization relative difference between privatized and control firm.

Since I calculate $R(P_{i,t})$ in method (A) or $PRPRD$ and $POPRD$ in method (B), I then able to run the statistical techniques for the significant difference in means and medians using the T test, the Wilcoxon signed-rank test and the proportion test.

5. Empirical Findings and Analysis

In this section, I report the empirical findings of the statistical analysis for the performance changes in variables described in the previous section using the T test, the Wilcoxon signed-rank test, and the proportion test. The analysis considers all 54 privatized firms (Table 2)[9]. I also present the same analysis for control firms (SOEs) to determine whether or not these firms witness any significant change (Table 3). The year 0 of a given control firm (SOE) would be the year of privatization of its sample firm (privatized). To make a comparison analysis of the performance change in sample privatized firms and control SOEs, I run the T test and the Mann-Whitney test to find out whether each group of firms records significant changes in the values of variables compared with the other group. In other words, I report the test results whether the performance change in privatized firms differs from that of SOEs. However, such comparison was performed based on both normalization and relative performance change methods (Table 4). Lastly, for real and relative privatized firms' performance method, I employ the T test, the Wilcoxon signed-rank test, and the proportion test and then present the results in Table. 5.

[9] For some variables, the number of eligible firms is less than (54) because some of the SOEs' variables have negative signs. For instance, if equity of a given firm is negative, the return on equity would be insensible. Consequently, this variable for this firm is discarded; in turn, the matched sample firm has to be excluded as well to allow more accurate comparison between privatized firms and SOEs. The same procedure is applied for other variables that experience the same problem or when the normalized year is negative. However, I run statistical tests for the whole 54 privatized firms and the results are similar for all variables apart from return on equity as this variable is significant at the 5 per cent level. Nevertheless, the author argues that such differences will not affect the final conclusion. Results of all privatized firms are not presented here but available from the author upon request.

Before moving to analyze the empirical results, it should be born in mind given that the test for normality is rejected for most values of variables, this would violate one of the important assumptions underlying the T test, so in such cases, results regarding parametric tests should be treated with caution. Even though I report both parametric and non-parametric results, in the discussion, I will rely mainly on the latter[10].

Insert Tables 2 to 5 near here

A. Profitability Changes

It is well documented theoretically and empirically that transferring the ownership from the public to private sector should lead to an increase in profitability, as private management would show a greater concern for profits compared to government. I measure profitability by several proxies: real net income (NI), return on sales (ROS), return on assets (ROA), and return on equity (ROE)[11]. Results from Table 2 reveal that all profitability ratios, apart from ROE, that witness insignificant improvement following privatization, also increase significantly after divestiture. For instance, the mean (median) NI, ROS, and ROA, increase from 0.73 (0.65), 0.15 (0.09), and 0.07 (0.06) to 1.07 (1.06), 0.18 (0.12), and 0.10 (0.09),

[10] Barber and Lyon, among others (1996) document that non-parametric Wilcoxon test statistics are uniformly more powerful than parametric *t*-statistics.

[11] On one hand, the net income might be affected by tax credits or carry forwards that do not related to the current year's performance, on other hand, governments might try to provide a brighter picture about firms' profits prior to privatization by selling some assets and then report capital gains on income statements that would be reflected in increasing net income, but in an artificial way. Due to theses reasons, it was important to consider calculating the above profitability ratios using profit before tax and extraordinary items to see whether there is a difference in measures. However, results were similar using net profits or profits before tax and extraordinary items. I do not report the statistical results here for the sake of space, but they are available from the author upon request.

respectively. All statistical tests pass the critical values of significance at the 1 per cent and the 5 per cent level for most cases. The increase in the above-mentioned profitability measures is equally significant as low as 67 per cent and as high as 73 per cent of the sample firms. Such findings are consistent with what Megginson et al (1994), Boubakri and Cosset (1998) and D'Souza and Megginson (1999) have documented.

On the other hand, results in Table 3 indicate mixed findings for SOEs in terms of profitability changes. ROA witnesses significant increase in terms of the mean and the median at the 5 and the 1 per cent level, respectively, and this was achieved by 67 per cent of the sample firms. In the meantime, the median of ROS increases significantly at the 10 per cent level from 0.02 to 0.032, while both the mean and the proportion tests were not significant. Additionally, NI and ROE do not show any significant improvement to the extent that ROE decreased insignificantly for the sample firms.

Even though it appears that privatized firms perform better compared with SOEs in terms of Profitability measures, I could not confirm whether such difference in performance is significant or not. For this reason, I adjusted the data to consider the firm-specific performance history using several methods mentioned in the previous section.

I report equality of performance change results for privatized firms and SOEs in Table 4 using the normalization and relative performance change methods. For both methods, it is clear that there is no significant difference in performance between privatized firms and SOEs for all profitability ratios using the parametric T test and the non-parametric Mann-Whitney test at any level. As a check on the robustness of these findings, I further employee two rigorous methods to calculate the real and relative privatized firms' performance and

utilize the parametric T test, the non-parametric Wilcoxon signed-rank test, and the proportion test. Table 5 presents the results for both methods: real and relative performance. As far as the real performance method is concerned, the empirical results indicate that privatized firms do not witness any significant change in all profitability ratios following privatization at any level of significance. Even though such results contradict the empirical findings given in Table 2, they are consistent with the comparison results given in Table 4. In fact, since the results indicate that there is no significant difference in performance change between privatized firms and SOEs, it is expected to find no significant change in the real performance of privatized firms as this method adjusts the data to take into consideration the performance of SOEs. Furthermore, the results of the relative performance of privatized firms to SOEs confirm the above-mentioned findings, as privatized firms do not achieve any significant performance change in all profitability ratios at any level for all tests: parametric, non-parametric, and the proportion test. In contrast, it seems that the performance change in some profitability ratios, such as ROS, witnesses significant decrease as indicated by the Wilcoxon signed-rank test and the proportion test at the 5 per cent level.

Considering these results as a whole, the evidence suggests that it might not be sensible to examine the performance change of privatized firms without considering the performance change in other control firms over the same interval period. It is a very important point to understand whether such significant change in performance of privatized firms is attributed to privatization or to other economic factors. As far as profitability measures are concerned, it is obvious that privatized firms have the same performance change as SOEs, and the significant improvement in performance of these firms could be due to changes in the

economic climate as a whole, which affected both privatized firms and SOEs in a positive way. In turn, one might conclude that if privatized firms were left under government control, the performance change would most likely be the same, and privatization itself would not have added any significant impact on the performance of firms.

B. Changes in Operating Efficiency

Since it is expected that privatization will provide the best allocation of resources, whether, financial, human, or technological, an improvement in operating efficiency is predicted after divestiture. To control for this dimension, I use two ratios: inflation-adjusted sales per employee (SALEFF) and inflation-adjusted net income per employee (NIEFF).

With regard to privatized firms, results in Table 2 show that SALEFF does increase insignificantly according to both the non-parametric signed-rank test and the proportion test, while such increase is significant at the 5 per cent level using the parametric T test. However the mean (median) of NIEFF increases from 0.71 (0.59) for the year 0 level during the pre-privatization period to 1.16 (1.1) for the year 0 level during the post-privatization period, which is significant at the 1 per cent level for all tests, and this improvement is achieved by 73 per cent of sample firms. The results tend to be partially consistent with the literature, as Megginson, et al (1994), Boubakri and Cosset (1998) and D'Souza and Megginson (1999) document significant increases, not only, in NIEFF but also in SALEFF.

As far as SOEs are concerned, results given in Table 3 indicate that both SALEFF and NIEFF increase significantly at different levels and such increase is achieved by 63 per cent of the sample firms for both ratios. Such results might arise two issues: (i) The first is that

SOEs seem to perform equal to or better than privatized firms. (ii) The second point is related to the performance change of privatized firms given the fact that the denominator for the above-mentioned two ratios is the same (number of employees). In turn, since the increase in SALEFF is not significant, while it is highly significant in NIEFF, an interesting point here is that the differences between the performance changes in both ratios would be due to the success of new management in controlling and reducing expenses more than increasing revenues from sales as NIEFF grows more compared with SALEFF.

Extending the analysis to show whether there is any significant difference between the performance change of privatized firms and SOEs, the findings given in Table 4 seem to be consistent with the above results. For both normalization and relative performance change methods, significant differences in performance change have been documented for SALEFF. More precisely, the results suggest that SOEs perform better compared with privatized firms at the 5 per cent level in both parametric and non-parametric tests using the normalization method and at the 10 per cent level for the non-parametric Mann-Whitney test only, using the relative performance change method. However, no significant difference in performance change between the two samples has been documented for NIEFF using both parametric and non-parametric tests.

Again, I examine the real and the relative privatized firms' performance and present the results in Table 5 for both methods. Results show that the ratio of SALEFF decreases significantly at the 1 per cent level in both the T test and the Wilcoxon signed-rank test using real performance method as the mean (median) decreases from 0.93 (0.97) of the year 0 level during the pre-privatization period to 0.58 (0.86) of the year 0 level during the post-privatization period. In the meantime, the same ratio shows a similar decrease using the

relative performance to SOEs method but at the 10 per cent level for both the parametric and non-parametric tests. On the other hand, the results given in Table 5 reveal no significant performance change in NIEFF using both methods at any level of significance. It is clear from the above results that findings from all analysis seem to be consistent with each other's. Since SALEFF ratio does not witness any significant change for privatized firms following privatization, while the statistical tests for the same ratio indicate that there is a significant increase for SOEs, it is not surprising that the statistical findings using real and relative performance methods reflect such fact and indicate a significant decrease in the performance change of privatized firms. Once again, the analysis of operating efficiency tends to be similar with the previous analysis of profitability ratios, as privatization, after adjusting the data, does not show a positive impact upon firms after being privatized.

C. Changes in Capital Expenditure

It is expected that firms after being privatized will increase the level of capital expenditure aiming at growth and expansion. Two reasons might explain such an issue: (i) On one hand, the new management of privatized firms would have greater access to private debt and equity markets. (ii) On the other hand, privatization has always taken place as a part of stabilization and structural adjustment programs, in particular, in developing countries, which means that the economic climate is moving in a positive direction; hence firms will have more incentive to increase capital expenditures to benefit from these factors. I compute investment intensity using three proxies, real capital expenditure (CE), capital expenditure divided by sales (CESA) and capital expenditure divided by total assets (CATA). For privatized firms, I document insignificant changes in all capital expenditure measures -CE, CESA and CETA- using the parametric, non-parametric, and proportion

tests. These surprisingly negative findings seem to contradict the theoretical argument given above as well as previous research studies, which document a significant increase in capital expenditures following privatization.

A significant decrease in all SOE capital expenditure ratios at the 10 and the 5 per cent level using non-parametric and proportion tests is reported in Table 3. It is not unexpected that the government in its method of privatizing SOEs tends to squeeze capital expenditures and in some cases, sells part of their assets in order to reform the financial structure of these firms before going private.

As for the two samples -privatized firms and SOEs- comparison results given in Table 4, employing both parametric and non-parametric tests following normalization methods show insignificant differences in the performance change between privatized firms and SOEs for all capital expenditure measures. However, the non-parametric Mann-Whitney test, following the relative performance change method, documents that privatized firms witness larger significant performance change in all capital expenditure ratios at the 1 per cent level. The difference in results between the two methods could be attributed to the assumption behind the calculation methods as the first one considers the year 0 as the base year, while the latter considers the entire time series history of a firm.

Table 5 highlight the statistical findings for privatized firms which have control-matching SOEs, The results of the Wilcoxon signed-rank test is significant at the 5 per cent level for both CE and CESA and at the 10 per cent level for CATA following real performance method, which means that privatized firms seem to increase their real capital expenditure following privatization. On the other hand, the same test shows that CE is the only

significant variable at the 10 per cent level following the relative performance to SOEs, while other two ratios are not significant at any level.

Even though some mixed results seem to be found, it is clear that the statistical results as a whole would confirm that privatized firms each witness a significant increase in capital expenditure compared with SOEs, but more investigation is required to understand the reason behind the insignificant increase in this variable for privatized firms. In turn, one might be interested in looking at the performance change in the private sector over the same time period interval to determine whether firms in this sector experience the same trend. Hence, one might gain a better understanding of the behavior of privatized firms regarding capital expenditure ratios.

D. Changes in Output

On important objective of privatization is to increase output of former SOEs. I test this proposition by computing the average-inflation adjusted sales level for the period pre-and-post-privatization as a proxy for output. The results show that there is no significant difference in performance changes in output for either privatized firms or SOEs, as all tests fail to pass the critical values at any level. Surprisingly, just 43 per cent of privatized firms exhibit an increase in output and the rest (57 per cent) show a decrease in output, whereas 56 per cent of SOEs show an increase in this variable. Such results, in particular for privatized firms, tend to contrast the expectation of an increase in output following privatization. However, this result seems to be consistent with Boycko, Shleifer and Vishny's (1996) argument, which states that effective privatization will lead to a reduction in output since the government can no longer entice management (through subsides) to maintain inefficiently high output levels. Since I document an insignificant increase in

SALEFF for privatized firms, the insignificant increase in output might be logically understandable. However, for SOEs, previous results indicate a significant increase in SALEFF and an insignificant increase in output, so a remarkable point here is that the significant increase in SALEFF would be entirely due to the reduction in the level of employment rather than to an increase in output. Extending the analysis to compare the performance change of privatized firms and SOEs, insignificant difference is shown using parametric and non-parametric tests for normalization and relative performance change methods. Furthermore, results given in Table 5, which examines the real and the relative performance of privatized firms provides additional support to the previous findings by revealing an insignificant change in real sales for privatized firms for all statistical tests.

E. Changes in Employment

One of the crucial issues in privatization is the effect on the employment level after firms move from government control to the private sector. Before discussing the statistical results of this variable, it is worth mentioning that there is neither a theoretical or empirical consensus with regard to the impact of privatization on the level of employment. On one hand, privatization might lead to an increase in the level of employment since privatized firms will target more growth and expand their investment spending; in turn; they will be able to produce more job openings. On the other hand, it is confirmed that most SOEs tend to be over-staffed for many social reasons; hence, extensive layoffs are expected to take place because of the style of new management, since social aspects will not be considered in favor of business objectives. I test for this variable by computing the average level of employment prior to- and post-privatization period. For privatized firms, I document significant decrease in the level of employment at 1 per cent level for all tests and this is

achieved by 72 per cent of the sample firms. In fact, the figures show that the number of employees decreases from the mean (median) 3337 (2632) employees before privatization to 3136 (2226) after privatization. On the other hand, the decrease in the number of employees in SOEs during the same time period is even more significant (the mean (median) of the number of employees drops from 3470 (2610) employees to 2826 (2152) over the same time period) and all statistical tests exceed the critical value of significance at the 1 per cent level with 87 per cent of the sample firms witnessing such a decrease.

It might be understandable that privatized firms might decrease the level of employment for economic reasons, but for SOEs it is not expected that the government would reduce the number of employees since as it is more concerned about the social aspects versus economics reasons. To confirm whether such a significant decrease in the employment level is identical for both samples, data is adjusted for this purpose and results are given in Table 4. Although not expected, results -using normalization and relative performance change measures- show that there is a significantly larger decline in the number of employees compared with privatized firms. Both the parametric T test and the non-parametric Mann-Whitney test are significant at the 1 per cent level. In addition to that, results given in Table 5 confirm theses findings. After taking into consideration the performance of SOEs, statistical tests indicate that the real performance and the relative performance of privatized firms to SOEs indeed, increase significantly following divestiture at the 1 per cent level, and this is achieved by 87 of the sample firms It is quite interesting and unexpected to find that the level of employment in SOEs drops significantly more compared to privatized firms. This in fact means that if privatized firms did not witness privatization, the employment level would follow the same trend. One explanation behind this is that

privatized firms are able to create more job opportunities compared with SOEs. Additionally, since Egypt's whole economic system is moving towards a market-oriented model, the government is no longer willing to give priority to social concerns by recruiting more people, given that SOEs are already over-staffed. In the meantime, the Egyptian government offers a generous early retirement program to employees, who in turn take advantage of the plan by establishing their own small businesses after retiring early from the government.

F. Changes in Leverage

A firm's capital structure might change significantly in response to moving from the public to private sector. It is argued that after privatization, firms will no longer have the advantage of borrowing funds at a lower rate, but they will have the opportunity to access the equity markets, domestically and internationally (see Bradley, Jarrell, and Kim 1984). In the light of that, debt ratios are expected to decline following privatization. To test for this proposition, I measure changes in leverage by two ratios: total debt to total assets (TDTA) and long term debt to equity (LTDE). For privatized firms, I document a significant decline in TDTA at the 10 per cent level and at the 1 per cent level for LTDE in both the parametric T test and the non-parametric Wilcoxon signed-rank test[12]. The means (medians) of TDTA and LTDE drop from 0.24(0.21) and 0.75 (0.32), respectively, to 0.20 (0.14) and 0.28 (0.17) for both variables respectively. Sixty-one per cent of the sample

[12] The difference between TDTA and LTDE as accounting measures might explain why the latter ratio seems to be more significant than the other. As total assets, in the left hand side of the balance sheet, would be affected by any increase in equity-given other variables constant-dividing total debt by total assets prior to and after increasing equity will yield lower decline compared with dividing part of the debt (long term debt) by equity prior to and after increasing the capital.

firms achieve this change in capital structure, which makes the proportion test significant at the 5 per cent level.

The significant change in leverage ratios is documented as well for SOEs at the 1 per cent level for the Wilcoxon signed-rank test and at the 10 and 1 per cent level using the T test for TDTA and LTDE, respectively. The means (medians) of TDTA and LTDE decline from 0.47 (0.41) and 0.86 (0.41), respectively, to 0.38 (0.20) and 0.40 (0.14) for both variables respectively. Sixty-five and 79 per cent of the sample firms achieve this change in leverage ratios, in terms of TDAT and LTDE, respectively, which makes the proportion test significant at the 5 per cent level for the first ratio and at the 1 per cent level for the latter one.

To understand whether privatized firms and SOEs experience an identical performance, I extend the analysis and present the results in Table 4. It is obvious that there is no significant difference in leverage changes between the two samples as both the parametric T test and the non-parametric Mann-Whitney test fail to pass the critical values of significance at any level, and such findings are valid for normalization and relative performance change methods. Lastly, results given in Table 5, which use adjusted data to consider measuring the real performance of privatized firms and their relative performance to SOEs, reveal that privatized firms witness no significant change in leverage following privatization using the following tests: the parametric T test, the non-parametric Wilcoxon signed-rank test, and the proportion test. Additionally, the analysis indicates that less than 50 per cent of the sample firms were able to achieve a decline in leverage ratios.

The economic argument given above might explain why privatized firms witness significant decline in leverage following privatization (results given in Table 2), but the question here

is how to explain the significant decline in leverage ratios for SOEs. A good point to argue might be that the government would like to prepare its SOEs for sale to investors; hence improving some accounting measures, such as leverage, which would make firms more attractive for investors and would bring higher prices to the government.

G. Changes in Dividends

According to Megginson et al. (1994) there is neither theoretical nor political argument concerning changes in dividends following privatization. However, it is argued that payouts will increase because, unlike the state, private investors generally demand dividends; hence, an increase in dividend payouts is expected following privatization due to a change in ownership structure. I consider total dividend payments divided by sales (DIVSAL) and dividends divided by net income (PAYOUT) to measure the change in dividend policy[13]. Both ratios for privatized firms and SOEs reveal a significant increase after the privatization date at the 5 and the 10 per cent level using the T test, the Wilcoxon signed-rank test, and the proportion test. The means (medians) of DIVSAL and PAYOUT for privatized firms increase from 0.09 (0.06) and 0.50 (0.49) to 0.11 (0.08) and 0.59 (0.65), respectively. Sixty-seven and 70 per cent of the sample firms achieved a significant positive change for DIVSAL and PAYOUT, respectively. On the other hand, the means (medians) of DIVSAL and PAYOUT for SOEs witness the same trend as they increase from 0.07 (0.02) and 0.52 (0.54) to 0.10 (0.04) and 0.66 (0.62), respectively, and this is achieved by 67 per cent of the sample firms for both ratios.

[13] Because some firms do not distribute dividends prior to privatization due to the fact that they do not achieve profits, I exclude these cases from the analysis.

It seems that both privatized firms and SOEs achieve the same identical performance as results given in Table 4, which indicates that there is no significant difference at any level for both normalization and relative performance change methods, and this is valid for all statistical tests. Furthermore, after adjusting the data, it seems that privatized firms do not witness significant change in dividend payouts in all tests performed in Table 5: the T test, the Wilcoxon signed-rank test and the proportion test are not significant at any level. Again, it is hard to find an explanation behind the significant change in dividend payouts for SOEs, unless it is to argue that the government tries to follow market rules and to benefit from the achieved profits by its SOEs before selling these firms to the public.

H. Changes in Risk

The last accounting measure I utilize in this study is related to the financial risk of firms. In fact, such a variable is chosen to reflect the ability of firms to face their financial obligation and it is expected that as firms move from public to private ownership, they would not incur debts unless they knew that they were able to cover their interest and to make some profits while incurring such debts. Given this proposition, a firm's ability to pay interest on incurred debt following privatization is expected to increase. However, for the sake of calculation, I utilize the inversed time interest earnings as a proxy for financial risk, which reflects paid interest as a percentage of net profit before tax and interest, so a decrease is expected in this ratio for firms following privatization. For privatized firms, I document a significant decrease in financial risk at the 10 per cent level using the parametric and non-parametric tests. The mean (median) declines from 0.25 (0.13) prior to privatization to 0.15 (0.07) in the post-privatization period. Such decline is achieved by 63 per cent of the sample firms, which makes the proportion test significant at the 10 per cent level.

As far as SOEs are concerned, a significant decline in risk is also shown at the 5 per cent level utilizing Wilcoxon signed-rank test only, and such decline is achieved by 73 per cent of the sample firms, which leaves the proportion test significant at the 5 per cent level as well.

On the other hand, results given in Table 4 reflect no significant difference in the performance change of financial risk between privatized firms and SOEs utilizing normalization and relative performance change methods at any level using parametric and non-parametric tests. Furthermore, the significant change in privatized firms given in Table 2 no longer exist in Table 5 after adjusting the data for the control firms' performance. The parametric T test, non-parametric Wilcoxon signed-rank test, and the proportion test fail to pass the critical values of significance at any level, and such findings are pervasive across the two utilized methods: real performance of privatized firms and their relative performance to SOEs.

Summary and Conclusion

This study documents the critical performance changes of Egyptian firms, which witnessed full or partial privatization from 1994 to 1998. Due to the fact that Egypt had adopted a program of economic reform by late 1991, it is important to consider the possibility that some of the performance changes of privatized firms might be attributed to economy-wide factors such as a structural break in the economic environment did indeed exist between the pre- and the post-privatization period. To account for such a dramatic change in the Egyptian economy, I do not rely only on unadjusted accounting performance measures, but I extend the study and utilize adjusted account performance measure by matching sample (privatized) firms to control (SOEs) firms of similar pre-privatization situation. The study

covers 108 Egyptian firms; half of them are privatized firms and another half are SOE control firms matched to the sample privatized firms by size and industry. Furthermore, I employ rigorous equations for additional adjustment to the data to capture the pre-privatization differences in performance measures among sample and control firms.

As far as privatized firms are concerned, using unadjusted measures, I document significant increases in profitability, operating efficiency, and dividends. On the other hand, test results indicate significant declines in leverage, employment level, and financial risk, whereas no significant change is observed for accounting performance measures (capital expenditure and output). For the same time period, I find that SOEs show a similar trend in most performance measures to privatized firms. To less extent I document significant increases in profitability, but to greater extent, results show significant increases in operating efficiency ratios. Additionally, a significant increase in dividends is also observed. On the other hand, I document significant decreases in capital expenditure, leverage, level of employment and financial risk, whereas no significant change is shown for output.

Most of my findings for privatized firms seem to be consistent with benchmark studies in terms of changes in profitability, operating efficiency, leverage, and dividends. However, some other results tend to contrast previous empirical findings in terms of level of employment, output, and capital expenditures as I document significant decreases for the first two variables and insignificant changes in the latter, one whereas benchmark studies show significant increases in theses variables or at least insignificant change in the level of employment.

Contrary to previous empirical studies, I extend my analysis in two ways: the first is to compare the performance changes in accounting measures of privatized firms versus SOEs.

The second way is to adjust the performance of privatized firms by matching them to control firms based on industry, size, and past performance. However, for the past performance adjustment, I develop some simple equations to calculate the real performance of privatized firms and their relative performance to control firms.

After adjusting the data to allow for sub-samples comparison, I document no significant difference in performance between privatized firms and SOEs in most accounting performance measures. However some surprising results have been observed: SOEs witness a significantly larger decline in the level of employment compared with privatized firms; in the mean time, they show significantly larger increase in sales efficiency. Apart from some measures of capital expenditures (privatized firms show larger significant increases), results indicate that all other performance measures seem to have the same trend for both the control group (SOEs) and the matching sample (privatized firms), and no significant difference in performance is observed.

Furthermore, as a check on the robustness of the above-mentioned results, I employ another technique to allow for determining the real performance of privatized firms and to calculate their performance relative to their comparison groups' performance. In the first method, real performance of privatized firms is calculated after taking away the performance of SOEs, while the second technique is based on the changes in the privatized firms' performance relative to changes in the benchmark of the SOEs. However, results of using these techniques tend to be similar to the sample comparison's results. The statistical tests indicate clearly that privatized firms do not show any significant improvement in accounting performance measures in terms of profitability, efficiency, leverage, dividends and risk. In contrast, some ratios of these measures witness significant decreases, namely

ROS, SALEFF, and QR. On the other hand, significant increases in capital expenditures and employment levels are documented.

My empirical findings question the role of privatization since the adjusted data reveals that privatized firms show an insignificant change in most accounting performance measures following divestiture, which means that privatization does not really matter in these sample firms. However, such results are very important to make us re-think previous empirical findings in the literature, whereas most of these studies employ unadjusted data. On the other hand, it might be argued that the evidence of this study could be attributed to the fact that the Egyptian government efficiently restructured its SOEs before selling them, and this is why these firms show the same performance trend as privatized firms, and in turn, make the accounting performance measures using adjusted data seem to be insignificant. If this is the case, a longer period of time is needed to show whether such improvement in SOEs would be sustainable and whether they would match the performance of privatized firms before determining the specific impact of privatization on a firm's performance. Nevertheless, with respect to these findings and to the role of privatization in improving the economic situation of privatized firms, at least privatization as a policy will assist in creating the motivation for private and public firms to face future changes in the economic system.

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Table 1
Number of Privatized Firms in Egypt

Year	Majority Privatization (more than 50%)				Partially Privatization (less than 50%)			Yearly Total	
	Anchor Investor	Majority IPO*	ESA	Liquidation	Minority IPO*	Asset Sales	**Leases**	Number	Value**
1990	–	–	–	1	–	–	**-**	**1**	**n.a.**
1991	–	–	–	3	–	–	–	**3**	**n.a.**
1992	–	–	–	1	–	–	–	**1**	**n.a.**
1993	–	–	–	6	–	–	–	**6**	**n.a.**
1994	3	-	7	2	2	–	–	**14**	**664**
1995	1	1	3	2	7	–	–	**14**	**1215**
1996	3	13	–	1	6	1	-	**24**	**2791**
1997	3	14	3	3	2	1	2	**28**	**3396**
1998	2	8	12	6	1	3	-	**32**	**2361**
1999	8	–	5	7	–	2	6	**28**	**2784**
2000	5	1	0	3	0	6	10	**25**	**2476**
Until Feb.2001	1	*0*	*0*	*2*	–	*3*	2	**8**	**n.a.**
Total	**26**	**37**	**30**	**37**	**18**	**16**	**20**	**184**	**15687**

Source: - The Egyptian Ministry of Public Enterprise Sector, Privatization Program Performance from the start to 24-5-1998, Unpublished Report, (Cairo: MPES, 2001).

* Initial Public Offering

**Million of Egyptian pound (Current rate 1 L.E.=0.26 US$)

Table 2
Test for Significance Change in Performance for Privatized Firms

The table shows results for the whole sample. I employ several techniques to test for the significant changes in performance of privatized firms. For the parametric test, the T test is used to test for significant difference between means for the pre- and post-privatization period. I provide the mean values of each variable for the pre- and post-privatization period, the mean change for each variable after versus before privatization, and T statistics with its P-value. The Wilcoxon signed-rank test is employed to test for the significant change in median values. I provide median values of each variable for the pre- and post-privatization period with the median change for each variable after versus before privatization, and Z statistics with its P-value. The proportion test is employed to determine whether the proportion of firms experiencing changes in a given direction is greater than what would be expected by chance. The number of useable firms is provided with the number of firms that witness an increase or decrease after privatization. I also provide the percentage of firms that changed as predicted with Z statistics and its P-value. For all tests, I list the results under the null hypothesis that the mean (median) = 0.0 and the alternative hypothesis is that the mean (median) is greater than 0.0, and this is valid for all variables except for employment, leverage, and inversed time interest earnings where the null hypothesis is that the mean (median) = 0.0, and the alternative hypothesis is that the mean (median) is less than 0.0.

Variables	No. Firms "Increased" (Decreased)	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	T-Statistic for Difference in Mean (P-Value)	Z-Statistic for Difference in Median (P-Value)	Percentage of Firms that Changes as Predicted	Z-Statistic for Significance of Proportion (P-Value)
Profitability								
Real net income (NI)	40	0.727	1.07	0.343	2.55	2.57	0.73	2.69
	"29"	(0.645)	(1.06)	(0.40)	(0.007)	(0.005)		(0.004)
	(11)							
Return on sales (ROS)	54	0.149	0.183	0.034	1.41	1.71	0.67	2.31
	"36"	(0.09)	(0.117)	(0.028)	(0.082)	(0.04)		(0.01)
	(18)							
Return on assets (ROA)	54	0.07	0.10	0.03	3.38	3.13	0.67	2.31
	"36"	(0.06)	(0.092)	(0.025)	(0.0007)	(0.0009)		(0.01)
	(18)							
Return on equity (ROE)	34	0.305	0.33	0.025	0.63	0.60	0.56	0.51
	"19"	(0.303)	(0.317)	(0.031)	(0.27)	(0.25)		(0.30)
	(15)							
Operating Efficiency								
Sales efficiency (SALEFF)	54	0.927	1.06	0.133	1.75	0.66	0.54	0.41
	"29"	(0.97)	(1.01)	(-0.016)	(0.043)	(0.25)		(0.66)
	(25)							
Net income efficiency (NIEFF)	40	0.71	1.16	0.45	3.14	3.00	0.73	2.69
	"29"	(0.59)	(1.1)	(0.505)	(0.0016)	(0.001)		(0.004)
	(11)							
Capital Expenditure								
Real capital expenditure (CE)	36	0.367	3.87	3.50	1.66	-0.38	0.42	0.83
	"15"	(1.06)	(0.86)	(-0.14)	(0.05)	(0.35)		(0.80)
	(21)							
Capital expenditure to sales (CESA)	54	0.01	0.115	0.105	2.29	0.00	0.50	0.00
	"27"	(0.027)	(0.023)	(0.003)	(0.013)	(1.00)		(1.00)
	(27)							

Table 2-*Continued*

Variables	No. Firms "Increased" (Decreased)	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	T-Statistic for Difference in Mean (P-Value)	Z-Statistic for Difference in Median (P-Value)	Percentage of Firms that Changes as Predicted	Z-Statistic for Significance of Proportion (P-Value)
Capital expenditure to total assets (CETA)	54	0.028	0.038	0.01	1.20	0.00	0.50	0.00
	"27"	(0.023)	(0.024)	(0.005)	(0.12)	(1.00)		(1.00)
	(27)							
Output								
Real sales (SAL)	54	0.962	0.94	-0.022	-0.38	-0.67	0.43	0.95
	"23"	(0.998)	(0.95)	(-0.05)	(0.65)	(0.75)		(0.83)
	(31)							
Employment								
Total employment (EMPL)	54	3337	3136	-201	-2.58	3.80	0.76	3.85
	"41"	(2632)	(2226)	(-166)	(0.006)	(0.0001)		(0.0001)
	(12)							
Leverage								
Total debt to total assets (TDTA)	54	0.235	0.195	-0.04	-1.50	1.33	0.61	1.80
	"19"	(0.208)	(0.138)	(-0.03)	(0.07)	(0.09)		(0.036)
	(33)							
Long term debt to Equity (LTDE)	33	0.75	0.276	-0.474	-2.7	2.4	0.61	2.08
	"8"	(0.32)	(0.164)	(-0.13)	(0.005)	(0.008)		(0.02)
	(20)							
Dividends								
Dividends to sales (DIVSAL)	30	0.088	0.114	0.026	1.74	1.67	0.67	1.64
	"20"	(0.06)	(0.078)	(0.042)	(0.046)	(0.048)		(0.05)
	(10)							
Payout ratio (PAYOUT)	30	0.50	0.59	0.09	1.37	1.38	0.70	2.00
	"21"	(0.485)	(0.65)	(0.13)	(0.09)	(0.08)		(0.02)
	(9)							
Risk								
Inversed time interest earnings (ITEE)	35	0.246	0.148	-0.098	-1.33	1.33	0.63	1.54
	"12"	(0.127)	(0.069)	(-0.057)	(0.096)	(0.09)		(0.06)
	(22)							

Table 3
Test for Significance Change in Performance for SOEs

The table shows results for the whole sample. I employ several techniques to test for the significant changes in performance of SOEs following the date of privatization. For the parametric test, the T test is used to test for significant difference between means for the pre- and post-privatization period. I provide the mean values of each variable for the pre- and post-privatization period, the mean change for each variable after versus before the privatization date, and T statistics with its P-value. The Wilcoxon signed-rank test is employed to test for the significant change in median values. I provide median values of each variable for the pre- and post-privatization period with the median change for each variable after versus before privatization, and Z statistics with its P-value. The proportion test is employed to determine whether the proportion of firms experiencing changes in a given direction is greater than what would be expected by chance. The number of useable firms is provided with the number of firms that witness an increase or decrease after the date of privatization. I also provide the percentage of firms that changed as predicted with Z statistics and its P-value. For all tests, I list the results under the null hypothesis that the mean (median) = 0.0 and the alternative hypothesis is that the mean (median) is greater than 0.0, and this is valid for all variables except for employment, leverage, and inversed time interest earnings where the null hypothesis is that the mean (median) = 0.0, and the alternative hypothesis is that the mean (median) is less than 0.0.

Variables	No. Firms "Increased" (Decreased)	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	T-Statistic for Difference in Mean (P-Value)	Z-Statistic for Difference in Median (P-Value)	Percentage of Firms that Changes as Predicted	Z-Statistic for Significance of Proportion (P-Value)
Profitability								
Real net income (NI)	40	-16.6	0.967	17.6	0.94	1.162	0.58	0.79
	"23"	(0.803)	(0.91)	(0.15)	(0.177)	(0.12)		(0.215)
	(17)							
Return on sales (ROS)	54	-0.059	-0.026	0.033	0.61	1.33	0.57	0.95
	"31"	(0.02)	(0.032)	(0.014)	(0.27)	(0.09)		(0.17)
	(23)							
Return on assets (ROA)	54	-0.035	0.0135	0.0485	2.30	2.4	0.67	2.31
	"36"	(0.012)	(0.025)	(0.016)	(0.013)	(0.008)		(0.01)
	(18)							
Return on equity (ROE)	34	0.226	0.058	-0.168	-1.27	-0.51	0.44	0.51
	"15"	(0.141)	(0.154)	(-0.006)	(0.89)	(0.70)		(0.70)
	(19)							
Operating Efficiency								
Sales efficiency (SALEFF)	54	1.02	1.40	0.38	2.11	2.83	0.63	1.77
	"34"	(0.98)	(1.11)	(0.108)	(0.02)	(0.002)		(0.038)
	(20)							
Net income efficiency (NIEFF)	40	-16	0.249	16.25	0.856	1.59	0.63	1.42
	"25"	(0.80)	(1.05)	(0.51)	(0.20)	(0.056)		(0.077)
	(15)							
Capital Expenditure								
Real capital expenditure (CE)	36	1.22	1.11	-0.11	-0.04	-1.45	0.36	1.5
	"13"	(1.67)	(0.607)	(-0.94)	(0.52)	(0.93)*		(0.93)*
	(23)							
Capital expenditure to sales (CESA)	54	0.013	-0.0007	-0.0137	-0.27	-1.31	0.37	1.77
	"20"	(0.018)	(0.005)	(-0.01)	(0.61)	(0.905)*		(0.96)*
	(34)							

Table 3-*Continued*

Variables	No. Firms "Increased" (Decreased)	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	T-Statistic for Difference in Mean (P-Value)	Z-Statistic for Difference in Median (P-Value)	Percentage of Firms that Changes as Predicted	Z-Statistic for Significance of Proportion (P-Value)
Capital expenditure to total assets (CETA)	54	0.014	0.005	-0.009	-1.17	-1.33	0.37	1.77
	"20"	(0.0105)	(0.002)	(-0.007)	(0.88)	(0.91)*		(0.96)*
	(34)							
Output								
Real sales (SAL)	54	1.09	1.12	0.03	0.169	-0.64	0.56	0.68
	"30"	(1.03)	(0.92)	(-0.11)	(0.43)	(0.74)		(0.75)
	(24)							
Employment								
Total employment (EMPL)	54	3470	2826	-644	-7.2	5.97	0.87	5.31
	"47"	(2610)	(2152)	(-458)	(0.0000)	(0.0000)		(0.0000)
	(7)							
Leverage								
Total debt to total assets (TDTA)	54	0.465	0.383	-0.082	-1.665	2.55	0.65	2.04
	"19"	(0.413)	(0.199)	(-0.07)	(0.05)	(0.0001)		(0.021)
	(35)							
Long term debt to Equity (LTDE)	33	0.86	0.40	-0.46	-3.18	3.72	0.79	3.83
	"4"	(0.406)	(0.135)	(-0.28)	(0.002)	(0.0001)		(0.0001)
	(26)							
Dividends								
Dividends to sales (DIVSAL)	30	0.07	0.096	0.026	1.42	1.50	0.67	1.64
	"20"	(0.023)	(0.043)	(0.01)	(0.083)	(0.067)		(0.05)
	(10)							
Payout ratio (PAYOUT)	30	0.52	0.66	0.14	1.60	1.97	0.67	1.64
	"20"	(0.54)	(0.62)	(0.07)	(0.06)	(0.024)		(0.05)
	(10)							
Risk								
Inversed time interest earnings (ITEE)	35	0.27	0.48	0.21	0.86	1.69	0.73	2.03
	"11"	(0.355)	(0.148)	(-0.08)	(0.80)	(0.045)		(0.02)
	(24)							

* This means that the variable is significant but in another direction, for instance capital investment, capital expenditure to sales, and capital expenditure to assets with P-value (0.93, 0.93, 0.905, 0.96, 0.91 and 0.96) for Wilcoxon test, and proportion test, respectively, these variables decreased significantly after the date of privatization with 0.07, 0.07, 0.095, 0.04, 0.09 and 0.04 level of significance.

Table 4

Comparison of Performance Changes Between Privatized Firms and SOEs (Normalization and Relative Performance Change Methods)

The table shows the result of comparison of performance change between privatized firms and SOEs using the parametric T test and the non-parametric Mann-Whitney test. I consider the privatization year (year 0) as the base year for all firms, and then I normalize every figure of each individual variable to equal 1:00 in year 0, so other years figures are expressed as a fraction of the year of divestment; in turn, this method considers the year of divestment as the base year. However, for the relative performance change method, I consider the history of a firm's performance by calculating post-privatization performance of a given firm relative to its performance prior to the year of privatization. According to that, I calculate the relative performance change for each firm as follows: $RPC = (P_{i,t} - P_{i,t-1}) / P_{i,t-1}$ where RPC = Relative Performance Change, $P_{i,t}$ = Mean performance post-privatization period, $P_{i,t-1}$ = Mean performance pre-privatization period. The T test is employed to compare the means of the two samples, in other words, the test has been constructed to determine whether the difference between two means equals 0.0 versus the alternative hypothesis that the difference does not equal zero. I provide the value of the T test with its P-value to indicate whether there is a statistically significant difference between the means of each sample. The non-parametric Mann-Whitney test compares the medians of each sample by combining the two samples, sorting the date from smallest to the largest, and then comparing the average ranks of the two samples in the combined data. The null hypothesis is that the median of sample one equals the median of sample two versus the alternative hypothesis that the median of sample one does not equal the median of sample two. I provide the average rank for each sample, Z statistics, and the P-value to show whether there is a statistically significant difference between medians of each sample.

Categories	Proxies	No. of Companies		Normalization Method						Relative Performance Change					
				T-Test			Mann-Whitney Test			T-Test			Mann-Whitney Test		
		Normalization Method	Relative Performance Change	Mean		T-Test (P-value)	Median		Av-Rank Z-Test (P-value)	Mean		T-Test (P-value)	Median		Av-Rank Z-Test (P-value)
				Privatized	SOEs		Privatized	SOEs		Privatized	SOEs		Privatized	SOEs	
Profitability	Real net income	39	30	1.00	2.60	1.05 (0.30)	0.98	0.92	40-39 -0.15 (0.99)	0.50	0.56	-0.16 (0.87)	0.27	-0.01	31-30 -0.25 (0.80)
	Return on sales	39	30	1.18	2.29	-0.68 (0.50)	1.09	0.96	42-37 -1.07 (0.28)	0.43	1.64	-0.91 (0.37)	0.09	0.12	30-31 -0.30 (0.77)
	Return on assets	39	30	0.96	2.71	-1.03 (0.31)	0.95	1.04	37-41 -0.76 (0.45)	0.53	0.69	-0.39 (0.70)	0.25	0.15	30-31 -0.074 (0.94)
	Return on equity	32	29	0.78	0.20	0.68 (0.50)	0.81	0.97	30-34 -0.87 (0.38)	0.19	0.42	-0.67 (0.51)	0.10	-0.01	29-30 -0.24 (0.81)
Operating Efficiency	Sales efficiency	54	54	1.06	1.40	-2.08 (0.04)	1.01	1.11	48-61 -2.14 (0.032)	0.41	0.71	-1.03 (0.31)	-0.014	0.11	50-61 -1.73 (0.09)
	Net income efficiency	39	30	1.08	3.42	-1.05 (0.30)	1.11	1.06	38-40 -0.45 (0.66)	0.72	0.94	-0.49 (0.63)	0.31	0.54	29-31 -0.38 (0.70)

Table 4-*Continued*

Categories	Proxies	No. of Companies		Normalization Method						Relative Performance Change					
				T-Test			Mann-Whitney Test			T-Test			Mann-Whitney Test		
		Normalization Method	Relative Performance Change	Mean		T-Test (P-value)	Median		Av-Rank Z-Test (P-value)	Mean		T-Test (P-value)	Median		Av-Rank Z-Test (P-value)
				Privatized	SOEs		Privatized	SOEs		Privatized	SOEs		Privatized	SOEs	
Capital Expenditure	Real capital expenditure	35	36	3.93	1.12	1.24 (0.22)	0.75	0.63	38-33 -0.96 (0.34)	2.67	3.38	-0.18 (0.86)	-0.29	-0.80	43-30 -2.86 (0.008)
	Capital expenditure to sales	35	36	5.63	0.86	1.63 (0.11)	1.19	0.64	38-32 -1.27 (0.20)	3.89	3.42	0.07 (0.94)	-0.17	-0.83	44-29 -3.26 (0.001)
	Capital expenditure to total assets	35	36	3.73	0.97	1.23 (0.23)	0.77	0.63	37-33 -0.79 (0.43)	1.94	3.00	-0.30 (0.77)	-0.20	-0.74	43-30 -2.86 (0.008)
Output	Real sales	54	54	0.94	1.12	-1.35 (0.18)	0.95	0.92	53-56 -0.54 (0.59)	0.13	0.24	-0.59 (0.56)	-0.055	-0.10	56-53 -0.46 (0.65)
Employment	Employment	54	54	0.94	0.84	4.15 (0.00)	0.94	0.87	65-44 -3.58 (0.00)	-0.09	-0.21	3.59 (0.001)	-0.076	-0.16	63-45 -2.94 (0.003)
Leverage	Total debt to total assets	48	49	1.32	1.16	1.32 (0.23)	1.00	0.85	54-43 -1.83 (0.068)	0.07	0.40	-0.71 (0.48)	-0.25	-0.24	50-49 -0.082 (0.94)
	Long term debt to Equity	30	25	0.87	0.78	0.47 (0.64)	0.70	0.71	30-31 -0.037 (0.97)	-0.22	-0.45	0.80 (0.43)	-0.83	-0.69	26-25 -0.34 (0.73)
Dividends	Dividends to sales	33	30	1.06	1.33	-0.99 (0.33)	1.04	1.00	33-34 -0.13 (0.90)	0.77	1.48	-0.96 (0.34)	0.74	0.42	30-31 -0.11 (0.91)
	Payout ratio	33	30	0.97	1.15	-0.84 (0.40)	0.97	1.00	31-35 -0.85 (0.40)	0.31	0.34	-0.12 (0.91)	0.22	0.11	31-29 -0.42 (0.67)
Risk	Inversed time interest earnings	37	30	1.07	0.93	1.02 (0.29)	0.96	0.81	41-34 -1.27 (0.20)	1.36	-0.002	1.57 (0.12)	-0.68	-0.58	30-31 -0.24 (0.81)

Table 5
Significance Change in Performance of Privatized Firms after Adjusting Data for SOE Performance

The table shows results for privatized firms, which have control-matching SOEs. I adjust the data with regard to SOEs performance. For the real performance method, the assumption is that the SOEs' performance should be taken into consideration when looking at the real performance of privatized firms. To compare, I could either add the performance of benchmark firms to the pre-privatization performance, or to deduct such performance from the post-privatization performance as follows: I firstly compute the expected performance of a given privatized firm and then deduct that from its actual performance, and the difference then would be added to the pre-privatization performance to get the real post-privatization performance. The expected performance of a given privatized firm is set to be equal to its past performance multiplied by one plus the relative change in benchmark performance: $E(P_{i,t}) = P_{i,t-1}[1 + (PS_{i,t} - PS_{i,t-1}) / PS_{i,t-1}]$ Where: $(PS_{i,t} - PS_{i,t-1})$ = The benchmark performance, i.e., SOEs and then real post-privatization performance would be: $R(P_{i,t}) = [A(P_{i,t}) - E(P_{i,t})] + P_{i,t-1}$ where: $R(P_{i,t})$ = Real post-privatization performance. $A(P_{i,t})$ = Actual post-privatization performance. However, another formula could be applied by considering that the real post-privatization performance should be set to equal the difference in relative change in performance between a given privatized firm and its control one plus one multiplied by the pre-privatization performance; as follows: $R(P_{i,t}) = P_{i,t-1}\{1 + [(P_{i,t} - P_{i,t-1}) / P_{i,t-1} - (PS_{i,t} - PS_{i,t-1}) / PS_{i,t-1}]\}$. For relative performance to SOEs method, I look at the relative performance of privatized firms compared to SOEs prior to and after privatization. This could be done as follows: $PRPRC = (P_{i,t-1} - PS_{i,t-1}) / PS_{i,t-1}$ where: $PRPRC$ = The pre-privatization relative difference change between privatized and control firm. $POPRC = (P_{i,t} - PS_{i,t}) / PS_{i,t}$ where: $POPRC$ = The post-privatization relative difference change between privatized and control firm. I employ several techniques to test for the significance change in performance of privatized firms. For the parametric test, the T test is used to test for significant difference between means for the pre- and post-privatization period. I provide the mean values of each variable for the pre- and post-privatization period, the mean change for each variable after versus before the privatization date, and T statistics with its P-value. The Wilcoxon signed-rank test is employed to test for the significant change in median values. I provide median values of each variable for the pre- and post-privatization period with the median change for each variable after versus before privatization, and Z statistics with its P-value. The proportion test is employed to determine whether the proportion of firms experiencing changes in a given direction is greater than what would be expected by chance. The number of useable firms is provided with the number of firms that witness an increase or decrease after the date of privatization. I also provide the percentage of firms that changed as predicted with Z statistics and its P-value. For all tests, I list the results under the null hypothesis that the mean (median) = 0.0 and the alternative hypothesis is that the mean (median) is greater than 0.0, and this is valid for all variables except for employment, leverage, and inversed time interest earnings where the null hypothesis is that the mean (median) = 0.0, and the alternative hypothesis is that the mean (median) is less than 0.0.

Table 5-*Continued*

Proxies	No. of Companies "Increased" (Decreased)		Real Performance							Relative Performance to SOEs						
	Real Performance	Relative Performance To SOEs	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Mean Test T-Test (P-value)	Median Test Z-Test (P-value)	Proportion Test % Change	Proportion Test Z-Test (P-value)	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Mean Test T-Test (P-value)	Median Test Z-Test (P-value)	Proportion Test % Change	Proportion Test Z-Test (P-value)
Profitability																
Real net income	32 "15" (17)	28 "11" (17)	0.81 (0.67)	1.25 (0.85)	0.44 (-0.03)	1.14 (0.13)	0.14 (0.44)	0.47	0.18 (0.57)	-0.9 (-0.16)	-.007 (-.20)	-0.083 (-0.08)	0.48 (0.32)	-0.33 (0.63)	0.39	0.94 (0.83)
Return on sales	33 "13" (20)	29 "9" (20)	0.17 (0.14)	0.46 (0.11)	0.29 (-0.02)	1.13 (0.13)	-0.66 (0.75)	0.39	1.04 (0.85)	46.5 (1.28)	38 (0.84)	-8.5 (-0.46)	-1.11 (0.86)	-1.77 (0.96)*	0.31	1.86 (0.97)*
Return on assets	33 "14" (19)	29 "10" (19)	0.08 (0.07)	0.13 (0.08)	0.05 (-0.01)	1.01 (0.16)	-0.23 (0.59)	0.42	0.69 (0.76)	30.5 (1.27)	57.8 (0.81)	27.3 (-0.37)	1.02 (0.16)	-0.97 (0.83)	0.34	1.49 (0.93)*
Return on equity	32 "16" (16)	28 "12" (16)	0.32 (0.31)	1.68 (0.25)	1.36 (-0.003)	1.17 (0.13)	0.00 (1.00)	0.50	0.00 (1.00)	16.50 (1.33)	36 (0.87)	19.5 (-0.31)	1.04 (0.15)	-0.42 (0.66)	0.43	0.57 (0.71)
Operating Efficiency																
Sales efficiency	54 "23" (31)	54 "23" (31)	0.93 (0.97)	0.58 (0.86)	-0.35 (-0.17)	-2.27 (0.99)*	-1.98 (0.98)*	0.43	0.95 (0.83)	0.07 (0.01)	-0.05 (-0.11)	-0.12 (-0.14)	-1.51 (0.93)*	-1.49 (0.93)*	0.43	0.95 (0.83)
Net income efficiency	33 "16" (17)	29 "12" (17)	0.06 (0.04)	0.22 (0.03)	0.16 (-0.003)	1.25 (0.11)	-0.70 (0.24)	0.48	0.00 (0.50)	43 (1.21)	70 (1.26)	27 (-0.17)	1.00 (0.16)	-0.13 (0.55)	0.41	0.74 (0.77)
Capital Expenditure																
Real capital expenditure	29 "17" (12)	23 "12" (11)	0.92 (1.10)	4.62 (1.56)	3.70 (0.53)	1.40 (0.087)	1.86 (0.031)	0.59	0.74 (0.23)	-0.07 (-0.63)	6.60 (0.24)	6.67 (0.11)	1.94 (0.032)	1.54 (0.062)	0.52	0.00 (0.50)
Capital expenditure to sales	36 "22" (14)	26 "13" (13)	0.04 (0.03)	-0.42 (0.07)	-0.46 (0.03)	-0.82 (0.79)	2.13 (0.017)	0.61	1.17 (0.12)	0.80 (0.15)	21.3 (-0.10)	20.5 (-0.01)	1.22 (0.11)	0.00 (1.00)	0.50	0.00 (1.00)
Capital expenditure to total assets	36 "19" (17)	26 "9" (17)	0.03 (0.02)	-0.09 (0.05)	-0.12 (0.01)	-0.75 (0.77)	1.56 (0.06)	0.53	0.17 (0.43)	1.60 (0.40)	20 (-0.26)	18.4 (-0.17)	1.19 (0.12)	-0.03 (0.51)	0.35	1.37 (0.92)*
Output																
Real sales	54 "25" (29)	54 "25" (29)	0.96 (0.99)	0.86 (1.00)	-0.10 (-0.06)	-1.25 (0.89)	-0.70 (0.76)	0.46	0.41 (0.66)	0.04 (-0.02)	0.13 (-0.04)	0.09 (-0.06)	0.90 (0.18)	0.28 (0.39)	0.46	0.41 (0.66)

Table 5-*Continued*

Proxies	No. of Companies "Increased" (Decreased)		Real Performance							Relative Performance to SOEs						
	Real Performance	Relative Performance To SOEs	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Mean Test T-Test (P-value)	Median Test Z-Test (P-value)	Proportion Test % Change	Proportion Test Z-Test (P-value)	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Mean Test T-Test (P-value)	Median Test Z-Test (P-value)	Proportion Test % Change	Proportion Test Z-Test (P-value)
Employment																
Total employment	54 "42" (12)	54 "42" (12)	3337 (2632)	3848 (2814)	511 (165)	3.73 (0.999)*	-4.34 (0.999)*	0.22	3.94 (0.999)*	0.38 (-0.09)	0.81 (-0.06)	0.43 (0.06)	2.63 (0.995)*	-4.10 (0.999)*	0.22	3.94 (0.999)*
Leverage																
Total debt to total assets	54 "26" (24)	49 "23" (24)	0.24 (0.21)	0.18 (0.16)	-0.06 (0.00)	-1.06 (0.18)	0.12 (0.45)	0.44	0.14 (0.56)	0.87 (-0.45)	0.29 (-0.48)	-0.58 (0.00)	-0.99 (0.16)	0.40 (0.35)	0.49	0.00 (1.00)
Long term debt to equity	30 "12" (12)	24 "8" (12)	0.78 (0.28)	0.56 (0.23)	-0.22 (0.00)	-0.96 (0.26)	0.00 (1.00)	0.40	0.00 (1.00)	1.25 (-0.67)	1.55 (-0.77)	0.30 (-0.03)	0.15 (0.56)	0.61 (0.27)	0.33	0.67 (0.25)
Dividends																
Dividends to sales	30 "17" (13)	30 "17" (13)	0.09 (0.06)	0.07 (0.05)	-0.02 (0.006)	-1.02 (0.72)	-0.91 (0.82)	0.57	0.55 (0.29)	2.67 (0.98)	3.46 (0.77)	0.79 (0.05)	0.74 (0.23)	-0.17 (0.57)	0.57	0.55 (0.29)
Payout ratio	30 "15" (15)	30 "15" (15)	0.50 (0.49)	0.44 (0.48)	-0.06 (0.02)	-0.64 (0.74)	0.00 (1.00)	0.50	0.00 (1.00)	0.026 (-0.05)	0.09 (-0.03)	0.065 (-0.02)	0.42 (0.34)	0.00 (1.00)	0.50	0.00 (1.00)
Risk																
Inversed time interest earnings	35 "18" (14)	29 "14" (14)	0.25 (0.13)	0.09 (0.18)	-0.15 (0.001)	-1.05 (0.15)	-0.52 (0.70)	0.51	0.53 (0.70)	0.047 (-0.57)	0.46 (-0.78)	0.41 (0.00)	0.48 (0.68)	0.00 (1.00)	0.50	0.00 (1.00)

* This means the variable is significant but in another direction.

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(xlii) This paper was presented at the International Workshop on "Climate Change and Mediterranean Coastal Systems: Regional Scenarios and Vulnerability Assessment" organised by the Fondazione Eni Enrico Mattei in co-operation with the Istituto Veneto di Scienze, Lettere ed Arti, Venice, December 9-10, 1999.

(xliii)This paper was presented at the International Workshop on "Voluntary Approaches, Competition and Competitiveness" organised by the Fondazione Eni Enrico Mattei within the research activities of the CAVA Network, Milan, May 25-26,2000.

(xliv) This paper was presented at the International Workshop on "Green National Accounting in Europe: Comparison of Methods and Experiences" organised by the Fondazione Eni Enrico Mattei within the Concerted Action of Environmental Valuation in Europe (EVE), Milan, March 4-7, 2000

(xlv) This paper was presented at the International Workshop on "New Ports and Urban and Regional Development. The Dynamics of Sustainability" organised by the Fondazione Eni Enrico Mattei, Venice, May 5-6, 2000.

(xlvi) This paper was presented at the Sixth Meeting of the Coalition Theory Network organised by the Fondazione Eni Enrico Mattei and the CORE, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, January 26-27, 2001

(xlvii) This paper was presented at the RICAMARE Workshop "Socioeconomic Assessments of Climate Change in the Mediterranean: Impact, Adaptation and Mitigation Co-benefits", organised by the Fondazione Eni Enrico Mattei, Milan, February 9-10, 2001

(xlviii) This paper was presented at the International Workshop "Trade and the Environment in the Perspective of the EU Enlargement ", organised by the Fondazione Eni Enrico Mattei, Milan, May 17-18, 2001

(xlix) This paper was presented at the International Conference "Knowledge as an Economic Good", organised by Fondazione Eni Enrico Mattei and The Beijer International Institute of Environmental Economics, Palermo, April 20-21, 2001

(l) This paper was presented at the Workshop "Growth, Environmental Policies and Sustainability" organised by the Fondazione Eni Enrico Mattei, Venice, June 1, 2001

(li) This paper was presented at the Fourth Toulouse Conference on Environment and Resource Economics on "Property Rights, Institutions and Management of Environmental and Natural Resources", organised by Fondazione Eni Enrico Mattei, IDEI and INRA and sponsored by MATE, Toulouse, May 3-4, 2001

(lii) This paper was presented at the International Conference on "Economic Valuation of Environmental Goods", organised by Fondazione Eni Enrico Mattei in cooperation with CORILA, Venice, May 11, 2001

(liii) This paper was circulated at the International Conference on "Climate Policy – Do We Need a New Approach?", jointly organised by Fondazione Eni Enrico Mattei, Stanford University and Venice International University, Isola di San Servolo, Venice, September 6-8, 2001

(liv) This paper was presented at the Seventh Meeting of the Coalition Theory Network organised by the Fondazione Eni Enrico Mattei and the CORE, Université Catholique de Louvain, Venice, Italy, January 11-12, 2002

(lv) This paper was presented at the First Workshop of the Concerted Action on Tradable Emission Permits (CATEP) organised by the Fondazione Eni Enrico Mattei, Venice, Italy, December 3-4, 2001

(lvi) This paper was presented at the ESF EURESCO Conference on Environmental Policy in a Global Economy "The International Dimension of Environmental Policy", organised with the collaboration of the Fondazione Eni Enrico Mattei , Acquafredda di Maratea, October 6-11, 2001

(lvii) This paper was presented at the First Workshop of "CFEWE – Carbon Flows between Eastern and Western Europe", organised by the Fondazione Eni Enrico Mattei and Zentrum fur Europaische Integrationsforschung (ZEI), Milan, July 5-6, 2001

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