

Economic reforms, corporate governance and privatization method as determinants in performance changes of new privatized firms: the case of MENA countries

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Abstract This paper aims to provide the determinants of how privatization works in some selected Middle East North Africa countries. Using a sample of 75 new privatized firms we examine the performance changes in countries namely Egypt, Morocco, Tunisia and Turkey. We document a significant increase in profitability, efficiency and output as well as a decrease in leverage. We also identify that these improvements vary with economic reforms and environment, effectiveness of corporate governance and the privatization method used. In particular, financial liberalization and control relinquishment by the government are associated with higher efficiency and output. Furthermore, foreign participation and the use of share issue privatization as divestment method appear to have a positive impact on efficiency and output changes. Additionally, the use of private sales is related to a significant decrease in leverage. Finally our results highlight the importance of economic reforms, corporate governance and the choice of privatization method in explaining the post privatization changes in performance.

Keywords Corporate governance · Privatization method · Economic reforms · MENA countries · Performance

JEL Classification G32 · G38

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1 Introduction

Privatization of state-owned enterprises (SOEs) has become an important phenomenon in both developed and developing countries. Over the last two decades, SOEs have been privatized at an increasing rate, particularly in developing countries (DCs). Through these privatization programs, the governments want to (1) raise revenue for the state, (2) promote economic efficiency, (3) reduce government interference in the economy, (4) promote wider share ownership, (5) stimulate product market competition, and (6) subject SOEs to capital market discipline (Megginson and Netter 2001).

Several multinational studies have documented a performance improvement of new privatized firms (NPFs) in developed and developing countries. For example, Megginson et al. (1994); Boubakri and Cosset (1998) and D'Souza and Megginson (1999) examined the performance of 204 privatized companies in 41 countries. Overall, these studies have documented significant post-privatization improvements in output, efficiency, profitability, capital investment spending and dividend payouts. They also found evidence of decline of both employment and leverage after privatization. In a recent study, Boubakri et al. (2005) reported that changes in performances of NPFs vary with the extent of macro-economic reforms and environment as well as the effectiveness of corporate governance. However, Boycko et al. (1996), Aussenegg and Jelic (2007) and Megginson (2010) have noted that privatizations in transition economies exhibit more different results than those conducted in other DCs. Indeed, most of these studies have examined the operating performances of privatized firms in some Central European transition economies (particularly in Hungary, Poland and Czech Republic) in the 1990s and found no evidence of a significant improvement in operating performances for the first years following privatization. In contrast to developed and developing countries, privatized firms in some transition countries have experienced no improvement in profitability, capital investments, efficiency and output, a significant drop in employment, as well as a significant increase in leverage.

In our study, we try to extend the literature on DCs to the Middle East and North Africa countries (MENA) which remained unexplored. In fact, few studies focusing specially on the MENA region do not seem to be achieved. Moreover, privatized companies in this region are present in the samples of international studies but usually very fragmentary. Privatization in these countries is usually prescribed by the international donor agencies such as the World Bank or the International Monetary Fund, as a main step in development and structural adjustment programs. This process started in the early 1990s (late 1980s in Turkey) with the divestiture of small entities from the competitive sectors (mostly industry and tourism). Even though privatization process today in the MENA region is far from being complete and it has been progressing more slowly than in other DCs such as in Latin America or Asia. The first wave of privatisations in the 1990s, which focused almost exclusively on profit-making enterprises in the tourism, transport, food and construction material sectors, slowed down towards the early 2000s then rebounded in 2005 as larger utilities were earmarked for sale. In fact, MENA countries suffer from environmental weaknesses in their efforts to privatize, namely embryonic

capital markets, scarce financial resources, a weak private sector and poor prudential regulation (Samy Ben Naceur et al. 2007).

Today, some key strategic infrastructure companies are still earmarked for divestiture in MENA, particularly in transport (e.g. national air carriers in Egypt and Morocco, port container terminals in Morocco, Tunisia, and Egypt) and energy sectors (e.g. oil companies in Egypt, electricity distribution network in Turkey). An assessment of past experiences is therefore useful for governments. Indeed, most empirical studies examining privatisation in developing economies have found that privatisation yields improvements in the operating and financial performances of divested firms. However, few studies have examined the determinants of performance changes and more specifically the impact of the choice of privatization method on these changes. We attempt to fill this gap by analysing the privatization phenomenon in some selected MENA countries.

Thus, based on privatization method choice study over a seventy-five-privatized-firm-sample, we scope to identify the determinants of how does privatization works. Generally speaking, our study aims to offer evidence on how economic reforms, governance changes and the choice of privatization method affect the firm's post-privatization performance. So, in this paper, through a panel of 75 firms privatized in 4 selected MENA countries, we investigate whether or not privatization improves performance in such an unexplored region. Our focus remains on the determinants of performances changes namely economic reforms, governance changes and the choice of privatization method.

The results obtained in our study should, therefore, be of interest to investors, government policy makers as well as international agencies by providing insights on the way privatization works. We examine the determinants of performance changes of NPFs by focusing on the specific environment of DCs and more specifically in the MENA countries. In order to explain how privatization works in such environment, we need to account for (1) the economic reforms such as stock market and trade liberalization policies, (2) corporate governance and institutional environments, as well as (3) the privatization method used. Indeed, all of these factors could affect the outcome of privatization.

The first set of factors is particularly important since it fundamentally distinguishes privatization in DCs from that in developed countries. According to Boubakri and Cosset (1998) and Boubakri et al. (2005), the performances resulting from privatization are impacted by the level of economic development. The second set of factors relates to the importance of a country's business culture reflected in corporate governance and institutional development. La Porta et al. (1997, 1998, 1999, 2000) have shown that these considerations constitute a major difference between developed and developing countries, since governance mechanisms are relatively weaker in the latter. The third and final set of factors is related to the choice of the method used for divestment. Levine (1997), La Porta et al. (1997, 1998), Demirgüç-Kunt and Maksimovic (1998), Bortolotti et al. (2004) and Megginson et al. (2004) have documented the importance of the privatization method on the development of financial markets and its impact on performance changes.

Our findings show that privatization bring significant changes in the financial performances of NPFs. More specifically, we document significant increase in

profitability, efficiency and output as well as a decrease in leverage. We find that economic reforms, corporate governance proxies and the privatization method used help to explain the improvements in post privatization performances. We particularly find higher improvements in efficiency and output for firms privatized after financial liberalization and where the government relinquishes control. Furthermore, foreign participation in ownership structure and the use of share issue privatizations as divestment method are, also, associated with higher efficiency and output. We also find a decrease in leverage for firms privatized through private sales and for firms operating under a reduced government intervention in economy.

Our paper is organized as follows. First, we explore the characteristics of privatization programs in MENA countries. Second, we review the literature with a particular emphasis on the links between economic reforms, corporate governance, method used and privatization. Then, we introduce the data and outline the methodology used. We present thereafter results driven from both univariate and multivariate analysis and we summarize our main findings. Finally, we conduct some additional robustness checks.

2 Privatization in MENA countries

Based on countries experiences around the world, Megginson (2010) recognize three historical privatization waves. The first one, beginning with the election of Margaret Thatcher's Conservative government in 1979, rounded off by 1990–1991. At the beginning of that decade, the recession stopped almost all equity offerings worldwide, whether private or public. Lasting from 1992 until late-2000, the second wave was described as the privatization's Golden Era. That period was characterized by a worldwide governments' commitment to adopt privatization programs, especially in Europe and Latin America. During those 9 years, the proceeds raised by governments through privatization were as important as those raised over the past three decades, or more. Just as stock markets and national economies recovered from the Crash of 2000, a new privatization wave, the third one, took place, lasting from 2002 until the greater Financial Crisis of 2008–2009. This crisis forced governments to rescue failing banks by purchasing large blocks of equity (usually in the form of preferred stock) and brought a virtual halt to privatizations.

The process of privatisation in MENA countries shares several similarities with what has been observed in other regions. The first wave of privatizations, which covered the decade of the 1990s, corresponded to the second waves discussed by Megginson (2010) and focused almost exclusively on profit-making enterprises in the tourism, transport, food and construction material sector. Later, this process slowed down and stalled in 2002, before rebounding from 2003 to reach a peak in 2005. This pattern reflects the difficulties faced by early beginners (Egypt, Morocco and Turkey) in addressing the privatization of the larger companies and the difficulties of the late comers (Algeria and Jordan) to implement their privatization program. After 2003, the process did not only accelerate but started involving divestiture of the largest companies (Telecom Egypt in 2005, Turk Telekom in

2005, Bank of Alexandria in 2006, and Tunisie Télécom in 2006, oil refinery Tupras in Turkey). But some key strategic infrastructure companies are still earmarked for divestiture particularly in transport (e.g. national air carriers in Egypt and Morocco, port container terminals in Morocco, Tunisia, and Egypt) and energy sectors (e.g. oil companies in Egypt, electricity distribution network in Turkey) (Kauffman and Wegner 2007).

The first recorded transaction took place in 1988 in Turkey and consisted of the divestiture of Teletas, the telecom operator for some \$392 million. The annual number of privatizations throughout the region then increased until 1998 when it culminated at just below 100 transactions. After then, the process somehow slowed down and reached a low early 2000 before rebounding and peaking again in 2005. Proceeds followed a similar pattern over the period: increasing slowly between the end of the 1980s until 2000, declining sharply in the early 2000s, but then rebounding significantly towards the end of the period. This sudden increase mainly reflects successful divestitures in the telecom sector in Egypt, Morocco, Tunisia and Turkey, as well as some important operations in the petroleum sector in Turkey (TUPRAS).

Figure 1, suggests that in the MENA region, as elsewhere, countries first put emphasis on divesting the small and medium size enterprises in the competitive sectors (mainly industry and tourism) before turning to the more sensitive sectors of network utilities.

Turkey and Egypt clearly lead the privatization process in the MENA region over 1990–2010 with some 32 and 25 % of the recorded number of transactions, respectively. In terms of revenues, however, Turkey received almost half of the total proceeds over this period, while Morocco, with only 13 % of the transactions, closely follows Egypt with around 16 % of total financial flows. In Egypt, three approaches have been considered: the first was to sell shares through the domestic

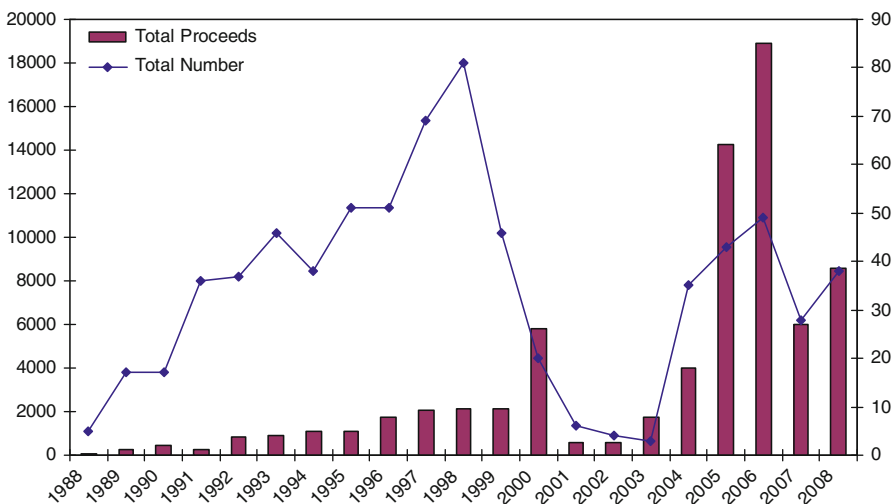


Fig. 1 Annual number of privatisations (right scale) and proceeds (\$million, left scale). Source World Bank privatization database (2010)

stock market as minority and majority initial public offerings (IPOs), the second was to sell strategic stakes of shares to anchor-investors through public auction, and the third was to sell firms to employees' shareholder associations (ESAs).¹ For Morocco, most of transactions took place in industry and services. The transfer phase consists of using a selling method where 77 % of SOEs are sold through invitation to bid, 17 % by direct granting and 6 % by public offering.² In the case of Tunisia, the asset sale is the most widespread privatization method followed by the block sales method. Only 12 companies have been sold through the stock exchange (IPO).³ In Turkey, block sale is the most used technique to privatize SOEs (53 enterprises). Selling shares to foreign investors consists of only 6 transactions over the entire set of privatized firms. Asset sales represent only 25 % of privatized firms.⁴

3 Literature review

3.1 Privatization and economic reforms

Over the last two decades, privatization has become a world-wide economic phenomenon where governments usually adopted the path in order to raise revenue, improve economic efficiency of the NPFs and develop their national stock market. Privatization has been viewed by most of economic actors as an inevitable step of the reforms required for economic development. Indeed, in the initial stages of the economic development, only government can promote investment in infrastructure and a highly capital intensive industries. Once the development process is launched, the government begins to disengage gradually from the economy through the process of privatization.

Privatization in DCs is often accompanied by economic reforms such as trade and stock market liberalization, which influence in turn the outcomes of post-privatization. Many studies, such as Levine (1997), Demirgüç-Kunt and Maksimovic (1998), Henry (2000), Bekaert and Harvey (2000), have shown that economic and financial reforms promote the economic growth of the DCs. For example, Henry (2000) documents that privatization has a positive effect on stocks returns and argues that governments tend to privatize when economic conditions are favourable. Bekaert and Harvey (2000) analyse the impact of stock market liberalization in emerging countries on the cost of equity capital and show that liberalization decreases the cost of capital. Similarly, Dornbusch (1992) focuses on trade liberalization by identifying several channels through which trade reforms could bring benefits, shows that it could bring changes in performances of the NPFs.

H1 Economic reforms spur performance improvements by creating favourable conditions (e.g. stronger competition and higher growth rate).

¹ Egyptian Ministry of Public Enterprise Sector.

² Moroccan Privatization Authority.

³ Ministry of economy, Privatization department.

⁴ Turkish Privatization Authority.

3.2 Privatization and corporate governance

Several studies have shown that corporate governance could explain the changes in performances of NPFs. For example, Shleifer and Vishny (1997) have documented that corporate governance in DCs is generally weak that may affect the performance of privatized firms.

La Porta et al. (1997) have found that countries with a weak protection of investors (measured by both the character of legal rules and the quality of law enforcement) have a small and illiquid capital market. They have also found that countries with French civil law offer less investors protection than countries endowed with common law. These constraints limit the financing opportunities for NPFs that need to invest or restructure and could thus affect the post-privatization performance.

Shleifer and Vishny (1997) have established a relationship between the ownership structure and firm performances. Similarly, La Porta et al. (1999) have found that firms located in countries with a strong investor protection have higher valuation shares. Moreover, La Porta et al. (1998) have shown higher concentration of property in countries with a weak protection of minority shareholders. They also found that NPFs could realise better performances in countries with better legal protection. In the same vein, Boubakri and Cosset (1998) and Boubakri et al. (2005) have shown that in the context of DCs, the higher performance of NPFs are associated with changes in ownership structure especially those regarding foreign investors participation and the decision of government to relinquish control. Indeed, foreign investors generally require high information disclosure standards, provide new funds to NPFs and maintain a strict control on managers.

H2 NPFs realize higher performances improvements as result of better corporate governance environment.

3.3 Privatization and the method used

Brada (1996) have presented three basic methods of privatizing state enterprises. First, SOEs can be divested by distributing vouchers to a nation's citizenry that investors can then use to bid for the companies on offer. Vouchers have been employed in the mass privatization programs of the transition economies of Central and Eastern Europe in the 1990s. The second and third methods of privatizing a company both involve the sale of the company to private investors with cash as payment. In an asset sale (trade sale or private sale), the government sells all of its holdings (or at least a controlling stake) directly to a single buyer. The buyer can either be an operating company or a group of investors. The sales are frequently conducted as auctions and many governments choose to require buyers to meet numerous mandates after the sale, such as preserving employment at existing levels or achieving high service levels.

Once a government has decided to renounce to a mass privatization program and choose to sell state assets for cash (maximising revenue), it must decide on the specific divestment method to use. In effect, this means choosing between a private sale (PS) and share issue privatization (SIP). Generally, this decision is made

separately for each individual asset sale, though some countries (i.e., Mexico) have used trade sales almost exclusively for all privatizations.

Bortolotti et al. (2004) have estimated the determinants of the fraction of privatizations revenues that come from public offerings (SIPs) for privatization in 49 countries. They found that in context of a conservative government suffering from budgetary deficit, we use a privatization through public offerings. However, SIP is less likely in French civil law countries.

Using a sample of 2,477 privatizations in 108 countries over the period 1977–2000, Megginson et al. (2004) have examined why 938 firms are divested using share offerings (in public capital markets, SIP) while 1539 companies are privatized via trade sales (in private market, PS). The authors found that the development of the capital market in the privatizing country is key decision to privatize: SIPs are more likely to occur in countries with less developed capital markets, perhaps to develop the national market's liquidity and absorptive capacity. Moreover, SIPs are more likely to occur when income is more equal throughout the country, providing more potential investors and avoiding the need for extreme under pricing of offerings. Furthermore, Megginson et al. (2004) results support the hypothesis that a country's political and legal environment affects financing decisions. Then, governments with less state control over the economy tend to privatize SOEs via asset sales. Investors are more willing to make the substantial investments required for acquiring SOEs through asset sales when there is a stronger commitment that they will be able to maintain ownership of those assets without undue government intervention. They also noticed that the stronger the legal and political environment in providing protection to minority interests is, the more likely the firm is to be privatized via a SIP.

In addition, Megginson et al. (2004) pointed out that governments are more likely to choose to privatize profitable firms via SIPs, presumably to gain political support for their privatization policies. Indeed, larger offerings and more profitable SOEs are more likely to be privatized through SIPs and the public capital markets.

H3 The choice of privatization method (between SIP and PS) improves the observed change in performances (profitability, operating efficiency, leverage and output).

4 Data and methodology

This section describes the sample of NPFs and outlines the methodology used in our analysis.

4.1 The sample of privatized firms

Our sample comes from Boubakri et al. (2005), the World Bank list of privatized firms between 1990 and 1998 and the Privatization International Database. Using these different sources, we gather data for a sample of 75 firms from four key countries in MENA region namely: Egypt, Morocco, Tunisia and Turkey over the

Table 1 Description of the sample of the new privatized firms in MENA countries

By year			By industry		
Year	Number	Percentage	Activity	Number	Percentage
1989	1	1.33	<i>basic industries</i>	18	24.03
			<i>food/tobacco</i>	17	22.66
1990	3	4	<i>construction</i>	15	20
			<i>textiles/trades</i>	6	8
1991	6	8	<i>finance</i>	6	8
			<i>consumer durable</i>	4	5.33
1992	1	1.33	<i>petroleum</i>	3	4
			<i>transportation</i>	2	2.66
1993	4	5.33	<i>utilities</i>	2	2.66
			<i>capital goods</i>	1	1.33
1994	1	1.33	<i>services</i>	1	1.33
1995	13	17.33	total	75	100
1996	26	34.66	By country		
1997	14	18.66	<i>Egypt</i>	49	65.33
			<i>Turkey</i>	14	18.66
1998	6	8.03	<i>Morocco</i>	7	9.33
			<i>Tunisia</i>	5	6.68
total	75	100	total	75	100

This table provides some descriptive statistics for the sample of 75 privatized firms in our study. We report the distribution of privatizations in MENA countries included in the sample by year, industry and country

period 1989–1998 which corresponds to the first wave of privatization in this region. Actually, privatization does not exist in MENA until the 90's, and during the third wave discussed by Megginson (2010), with a delayed recovery from the 2000's recession, it was rather modest. And since our approach is time-invariant, thus, no reasonable studies could be performed during these two eras.

Our data includes firms privatized using both SIPs and PSs privatization methods. Firms in our sample are distributed across the four mentioned countries as follow: 49 from Egypt, 7 from Morocco, 5 from Tunisia and 14 from Turkey. To assess the post-privatization performance changes, we extract the financial information from the firm's financial statements and annual reports.

In a similar way, Samy Ben Naceur et al. (2007) gather a sample that includes 95 firms in MENA region (55 Egyptian, 6 Moroccan, 13 Tunisian and 21 Turkish) privatized between 1990 and 2000. More generally, Boubakri et al. (2005) have studied 230 firms from DCs that took place between 1980 and 1999.

Table 1 provides the main characteristics of the sample used for this study. We observe a strong concentration of privatization in the period 1995–1997 where 70 % of the privatizations have occurred. Table 1 also shows that the sample is diversified across industries with 24 % in Basic industries, 23 % in the Food industries and 20 % in Construction.

Table 2 Descriptive data on macroeconomic indicators and firm characteristics

	Egypt	Morocco	Tunisia	Turkey
Panel A: Macroeconomic indicators				
Stock market liberalization date	1997	1997	1995	1989
Index of economic freedom, mean 1980–1998	5.12	5.06	5.18	5.16
Governance index, mean 1980–1998	5.28	5.2	5.16	5.5
Stock market turnover, mean 1980–1998	28.78	20.65	1.45	67.08
Panel B: Firms characteristics				
Post-privatization government ownership (%)				
Mean	41	14.24	39.02	30.12
Median	44.19	11.07	45.2	20.21
N	49	7	5	14
Post-privatization foreign ownership (%)				
Mean	5.45	10.1	11.8	4.1
Median	3.21	8.2	5.8	0
N	49	7	5	14

This table shows some summary statistics on macroeconomics variables (Panel A) and post privatization ownership structure for the samples on NPFs (Panel B). In Panel A, Stock market liberalization date: Data are from Bekaert et al. (2001), Index of economic freedom: Data are from Gwartney et al. (2000), Governance index : Data are from Gwartney et al. (2000) and are available from 1980 to 1997, Stock market turnover: Total value of shares traded during the period divided by the average market capitalization for the period. Data are from the World Development Indicators (2001). In Panel B, we present summary statistics on the government and foreign ownership after privatization for our sample

In Table 2 we present summary statistics on macroeconomics variables (Panel A) and post privatization ownership structure for the samples on NPFs (Panel B).

In MENA region, macroeconomic reforms started mainly in the early 1990s with the adoption of International Monetary Fund-supported structural adjustment programs. Turkey was the first to launch its stock market liberalization in 1989, followed by Tunisia in 1995 and Morocco and Egypt in 1997. As an overall measure of economic freedom, we use an index constructed by Gwartney et al. (2000). This index is a range of objective components designed to identify how policies in key economic areas are consistent with economic freedom. We use a governance index constructed by Gwartney et al. (2000) as a measure of legal structure, security of property rights and the enforcements of contracts. Higher levels of the index are conduced to more effective governance. We also include the change of average turnover as a measure of stock market liquidity. Turkey exhibits a very high level of stock market development (the turnover ratio over the period 1980–1998, is 67.08) compared to the other MENA countries. Panel B of Table 2 presents some descriptive statistics on the post-privatization ownership structure for sample of NPFs. Government maintains high proportions in ownership structure after privatization in Egypt and Tunisia than other MENA countries. The mean (median) post-privatization government ownership is 41 % (44.19 %) in Egypt and 39.02 % (45.2 %) in Tunisia. Moreover, foreign ownership is limited in all countries which not exceed 10 %.

4.2 Methodology

As Megginson et al. (1994), Boubakri and Cosset (1998), D'Souza and Megginson (1999) and Boubakri et al. (2005), we use the same operating and financial performance measures and the same methodology. In order to assess the determinants of performance change identified in H1, H2 and H3, we rely on four aspects for firm performance:

Profitability: We measure profitability by the return on sales (net income to sales), return on assets (net income to total assets) and return on equity (net income to equity) ratios.

Efficiency: We measure operating efficiency by sales efficiency (real sales per employee) and net income efficiency (net income per employee) ratios.

Leverage: We measure leverage by total debt to total assets and total debt to total equity ratios.

Output: We measure output by real sales (nominal sales over the price index) ratio.

Indeed, we first compute empirical proxies for each company for a 7 year period: 3 years before through 3 years after and the privatization year. We then compute the mean of each variable for the pre-privatization (years -3 to -1) and post-privatization (years $+1$ to $+3$) periods. The year of privatization is excluded from the analysis because of the existence of both ownerships: Public and private. Then we use the two-tailed Wilcoxon signed-rank test to assess the significance changes in the variables. Besides the Wilcoxon test, we use a proportion test that determines whether the proportion of firms with the anticipated changes is greater than 50 %.

Further, we investigate the performance changes by determining, using non parametric tests, whether the changes in performances vary according to the economic reforms and environment, to corporate governance variables and to the method of privatization used.

4.2.1 Univariate analysis

We analyse the performance changes for our sample by examining whether the privatization outcome vary with the economic reforms and the environment, with the efficiency of corporate governance and with the privatization method used. We divide our full sample into two sub-samples according to every hypothesis and we consider the performance changes between these two sub-samples.

According to economic reforms

1. Firms privatized before financial liberalization versus those privatized after. The dates of liberalization are obtained from Sachs and Warner (1995) and Bekaert et al. (2001).
2. Firms privatized in countries with a high index of economic freedom versus those with a lower index.

The reason of the use of this index built by Gwartney et al. (2000) is that countries with the lower level of economic freedom are characterized by a higher

intervention of the government and a political uncertainty which can bring an economic inefficiency.

According to corporate governance

3. Control versus revenue firms.

Firms privatized by less or equal to 50 % against those of more than 50 % (Megginson et al. 1994).

4. Firms with a foreign participation versus those without.

5. Firms privatized in a strong legal and institutional environment versus that in a weak environment.

We use a “governance index” built by Gwartney et al. (2000) as measure of the legal structure and the protection of property rights as well as the enforcement of laws. A high value of this index indicates more effective governance.

According to the method used

6. Firms privatized by share issue privatization versus privatized with private sale.
7. Firms privatized in a high developed capital market versus less developed capital market.

According to Megginson et al. (2004) SIPs is used in the underdeveloped capital markets in order to develop them.

4.2.2 Multivariate analysis

The results of the univariate analysis offer some insights of the performance changes in NPFs and highlight a bi-variable relation, but it doesn't control for the effect of the other variables. We elaborate a multivariate analysis in which we regress the changes in performance indicators (profitability, efficiency, leverage and output) on several explanatory variables in relation with economic reforms and environment, corporate governance and the method of privatization used. We also control for the size of the firm as well as the potential effect of industry. Table 3 describes all the variables used in the regression analysis.

$$\begin{aligned} \text{Performance changes} = & \alpha_0 + \beta_1(\text{economic reforms and environment variables}) \\ & + \beta_2(\text{corporate governance variables}) \\ & + \beta_3(\text{privatization method used}) \\ & + \beta_4(\text{control variables : size and industry}) + \varepsilon_1 \end{aligned} \quad (1)$$

We use the following independent variables related to economic reforms and environment: the changes in the real GDP growth allows us to control for the impact of economic growth on post-privatization performances of NPFs. The size of the trade sector (the sum of exports and imports over GDP) during the privatization window (−3, −1 vs. +1, +3) is to control the economy's openness to trade. We use also an indicator variable that takes the value of 1 if the privatization occurs after the stock market liberalization date and 0 otherwise.

Table 3 Summary of variables

Variables	Definition
<i>Operating performance</i>	
DROS	Change in return on sales during the privatization window (-3, -1 vs. +1, +3)
DSALESEFF	Change in sales efficiency during the privatization window (-3, -1 vs. +1, +3)
DTDtoTE	Change in total debt to total equity during the privatization window (-3, -1 vs. +1, +3)
DSALES	Change in output during the privatization window (-3, -1 vs. +1, +3)
<i>Economic reforms and environment</i>	
DGDP	Percentage growth in real GDP during the privatization window (-3, -1 vs. +1, +3)
Liber	Indicator variable that takes the value of 1 if the privatization occurs after stock market liberalization date and 0 otherwise
DTrade	Change of the sum of exports and imports over GDP during the privatization window (-3, -1 vs. +1, +3)
Free	The value of the economic freedom index before privatization
<i>Corporate governance</i>	
Control	Indicator variable that takes the value of 1 if the government control the privatized firm and 0 otherwise
Foreign	Dummy variable that takes the value of 1 if foreign investors are involved for the first time in the ownership structure of the privatized firm and 0 otherwise
Governance	Measure of the extent of legal protections and enforcement before privatization that comprises three components: rule of law, risk of confiscation and risk of contract repudiation by the government
<i>Method</i>	
Method	As explained by Eq. 2
<i>Control</i>	
Size	The natural logarithm of total sales
Industry	Indicator variables included for four of the five industries defined in Table 1

Related to corporate governance: *Control* is an indicator variable that takes the value of 1 if the government controls the privatized firm and 0 otherwise. Boycko et al. (1996) suggest that relinquishment control of the state improve performance. *Foreign* is a dummy variable that takes the value of 1 if foreign investors are involved for the first time in the ownership structure. This involvement in NPFs brings better control and management which may have a positive impact on their performance. *Governance* which measures the extent of legal protections and enforcement before privatization that comprises three components: rule of law, risk of confiscation and risk of contract repudiation by the government (data from Gwartney et al. 2000).

Related to the firms and industry characteristics: *Size* is the natural logarithm of total sales and *Industry* is a dummy included for four industries (Basic industries, foods industries, construction and finance).

Meggison et al. (2004) have examined the impact of political, institutional and economic factors on the choice of the method of selling a state owned firms in the public capital market through a share issue privatization (SIP) and selling it in the

Table 4 Summary of variables

Variables	Definition
<i>Choice of the privatization method</i>	
Method	Takes 1 if the firm is privatized by SIPs and 0 for PSs
<i>Market considerations</i>	
Turnover ratio	Measures the development of capital market: value of shares traded/market capitalization
Log GNI per Capita	Measures the average income of the population
<i>Political and legal environment and the protection of investors rights</i>	
Law	Which measures the legal protection and the enforcement of legal rules
<i>Firms specific characteristics</i>	
Log proceeds	The amount of privatization expressed on US\$
ROS _{<i>t</i>-1}	The return on sales of the firm for the year before privatization

private capital market in private sale (PS). They found that this choice is influenced by considerations of capital market; economic, political and institutional factors and specific characteristic of the firms. Using the same methodology, we estimate this choice:

$$\text{Method} = \theta + \delta_1(\text{market considerations}) + \delta_2(\text{environment variables}) + \delta_3(\text{firm characteristics}) + \varepsilon_2 \quad (2)$$

where *Method* is a dependant variable takes 1 if the firm is privatized by SIP and 0 for PS. Table 4 describes all the variables used in the regression analysis. We use three groups of independent variables related to the market considerations: *turnover ratio* which measures the development of the capital market (value of share traded/market capitalization) and *Log GNI per capita* which measures the average income of the population. Related to the political and legal environment and the protection of investors rights, *Law* measures the legal protection and the enforcement of legal rules. Finally, related to the firms specific characteristics: *Log proceeds* from the privatization expressed on US\$ and *ROS_{*t*-1}* return on sales for the year before privatization.

After estimating Eq. (2), we construct a new variable explained by a Logit regression (Eq. 2) to introduce in the first and main equation of our model and we estimate the performance changes of the NPFs Eq. (1).

5 Empirical results

5.1 Univariate analysis

In this section, we discuss the performance changes and examine whether privatization outcomes differ according to economic reforms, corporate governance and the privatization method used.

5.1.1 Performance changes for the sample of NPFs in MENA countries

Table 5 exhibits the performance changes after privatization as measured by profitability, efficiency, leverage and output. Indeed, we measure profitability using three ratios namely: Return on sales ROS, return on assets ROA and return on equity ROE. However, we focus only on ROS as it is based on two measures (net income and sales) that are less sensitive than other ratios to inflation and accounting standards of the various countries. The mean (median) ROS increases significantly (at the 10 % level) from 0.1007 (0.0707) before privatization to 0.127 (0.0952) after privatization. These improvements are achieved by 66 % of the sample firms. These results support that NPFs in MENA countries increase significantly profitability.

Concerning efficiency, we use sales efficiency SALEFF (real sales per employee) and net income efficiency NIEFF (net income per employee). We find that NIEFF shows significant improvements (at the 1 % level) where the mean (median) increases from 0.6528 (0.5721) before privatization to 0.8503 (0.8527) after privatization and 66 % of the observed firms realize such a change. These results show that NPFs improve efficiency (which is presented by governments as a main objective of the privatization program).

Regarding leverage, we use total debt to total assets TDtoTA and total debt to total equity TDtoTE which decline as predicted. Indeed, 60 % of the observed firms realize a decline in mean (median) of 0.2184 (0.0974) in TDtoTE significantly at the 1 % level. These results suggest that the NPFs increase capital expenditure to improve efficiency and output in order to face competition.

Table 5 also reports significant improvements (at the 10 % level) in output which is measured by sales in US \$ for 59 % of the observed firms. The mean (median) increases from 4.5722 (4.6167) before privatization to 4.6718 (4.6946) after privatization.

In sum, our results show that the NPFs realize significant improvements in profitability, efficiency and output as well as a significant decrease in leverage. Using the same methodology, Boubakri et al. (2005) also find significant performance post-privatization improvements of firms in DCs.

5.1.2 Performance changes and economic reforms

Table 6 reports the impact of economic reforms and environment on the performance change of NPFs. Panel A of Table 6 provides the results obtained by comparing the performances of privatized firms before financial liberalization with those after financial liberalization.

We find significant increase of efficiency (at the 1 % level) and output (at the 5 % level) for firms privatized after financial liberalization than those before.

These results show that financial liberalization is associated with the highest improvements in performances of NPFs. Our results are almost consistent with Boubakri et al. (2005) arguments, except for profitability. They stipulate that liberalization brings a better allocation of the resources in firms and facilitate the access to the financing and new technologies.

Table 5 Results for the full sample of the privatized firms in MENA countries

Variables	N	Mean before (median)	Mean after (median)	Mean change (median)	Z-statistic for difference in medians (after-before)	Proportion of firms behaved as predicted (%)	P-value for significance of proportion change
<i>Profitability</i>							
ROS	75	0.1007 (0.0707)	0.127 (0.0952)	0.0263 (0.0245)	-1.855*	66	0.007***
ROA	75	0.0653 (0.0516)	0.793 (0.0773)	0.7277 (0.0257)	-2.05**	59	0.165
ROE	75	0.2407 (0.2197)	0.2436 (0.2265)	0.0029 (0.0068)	-0.1	47	0.644
<i>Efficiency</i>							
Sales efficiency	60	1.0336 (1.004)	0.9708 (0.953)	-0.0628 (-0.051)	-1.616*	39	0.098*
Net income efficiency	59	0.6528 (0.5721)	0.8503 (0.8527)	0.1975 (0.2806)	-2.656***	66	0.02**
<i>Leverage</i>							
TD toTA	73	0.3267 (0.2384)	0.2966 (0.2279)	-0.0301 (-0.0105)	-0.602	59	0.16
TD toTE	69	0.4669 (0.2705)	0.2485 (0.1731)	-0.2184 (-0.0974)	-2.611***	60	0.12
<i>Output</i>							
Sales \$	72	4.5722 (4.6167)	4.6718 (4.6946)	0.0996 (0.0779)	-1.719*	59	0.16

This table presents the univariate results for the complete sample of privatized firms in MENA countries (Egypt, Morocco, Tunisia and Turkey) for the period 1989–1998. For each performance measure, the mean and the median values are computed for windows of (-3, +3) years around the privatization year. Column 5 presents the change in mean and median values after versus before privatization. Column 6 provides the Wilcoxon Z statistic for the difference in medians. The two remaining columns provide the proportion of firms that the performance changed as predicted and the significance test of this change.***, **, * indicate the significance at 1, 5 and 10 % respectively

Table 6 Comparison of performance changes: the role of economic reforms and environment

Measures of operating performance	ROS	NIEFF	TDtoTE	SALES
A. Firms privatized before versus after financial liberalization				
Before financial liberalization				
Mean	0.04	0.0546	-0.2857	0.0818
Median	0.051	0.0616	-0.1581	0.0163
Z-stat Wilcoxon test	-2.4**	-0.434	-3.207***	-1.416
N	38	32	35	37
After financial liberalization				
Mean	0.0113	0.2972	-0.168	0.1187
Median	0.001	0.4097	-0.0612	0.1864
Z-stat Wilcoxon test	-0.344	-2.992***	-0.919	-1.359
N	35	26	32	34
KW statistic for difference between subsamples	7.736***	12.89***	7.788***	8.731**
B. Firms privatized with low versus high index of economic freedom				
High economic freedom				
Mean	0.0205	-0.4553	-0.1605	0.1269
Median	0.002	-0.4906	-0.0225	0.2217
Z-stat Wilcoxon test	-0.628	-1.604*	-1.521	-1.701*
N	12	3	9	12
Low economic freedom				
Mean	0.0276	0.228	-0.1239	-0.0315
Median	0.0273	0.3163	-0.0874	-0.0315
Z-stat Wilcoxon test	-1.692*	-2.527**	-2.342**	-0.663
N	62	56	60	59
KW statistic for difference between subsamples	2.097	13.343***	9.147**	6.352*

This table presents comparisons between the operating performance changes of several partitions of privatized firms based on economic reforms and environment variables. The measures of operating performance are return on sales (ROS), net income efficiency (NIEFF), total debt to total equity (TDtoTE) and real sales (SALES). Panel A compares the performance changes of firms privatized before financial liberalization versus those privatized after financial liberalization. Panel B compares the performance changes of privatized firms in countries with low economic freedom versus those from countries with high economic freedom. For each performance measure, the table provides the change in the mean and median values, the Wilcoxon Z statistic for the difference in medians and the number of observations. It also presents the KW Statistic of Kruskal–Wallis test for the difference between the two subsamples. ***, **, * denote significance levels of 1, 5 and 10 %, respectively

Panel B of Table 6 shows output gains and a leverage decrease significantly higher for firms privatized in countries with a high degree of economic freedom than those with a lower degree.⁵ These results confirm that government intervention reduces the motivations of firms to restructure and to improve their performances.

⁵ Note that the reduced number of observations in Table 4 Panel B is due to the fact that only Tunisia and Morocco (12 NPFs together) show high economic freedom. Unfortunately, for NIEFF we have only 3 observations.

5.1.3 Performance changes and corporate governance

Table 7 examines the impact of corporate governance on the performance changes of NPFs. Panel A of Table 7 compares the performance changes on firms when the government relinquishes the control (less than 50 % of shares) to those when the government maintains the control (more than 50 %). Our results show that firms without government control realize higher gain in efficiency and output and less important decrease in leverage (at the 1 % level) than firms under government control. These results are in line with those of Megginson et al. (1994), Boubakri and Cosset (1998), D'Souza and Megginson (1999) and Boubakri et al. (2005) who found that gains in efficiency are more important for firms in which the government relinquishes control. Also, our results confirm Boycko et al. (1996) arguments which stipulate that the objectives pursued by the SOEs are more consistent with social and economic objectives than profit maximization targets.

Panel B of Table 7 shows that NPFs with foreign investor's participation achieve more significant gains in efficiency and significant decrease in leverage than those without. These results clearly prove the importance of the foreign investor's participation in privatization process in DCs. According to Bekaert and Harvey (2000) and Henry (2000), foreign participation in NPFs is important for three grounds (1) it makes a pressure on management through a tighter monitoring and more information disclosure (2) it provides new capital and managerial know-how to NPFs and (3) it helps emergent markets in their integration in the international markets. We conclude that the role of the ownership structure (private and foreign) is an important mechanism of corporate governance especially when legal protections are weak (Dyck 2000).

Panel C of Table 7 compares the performance changes of the NPFs in a strong legal environment to those in a weak legal environment. Using Gwartney et al. (2000) findings who measure the legal structure, the protection of property rights and the law enforcement, we make our firms partition based on legal environment characteristic. Indeed, we find a significant increase in output (real sales) as well as a decrease in leverage for firms in a strong legal environment higher than those in a weak one.

The results confirm the findings of Ramamurti (2000) and Dyck (2000) who stipulate that the level of country institutional development should contribute to the success of the privatization program.

5.1.4 Performance changes and privatization method used

Table 8 examines the impact of the privatization method used on performance changes of NPFs. Panel A of Table 8 compares the performance changes of the firms privatized by private sales (PSs) to those privatized by share issue privatizations (SIPs).

The results show appreciably the same improvements in profitability between firms privatized by both SIPs and PSs. The mean (median) changes in ROS is about 3 % (5, 7 % for firms privatized by PSs versus 1, 5 % for firms privatized by SIPs). However, firms privatized by SIPs outperform those privatized by PSs in efficiency

Table 7 Comparison of performance changes: the role of corporate governance

Measures of operating performance	ROS	NIEFF	TDtoTE	SALES
A. Control versus revenue privatization				
Control				
Mean	0.0108	0.1576	-0.2756	0.0857
Median	0.0129	0.2679	-0.1543	0.1239
Z-stat Wilcoxon test	-0.519	-1.594*	-3.194***	-1.298
N	42	32	39	41
Revenue				
Mean	0.0543	0.2435	-0.1718	0.0986
Median	0.0407	0.2586	0.0452	-0.0476
Z-stat Wilcoxon test	-2.622***	-2.146*	-1.047	-0.743
N	31	28	29	29
KW statistic for difference between subsamples	3.473	8.557***	15.347***	3.843
B. Firms with versus without foreign ownership				
With foreign ownership				
Mean	0.0334	0.2712	-0.287	0.0349
Median	0.0378	0.3514	-0.2612	0.1299
Z-stat Wilcoxon test	-2.54***	-2.944***	-3.44***	-0.281
N	46	40	45	46
Without foreign ownership				
Mean	0.0146	0.0425	-0.0897	0.2149
Median	-0.01	0.0963	-0.0044	0.0933
Z-stat Wilcoxon test	-0.346	-0.682	-0.156	-2.346**
N	29	20	24	26
KW statistic for difference between subsamples	3.542	10.382**	8.326**	5.664
C. Firms privatized in countries with low versus high legal and institutional environment				
Low environment				
Mean	0.0276	0.2325	-0.1605	-0.0315
Median	0.0273	0.319	-0.0225	-0.0542
Z-stat Wilcoxon test	-1.692	-3.149***	-1.521	-0.663
N	63	56	61	60
High environment				
Mean	0.0204	-0.4553	-0.2239	0.1269
Median	0.002	-0.4906	-0.0874	0.2217
Z-stat Wilcoxon test	-0.628	-1.1604*	-2.342**	-1.701*
N	12	8	9	12
KW statistic for difference between subsamples	2.097	13.343***	9.147**	6.352*

This table presents comparisons between the operating performance changes of several partitions of privatized firms based on corporate governance variables. The measures of operating performance are return on sales (ROS), net income efficiency (NIEFF), total debt to total equity (TDtoTE) and real sales (SALES). Panel A compares the performance changes of control privatization (less than 50 % of the company is privatized) and revenue privatization (more than 50 % of the company is privatized). Panel B compares the performance changes of privatized firms without foreign ownership or with foreign ownership after privatization. Panel C compares the performance changes for privatized firms in countries with low institutional environment versus those with high institutional environment. For each performance measure, it provides the change in mean and median values, the Wilcoxon Z statistic for the difference in medians and the number of observations. It also presents the KW statistic of the Kruskal–Wallis test for the difference between the two subsamples. ***, **, * denote significance levels of 1, 5 and 10 %, respectively

Table 8 Comparison of performance changes: the role of privatization method used

Measures of operating performance	ROS	NIEFF	TDtoTE	SALES
A. Firms privatized by SIP versus PS				
PS				
Mean	0.0294	0.0352	-0.2933	0.0909
Median	0.0576	0.123	-0.0758	0.0565
Z-stat Wilcoxon test	-0.664	-0.135	-0.98	-1.334
N	13	7	11	13
SIP				
Mean	0.0281	0.1582	-0.2006	0.1123
Median	0.0151	0.2487	-0.0989	0.1771
Z-stat Wilcoxon test	-1.56	-1.969**	-2.501***	-1.642*
N	59	51	56	58
KW statistic for difference between subsamples	7.645**	5.533*	6.76**	19.72***
B. Firms privatized in countries with high developed capital market versus less developed				
High developed Cap Mark				
Moyenne	0.0332	-0.0951	0.0181	0.2312
Mediane	0.0495	0.1028	0.0268	0.1195
Z-stat Wilcoxon test	-0.454	-0.365	-0.296	-2.045**
N	13	8	12	13
Less developed Cap Mark				
Mean	0.0244	0.2434	-0.2653	0.0724
Median	0.0242	0.3272	-0.2105	0.1716
Z-stat Wilcoxon test	-2.091**	-2.718***	-3.637***	-0.695
N	61	51	58	58
KW statistic for difference between subsamples	1.932	9.991**	9.022**	9.961***

This table presents comparisons between the operating performance changes of several partitions of privatized firms based on privatization method used. The measures of operating performance are return on sales (ROS), net income efficiency (NIEFF), total debt to total equity (TDtoTE) and real sales (SALES). Panel A compares the performance changes of firms privatized using SIPs and firms privatized using PSs. Panel B compares the performance changes for privatized firms in countries with low developed capital market versus those with high developed capital market. For each performance measure, it provides the change in mean and median values, the Wilcoxon Z statistic for the difference in medians and the number of observations. It also presents the KW statistic of the Kruskal–Wallis test for the difference between the two subsamples. ***, **, * denote significance levels of 1, 5 and 10 %, respectively

and output. Concerning leverage, firms privatized by PSs realize better changes than those privatized by SIPs. Our results, except for profitability, join Jones et al. (1999) who stipulate that government tend to use PSs for smaller and less profitable SOEs and prefer SIPs for larger and more profitable companies.

Panel B of Table 8 compares performance changes of NPFs in highly developed capital markets to those in less developed ones. We use to proxy the capital market development the turnover ratio: total value of transaction/total market capitalization. The results obtained show that firms privatized in a highly developed capital market

achieve more significant increase in output as well as a decrease in leverage (at the 1 % level) than those privatized in a less developed capital market. Concerning efficiency, we find the inverse effect. Except for efficiency, our results confirm that the level of capital market development plays an important role in the success of the privatization program.

5.2 Multivariate regression analysis

We perform a multivariate analysis in which we regress the changes in profitability, efficiency, leverage and output on four groups of independent variables: (1) those related to economic reforms and environment (2) those related to corporate governance variables, (3) those related to the privatization method used and (4) those related to the firm and industry characteristics.

$$\begin{aligned} \text{Performance changes} = & \alpha_0 + \beta_1(\text{economic reforms and environment variables}) \\ & + \beta_2(\text{corporate governance variables}) \\ & + \beta_3(\text{privatization method used}) \\ & + \beta_4(\text{control variables : size and industry}) + \varepsilon_1 \end{aligned} \quad (1)$$

$$\begin{aligned} \text{Method} = & \theta + \delta_1(\text{market considerations}) + \delta_2(\text{environment variables}) \\ & + \delta_3(\text{firm characteristics}) + \varepsilon_2 \end{aligned} \quad (2)$$

As a first step, we start with the second equation to estimate the choice of the privatization method. The predicted value obtained from the Logit model in Eq. (2) represents a method choice rid of noise. In a second step, the obtained variable “Method” was incorporated into Eq. (1). The relation, then, obtained between the dependent variables (measures of performance changes after privatization) and the independent variables come from a rational and non-subjective choice of the method⁶.

5.2.1 The choice of privatization method

In Table 9 we report a Logit regression that explains the choice of method for privatizations occurred over the period 1989–1998 in MENA countries. The dependant variable which is the method used equal 1 if the SOE was privatized by SIP and 0 if by PS. The positive sign of a coefficient of an explanatory variable implies that a higher value of this independent variable is associated with a greater likelihood that the government privatizes by SIP.

We document a significant (at the 10 % level) negative relationship between turnover ratio⁷ and the choice to privatize by SIP. This is inconsistent with Megginson et al. (2004) who found that in less developed capital market,

⁶ The method was explained by a Logit model in order to make an endogeneized variable. Once incorporated in Eq. (1) all the effect associated with endogenous choice of the method are controlled. This avoid any endogeneity bias.

⁷ A lower ratio suggests a less developed financial market.

Table 9 Logit regression results explaining the choice between SIPs or PSs for the privatization method

	Capital markets		Legal environment	Firms characteristics		R ² adjusted (%)	Chi ²	
	Intercept	Turnover ratio	Log GNI percapita	Law	Log proceeds			ROS _{t-1}
Method	19.218*** (7.872)	-3.391* (1.92)	-1.835* (1.001)	-0.492*** (0.164)	-0.128 (0.178)	-2.614 (1.757)	41.30%	26.19***

Logit regression is estimated where the dependent variable is equal to 1 if the privatization of the SOEs is through share issue privatization and 0 if through an private sale. The market turnover ratio (the ratio of the value of shares traded to market capitalization), the log of the GNI per capita measure capital market characteristics in the privatizing country. The rule of law measure the political and legal environment of the privatizing country. Higher values for each index represent stronger protection of property and legal rights. The log of the size of the offer and the return on sales of the year before privatization are firm-specific variables for the privatized enterprise

governments are more likely to sell SOEs by SIPs. This implies that governments choose share offerings as a mean of developing their stock markets. They also found that privatizing governments are frequently willing to sacrifice revenue in order to achieve broader political and economic objectives.

However, Jones et al. (1999) have shown that a government's decision to privatize using share offering, rather than private sale, is negatively related to the level of stock market development. Additionally, Dewenter and Malatesta (1997) found that countries with a less developed capital market may use PS rather than SIP because SIPs are extremely costly and time-consuming to organize. Most of these costs must be paid whether the offering proceeds or not. The governments in MENA countries generally support the choice of PS in the less developed capital market in order to maximize the revenue of SOE sale.

The country income characteristics provide an alternative indication about development of the capital market and can, also, impact the choice between SIPs and PSs. Table 9 also indicates that GNI per capita (used to proxy the income characteristics) is negatively and significantly related to the probability to privatize via an SIP. This suggests that SIPs are more feasible in countries with equal income average. This result confirms the La Porta et al. (1997, 1998) and Jones et al. (1999) findings that more inequal incomes average is associated with greater ownership concentration.

Megginson et al. (2004) found a significant relation between Law and privatization method decision. The rule of law index is positively associated with the probability of the government choosing to privatize via SIPs. This result is consistent with Bortolotti et al. (2004) who argued that privatizing governments consider the legal protections of shareholders when formulating privatization policy. The generally positive and significant relation between the rule of law and SIPs suggests the importance of protecting minority shareholders in privatization decision. We also find a significant negative relationship at the 1 % level between law and the choice of the SIP as a method of privatization. We, thus, note that MENA countries with weak structure and poor legal protection are more willing to privatize using PS. One explanation can be advanced is that in many countries considering SIP programs we find *sleepy* stock markets, few people own shares, and

the stock ownership that does exist is highly concentrated in controlling blocks of family-dominated businesses. To have any chance of success, a government must create a new and trustworthy corporate governance system.

Ours results support the importance of capital market and legal environment in the choice of the privatization method between SIPs and PSs. Indeed, privatization in MENA countries is associated with capital market development, country income characteristics and legal protections of shareholders. We find higher likelihood that MENA countries privatise using PSs.

5.2.2 *Empirical results: economic reforms, corporate governance, method used and performance changes*

In Table 10, we report the results of a multivariate regression analysis in which the changes in profitability, efficiency, leverage and output are regressed on four groups of independent variables, namely the economic reforms and environment variables, the corporate governance variables, the choice of privatization method used and the firm and the industry characteristics. All four models are estimated independently by eliminating the variable Governance highly correlated with Method as explained by Eq. (2). Wherever possible, we compare our results to those documented by Boubakri et al. (2005) and Samy ben Naceur et al. (2007) employing sensibly the same analysis of performance changes of NPFs respectively in DCs and in MENA countries.

5.2.2.1 Profitability Panel A of Table 10 reports the results for the profitability model. Unlike efficiency, leverage and output models, few variables help to explain the changes in profitability. Only the variable of control which is the size of the firm (measured by Logsales) can explain in a certain way this change measured by ROS.

Our results are consistent with those made by Samy Ben Naceur et al. (2007) and Boubakri et al. (2005) with regard to the countries of the MENA zone. An explanation can be advanced is that governments see in privatization an opportunity to spin off loss making enterprises and to generate revenue in short term. This explains why the list of privatization candidates in most MENA countries typically excludes profitable enterprises and sectors that would entail massive layoffs. Indeed, they have privatized only the marginal or less politically significant SOEs. Small and medium sized SOEs in manufacturing and services are the most likely candidates for privatization. Moreover, the majority of privatized companies in MENA countries is under partial privatizations and stay for the greater part under state control after privatization. Besides, governments pursue to a certain way their interferences in the management of these firms recently privatized for the application of a part of their socio-political programs (Gupta 2002).

5.2.2.2 Efficiency Panel B of Table 10 reports the results of the efficiency changes of firms after privatization. In relation to the economic reforms and of the environment variables we document a significant positive relationship at the 1 % level between the operating efficiency (SALEFF) changes and the economic growth (measured by the variation of the GDP) and the economic index of freedom. These

Table 10 Coefficient estimates from regressions of performance changes of privatized firms on economic reforms, corporate governance and privatization method used

DGDp	Economic reforms				Governance		Method		Control		R ² adjusted (%)	F-test
	LIBER	DTRADE	Free	Control	Foreign	Control		Log_sales	Industry			
						Control	Foreign					
DROS												
0.023 (0.03)	0.021 (0.121)	0.425 (0.842)	-0.042 (0.05)	0.055 (0.108)	-0.036 (0.114)	-0.095 (0.249)	0.048* (0.025)	Included		4.40	1.425	
DSALEFF												
0.856*** (0.166)	0.198 (0.58)	6.337 (4.99)	0.751*** (0.225)	0.821 (0.492)	0.037 (0.571)	-7.202*** (0.539)	0.102 (0.116)	Included		50.30	7.86***	
DDToTE												
-0.209 (0.208)	0.635 (0.797)	-9.998 (7.383)	-0.864*** (0.324)	-1.503** (0.718)	-0.115 (0.761)	4.886*** (1.837)	0.011 (0.17)	Included		22.90	3.18***	
DSales												
0.413*** (0.065)	0.479* (0.271)	6.094*** (1.852)	-0.207* (0.109)	0.157 (0.240)	-0.506* (0.261)	2.501*** (0.584)	-0.07 (0.068)	Included		56.2	9.136***	

Regression results to determine the sources of performance changes of privatized firms in MENA countries over the period 1989–1998. The dependent variables are profitability, operating efficiency, leverage and output measured by change in ROS, SALEFF, TDtoTE and SALES. Change in the dependent variable is computed by subtracting the average of the 3 years pre-privatization data from the average of 3 years post privatization data. The independent variables are related to economic reforms and environment, to corporate governance and to the privatization method used as explained in Eq. (2). They are described as follows: DGDp is the change of real GDP growth during the privatization window (-3, -1 and +1, +3); Liber takes the value of 1 if the privatization occurs after the stock market liberalization; DTrade is the change of the sum of exports and imports over GDP during the privatization window (-3, -1 and +1, +3); Free The value of the economic freedom index before privatization, Control takes the value of 1 if the government maintains control of the privatized firm; Foreign equals 1 if foreign investors are involved in the ownership structure of the privatized firm; Method as explained in Eq. (2). Size is the natural logarithm of total sales at the time of privatization. *, **, *** indicate significant levels at the 1, 5 and 10 % levels, respectively

results are in line with our first hypothesis (H1) since economic reforms spur performance improvements of NPFs. They also join the findings of Dornbusch (1992), Bekaert and Harvey (2000) and Bekaert et al. (2001) according to which economic reforms such as stock market liberalization influence the outcomes of privatization program.

Regarding the method as explained by the consideration of the capital market, by the political and legal environment and the specific characteristics to each firm, the regression analysis shows a significant negative association (at the 1 % level) between operating efficiency changes and method. Indeed, the use of the PSs will inevitably have a positive impact on operating efficiency, which joins Megginson et al. (2004) findings as for the importance of the choice of the method of privatization and its impact on the firm performances. These results support our hypothesis H3.

Our estimation explains 50 % of the changes in sales efficiency after privatization. These results indicate that economic reforms (Change in real GDP growth during the privatization window and economic freedom) and the use of PSs are key determinants of post privatization efficiency improvements. Our results support Boubakri et al. (2005) findings that economic growth and relinquishment control of the government are associated with stronger efficiency gains.

5.2.2.3 Leverage Panel C of Table 10 presents the results of the leverage regression as measured by TDtoTE (total debts to the total equity) post-privatization. Concerning the variables related to economic reforms, we observe a significant negative relationship between index of economic freedom and change in leverage post-privatization in contrast with our hypothesis H1. These results are inconsistent with the Henry (2000), Boubakri et al. (2005) findings which stipulate that by privatization and in a favourable economic environment, the NPFs have a better access to sources of financing.

Regarding the corporate governance variables, we find a significant negative relationship at the 1 % level between control relinquishment by the government and the decrease in leverage. This result is inconsistent with H2. One possible explanation is that governments reduce (or remove) subsidies and firms have an easier access to the capital market as a private company.

Concerning the privatization method used, we document a significant positive relationship between the choice of privatization method (in occurrence the SIP) and the change in leverage. This result confirm the claim stated in H3 and joins Megginson et al. (2004) findings which found that using SIP firms have easier access to funding through the capital market.

Our estimation explains 23 % of the change of financing after privatization at the 1 % level. Overall, these results indicate that economic freedom, government control relinquishment and the use of SIPs as privatization method are key determinants of post privatization leverage improvements.

5.2.2.4 Output Panel D of Table 10 reports the results for the output model. The results of the regression analysis indicate a significant relationship between

economic reforms and environment, the corporate governance variables as well as the privatization method used and output changes. Indeed, we find a significant positive relationship between economic growth (at the 1 % level), trade openness (at the 1 % level) and financial liberalization (at the 10 % level) and output changes. These results are in line with our hypothesis (H1) since firms become more productive after economic reforms. We find a significant (at the 10 % level) negative relationship between economic freedom and output changes. This result is inconsistent with prediction that lower interventions of the government in the economy encourage NPFs to increase production.

Regarding the corporate governance variables, our results indicate a significant negative relationship between output changes and the foreign participation which is in contradiction with H2. These results are inconsistent with Dyck's (2000) findings that foreign ownership can improve privatization outcomes in DCs where legal protections are weak.

Concerning the privatization method used, we find a significant positive relationship at the 1 % level between the method used (in occurrence the SIP) and the change in output post-privatization. This is consistent with our hypothesis H3 and joins Megginson et al. (2004) findings according to which the choice of the method of privatization has an impact on the productivity of the NPFs.

The results indicate that economic reforms, foreign participation and the use of SIPs are key determinants of output changes following privatization. These variables explain 56 % of the variation in output after privatization.

6 Robustness to sample composition

We examine here the robustness of our results discussed earlier to the sample composition. Given the fact Egyptian firms represent around 65 % of our sample; we want to investigate whether our main findings are driven by the major presence of Egyptian firms.

To examine this point, we start in a first stage by examining the descriptive statistics of data using univariate analysis. We implement both mean and median difference tests for the selected model variables, and this over two subsamples: Egyptian and non-Egyptian firms. Table 11 summarizes these tests.

As one can see, both Egyptian and non-Egyptian firms realise sensibly the same increase in efficiency and output as well as a decrease in leverage.

To complete our robustness tests, we also examine the sensitivity of our regression model results to the sample composition. We perform the same regression presented earlier over the two subsamples of Egyptian and non-Egyptian firms. Table 12 regroups the results derived after this check. We notice that NPFs from both, Egypt and non-Egypt, realize significant improvements in efficiency and output as well as a significant decrease in leverage. We find that economic reforms and environment, corporate governance and the privatization method (SIPs for Leverage and output and PSs for operating efficiency) are key determinants of post-privatization increases in efficiency and output as well as a decrease in leverage. We

Table 11 Comparison of performance changes: Egypt versus non-Egypt (Morocco, Tunisia and Turkey)

Measures of operating performance	ROS	NIEFF	TDtoTE	SALES
Egypt				
Mean	0.0254	0.2871	-0.281	0.101
Median	0.0286	0.3741	-0.1657	0.1701
Z-stat Wilcoxon test	-1.918**	-3.139***	-3.396***	-0.796
N	49	49	49	46
Morocco, Tunisia and Turkey				
Mean	0.0281	0.1933	-0.065	0.105
Median	0.0326	0.349	-0.023	0.0771
Z-stat Wilcoxon test	-0.767	-1.183	-0.517	-1.99**
N	25	11	20	25
KW statistic for difference between subsamples	1.912	14.376***	10.778***	16.56***

This table compares the operating performance changes between Egyptian and non-Egyptian firms. The measures of operating performance are return on sales (ROS), net income efficiency (NIEFF), total debt to total equity (TDtoTE) and real sales (SALES). For each performance measure, the table provides the change in the mean and median values, the Wilcoxon Z Statistic for the difference in medians and the number of observations. It also presents the KW Statistic of Kruskal-Wallis test for the difference between the two subsamples. ***, **, * denote significance levels of 1, 5 and 10% respectively

also find the same relationships for the total sample regression analysis then those obtained against our partition.

Although both univariate and multivariate (regression) analysis confirm the robustness of our main findings to the sample composition, we implement an additional test to validate the conclusions discussed above. This additional check consists of performing regression analysis over a reduced model composed of a limited set of explanatory variables. The motivation of this additional test comes from the fact that the subsample of non-Egyptian firms has a relatively small size (26 observations) to rely on the regression results as obtained from the original model containing nine explanatory variables. In doing so, we selected the most significant variables per each category of factors as appearing upon the regression of the original model. This is what we call the '*reduced model*', which contains four variables solely: GDP growth (for macroeconomic conditions), Control (for governance), Method (for method) and Log sales (for control). The estimation results of this reduced model over the two subsamples are regrouped in Table 13.

The regression results of the reduced model over the whole sample are also provided in the same table for indication purposes. Again, our results confirm the robustness of our main findings to the sample composition under this reduced model. Indeed, we observe the persistence of the pervious results.

In sum, the results derived from the robustness checks discussed in this section based on both univariate and multivariate (regression) analysis are in line with our main findings presented earlier. Although the sample is dominated by Egyptian firms, our main conclusions are still true whether we face Egyptian or non-Egyptian cases of privatization. Indeed, despite its relative small size, the subsample of non-

Table 12 Coefficient estimates from regressions of performance changes of privatized firms: Egyptian versus non-Egyptian (Morocco, Tunisia and Turkey)

DGDGP	Economic reforms			Governance		Method	Control		R ² adjusted (%)	F-test
	LIBER	DTRADE	Free	Control	Foreign		Log_sales	Industry		
DROS										
Egpt	0.492 (0.329)	-0.118 (9.303)	-0.133 (0.112)	0.071 (0.186)	-0.131 (0.185)	-0.005 (1.014)	0.042 (0.050)	Included	9.7	1.587
MTT	0.031*** (0.009)	0.724** (0.300)	0.055 (0.033)	-0.019 (0.055)	-0.093* (0.051)	-0.052 (0.081)	-0.026 (0.019)	Included	48.7	3.748***
DSALEFF										
Egpt	0.125 (0.428)	-13.252 (12.192)	-0.055 (0.145)	-0.256 (0.248)	0.093 (0.250)	-1.203 (1.324)	-0.022 (0.065)	Included	-5.2	0.735
MTT	0.852 (0.403)	35.340 (19.290)	-2.133 (1.858)	0.259 (2.315)	-0.023 (2.777)	-8.822* (3.705)	0.927 (0.638)	Included	70	4.374*
DTDtote										
Egpt	-1.121* (0.564)	34.052** (15.571)	0.651*** (0.190)	-0.095 (0.309)	-0.066 (0.337)	-1.586 (1.726)	0.256*** (0.084)	Included	50.7	6.025***
MTT	-0.010 (0.348)	-32.931 (14.930)	0.589** (1.137)	-2.031 (2.320)	-0.171 (1.781)	6.919** (3.095)	-0.828 (0.648)	Included	46.7	3.141**
DSALES										
Egpt	1.313*** (0.458)	-20.566 (12.696)	-0.488*** (0.153)	0.077 (0.255)	-0.193 (0.276)	0.213 (1.391)	-0.093 (0.068)	Included	31.7	3.420***

Table 12 continued

DGDPI	Economic reforms			Governance		Method		Control		F-test
	LIBER	DTRADE	Free	Control	Foreign	Log_sales	Industry	R ² adjusted (%)		
MTT	0.427*** (0.092)	8.210** (3.103)	-0.039 (0.340)	-0.204 (0.573)	-0.777 (0.526)	2.447*** (0.839)	Included	-0.162 (0.197)	62.9	5.899***

Regression results to compare the sources of performance changes of privatized firms in Egypt Versus non-Egypt (Morocco, Tunisia and Turkey) over the period 1989–1998. The dependent variables are profitability, operating efficiency, leverage and output measured by change in ROS, SALEFF, TDtoTE and SALES. Change in the dependent variable is computed by subtracting the average of the 3 years pre-privatization data from the average of 3 years post privatization data. The independent variables are related to economic reforms and environment, to corporate governance and to the privatization method used as explained in Eq. (2). They are described as follows: DGDPI is the change of real GDP growth during the privatization window (-3, -1 and +1, +3); Liber takes the value of 1 if the privatization occurs after the stock market liberalization; DTrade is the change of the sum of exports and imports over GDP during the privatization window (-3, -1 and +1, +3); Free The value of the economic freedom index before privatization, Control takes the value of 1 if the government maintains control of the privatized firm; Foreign equals 1 if foreign investors are involved in the ownership structure of the privatized firm; Method as explained in Eq. (2). Size is the natural logarithm of total sales at the time of privatization. *, **, *** indicate significant levels at the 1, 5 and 10 % levels, respectively

Table 13 Coefficient estimates from reduced model of performance changes of privatized firms: Egyptian versus non-Egyptian (Morocco, Tunisia and Turkey)

	Economic reforms	Governance		Control		
	DGDP	Control	Method	Log_sales	R ² adjusted (%)	F-test
ROS method						
Egpt	0.151 (0.132)	0.180 (0.148)	-0.948** (0.472)	0.057 (0.046)	5.7	1.742
MTT	0.025** (0.009)	-0.037 (0.065)	-0.111 (0.100)	0.009 (0.006)	18.8	2.509*
DSALEFF method						
Egpt	-0.038 (0.168)	-0.257 (0.191)	0.046 (0.608)	0.016 (0.060)	4.5	0.487
MTT	0.887** (0.246)	2.123 (1.709)	-12.144** (2.486)	0.677*** (0.151)	72.9	9.762***
DTDtoTE method						
Egpt	-0.453* (0.262)	-0.394 (0.303)	-1.873** (0.928)	0.205** (0.091)	27	5.060***
MTT	-0.195 (0.308)	-1.352 (2.229)	9.830*** (3.065)	-0.559*** (0.187)	35.5	4.022***
DSALES method						
Egpt	0.527** (0.214)	0.263 (0.229)	-0.322 (0.713)	-0.029 (0.070)	11.6	2.548**
MTT	0.379*** (0.098)	-0.021 (0.676)	2.000* (1.033)	-0.103 (0.062)	41.1	5.528***

Regression results to compare the sources of performance changes of privatized firms in Egyptian versus non Egyptian (Morocco, Tunisia and Turkey) over the period 1989–1998. The dependent variables are profitability, operating efficiency, leverage and output measured by change in ROS, SALEFF, TDtoTE and SALES. Change in the dependent variable is computed by subtracting the average of the 3 years pre-privatization data from the average of 3 years post privatization data. The independent variables are related to economic reforms and environment, to corporate governance and to the privatization method used as explained in Eq. (2). They are described as follows: DGDP is the change of real GDP growth during the privatization window (-3, -1 and +1, +3), Control takes the value of 1 if the government maintains control of the privatized firm; Method as explained in Eq. (2). Size is the natural logarithm of total sales at the time of privatization. *, **, *** indicate significant levels at the 1, 5 and 10 % levels, respectively

Egyptian firms consistently contributes to provide empirical evidence supporting the main findings presented in this paper.

7 Conclusion

We investigate in our study the determinants of the post-privatization performance changes of newly privatized firms in some MENA countries namely Egypt, Morocco, Tunisia and Turkey. Using a unique sample of 75 firms, we first document a significant increase in profitability, efficiency and output as well as a decrease in

leverage. Next, using a non parametric test, we show that performance changes vary according to economic reforms and of environment, corporate governance and privatization method variables. Indeed, privatization shows better results in efficiency and output (real sales) when it was preceded by financial liberalisation and foreign participation. Moreover, relinquishment control of the government from the privatized firms and lower intervention in economy bring higher improvements in efficiency and output. Furthermore, performance gains from privatization vary across the method used. Indeed, firms privatized through SIPs exhibit better significant changes in efficiency and output compared to those privatized through PSs. Besides, we find a decrease in leverage for firms with foreign participation and a lower intervention of the government in economy as well as they are privatized by PSs.

Using a multivariate regression analysis we try to identify the most important determinants of performance changes after privatization. Economic reforms and environment, corporate governance variables and the privatization method used appear to drive the performance improvements of NPFs in MENA countries. Concerning the privatization method, we find that the consideration of capital market; economic, political and institutional factors and the specific characteristics of firms can affect the choice between SIPs and PSs. We find higher likelihood that MENA countries privatise using PSs. Concerning the performance changes of the NPFs we find that economic reforms and environment, corporate governance and the privatization method explain post-privatization performance improvements. More specifically, we show that economic growth, trade openness, economic freedom, government relinquishment control, foreign participation and the privatization method used (SIPs for Leverage and output and PSs for operating efficiency) are key determinants of post-privatization increases in efficiency and output as well as a decrease in leverage.

Using a similar analysis Boubakri et al. (2005) show that in the context of DCs, the higher performance of NPFs are associated with change in ownership structure especially with foreign investor and when the governments relinquish control. Moreover, privatization produced better overall results in DCs when preceded by economic reforms such as stock market and trade liberalization. Our study joins these results by introducing new variable in explaining the performance changes of NPFs namely: the privatization method used.

While our results enable us to highlight the key determinants of performance changes of NPFs in MENA countries, our analysis presents some limits which come to moderate our results. We notice that specificities of the MENA countries do not allow us to generalize our findings to the other DCs and transition economies.

In addition, comparing performance before and after privatization over periods of 3 years, implicitly assumes that the influence of privatization occurs instantly and there is a relatively rapid improvement in performance. On the one hand, in some companies, there is a restructuring prior to privatization (e.g, recapitalization or lay-offs). And on the other hand, the effects of privatization may occur slowly (over 3 years). Performance improvement usually implies changes in governance systems, reconfiguration of the organizational architecture, and implementation of a new strategy, which, due to the organization inertia, are often time-consuming, taking more than 3 years.

Furthermore, the static method used by Megginson et al. (1994), which tests whether a significant change in performance level (a level effect) between the pre-privatization period and the post-privatization, does not control the dynamic effects of privatization.

This research could potentially be extended in several directions, which may overcome actual limitations. One issue could be expanding the sample with other developing countries. Another issue would be to consider more than 3 years after privatization. Last, but not least, we must investigate other determinants of the privatization method choice, e.g. political connections.

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