

Has Privatization Promoted Efficiency in Ethiopia?: A Panel Data Analysis on Large and Medium Scale Manufacturing Firms

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Abstract

Privatization, as a program, has been implemented in Ethiopia since EPRDF² took power, with the motive, among other things, to increase efficiency of firms. This study aimed at investigating whether the program has promoted efficiency of privatized large and medium scale manufacturing firms. A panel data ranging from 1995 to 2009 was collected from Central Statistical Agency for 71 privatized and 333 publicly remained firm. The results revealed the overall insignificant effect of privatization on the efficiency of large and medium scale manufacturing firms. Based on the findings of the study, one can forward the following recommendations. If the privatization program is being implemented in the motive of increasing efficiency of firms as a major and immediate objective, it is better to stop the process, since it has nothing to do with improvement in efficiency. On the other hand, if the motives other than increasing efficiency such as promoting participation of the private sector and generating revenue outweigh as causes of implementing the program, the assessment of its effect on these goals is important to provide a realistic recommendation.

Key Words: Privatization, Efficiency, Panel Data, Ethiopia

JEL classification: L33, J24, L25, L60

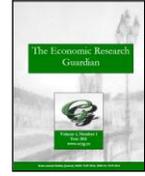
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1. Introduction

In developing countries like Africa, the move for privatization was a consequence of the interplay of many factors. The reasons given by the government officials, why there is a huge privatization program, however, include an emphasis to improve economic performance (Makalaou, 1999). More specifically, the motive for privatization provided by government officials include improving economic efficiency, streamlining expansive public sector, decreasing government borrowing, increasing share ownership, lowering deficits, enhancing competition, encouraging market forces, generating government revenues, expanding customers' choices, and improving service quality (Haque, 2000). The critical factors for privatization, however, go beyond the above listed reasons. In the first place, it is important to look at the ideology the state was following. Privatization, thus, was among the policies of Neo-Liberal states who favor the working of the market forces. There was also

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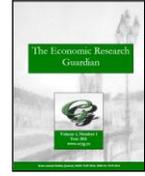
an external pressure from the developed countries on the governments of developing countries to undertake the program. In addition, the program has also been implemented in the aim of achieving political and economic interests of government officials (Haque, 2000). In general, in developing countries like Sub Saharan Africa, privatization can be seen in three aspects. First, it has resulted in new investment and donor aid. Second, it has improved the image of many African governments in the eyes of investors, and third politicians were not threatened as expected but benefited by directly and indirectly (Mugerwa, 2002).

In the Ethiopian context, industrial public firms were constrained by their weak management, foreign exchange bottleneck, weak financial position, inadequate availability of raw materials and other inputs, and weak technology (Eshetu, 1993). Nonetheless, Derg, the ruling military government in the 1980s was not towards privatizing such firms since the ideology being followed was not compatible with private ownership of property. After the fall of socialism in the east, the government started to recognize the need for economic adjustment and privatized a limited number of public firms (Eshete, 1994). Following the downfall of the Derg regime, however, privatization was undertaken in large extent. The change in the regime being important, the program was part of the general reform package of structural adjustment program (Worku, 2000).

Privatization as part of the structural adjustment program, being initiated by the multilateral financial institutions, can largely be attributed to the belief held by western countries that “publicly owned firms are inefficient” and it needs the transfer of ownership to the private sector. After the establishment of Privatization and Public Firms Supervising Agency in 1995, the move to such a reform was further accelerated. Between 1995 and 2014, the country privatized 370 public firms and it earned around birr 19.8 billion which could be allocated in other government’s priority development activities. The move for privatization was implemented step by step in which small and retail shops were privatized first and by taking this experience medium and large-scale firms were privatized afterwards (Alemayehu, 2015). Proclamation No. 146/1998 stated the objectives of privatization in Ethiopia to be generating revenue for government, changing the role and participation of the government in the economy and encouraging the expansion of the private sector.

As the term privatization is raised, there comes an issue of efficiency, still the existence of a competitive market being important (Sheshinski and Lopez, 2003). Hence, the concept should not be misunderstood, knowing that a monopoly firm without competitors can be profitable without increasing productivity but by exploiting its market power. Therefore, for the program to bring efficiency in operation, there should be a comprehensive change of economic constitution of a country (Drakic, 2007). Hence, what is meant by privatization is not only a transfer of ownership from the public into the hands of the private investor, but also a change in the overall system of the economy. There exists empirical evidence that says non-privatizing reform measures such as price deregulation, market liberalization and increased use of incentives could lead to a greater outcome if coupled with privatization (Megginson and Netter, 2000). There also exists evidence supporting the claim that, the general impact of privatization on economic growth depends on other policy measures undertaken simultaneously (Filipovic, 2005).

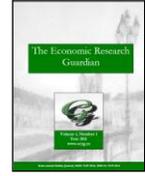
Privatization, if not undertaken in a strong legal and institutional environment, however, has been found to rarely improve the firms’ performance (Estrin, 2007). A study by Haque (2000) showed that



privatization has an adverse impact in the developing countries case. Increasing unemployment and decreasing wages were resulted by measures related to privatization such as a decrease in public employees, withdrawal of minimum wage legislation, price increases because of market competition, and subsidy and welfare cuts. Also, privatization was found to aggravate the problem of social inequality in developing countries. These are macroeconomic negative impacts of privatization which may offset the microeconomic efficiency increase of firms. Other disadvantages from privatization include those impacts, which arise from the profit-seeking behavior of private investors and malfunctioning of government officials with the private sector (Kousadikar and Singh, 2013). These negative impacts of privatization are to be addressed by the dynamic analysis of privatization effect, which is not in the scope of this study.

The role of manufacturing sector in Ethiopia is so important, that its 1% change in output increases the national economy by 26% and the labor productivity by 47% (Teshome, 2014). The sector, however, is growing at a low pace, implying that increment in its growth rate has an even increasing impact on the overall economic growth. Hence, there is a necessity of increasing the efficiency of the manufacturing firms, to transform the country's economy to the next stage. Among the manufacturing firms in Ethiopia, one being public firms is found to operate inefficiently because of organizational structure and the incentive system (Alemu, 1992). Public firms were also found to suffer from the problems of weak management, foreign exchange bottleneck, weak financial position, inadequate availability of raw materials and other inputs, and weak technology (Eshetu, 1993). In the implementation process of the privatization program, it has been found that there is administrative and organizational problem (Hishe, 2005). Also, there was ambiguity among the public in respect of the privatization program, implying that there exists no public support, but it is only the government agenda (Berhanu and Elizabeth, 2009). Whether the privatization program has promoted increased performance of public firms remains to be a question that is going to be answered by empirical studies.

To investigate the link between privatization and efficiency, various studies have been conducted around the world, each having its own area of interest and distinct method of data analysis (Megginson and Netter, 2000). In Ethiopia, also, there exist empirical studies on the same topic. A study by Getachew (2003) found that, privatization has a positive impact on productivity and a negative impact on employment. Another study by Worku (2000) showed that privatized firms rather operated inefficiently as compared to public firms and other private firms during the period covered by the study. Also, a firm level analysis of privatization effect was conducted by Muluken (2010) for a Shoe Company, which found that privatization has a negative impact on operating efficiency. A similar study by Aweke (2011) for hotel firms, found that privatized hotels' performance fails to fit the goals of the government, which is evidenced by reduction in employment. Taking the case of 3 firms, Alemayehu (2015) conducted a study which found that, privatization has positive impact on most of proxy variables specified. Looking at the above empirical studies, the need for another study is justified, because of the presence of a gap in many aspects. With respect to taking a representative sample, the studies sample size is less likely to allow for a more generalized conclusion. Except the study by Worku (2004), for the remaining studies, the variables taken as a measure of performance are not strong, meaning they cannot be directly interpreted with greater confidence as they are easily affected by nominal changes (fluctuations). The time range covered by the studies and the method of



data analysis, which is going to employ econometric analysis, are also issues that are going to be improved by this study.

Due the availability of data, proper focus has been given on large and medium scale manufacturing firms, which were privatized between 1996 and 2009, and those firms, which have the pre- and post-privatization data. The study involves comparison of the before-after privatization performance of privatized firms and with firms that remain in the hands of the public. The general objective of this study is to investigate whether privatization has increased efficiency of privatized large and medium scale manufacturing firms in Ethiopia. The remaining parts of the paper comprise 4 sections. The second section discusses theoretical and empirical literatures. The third section deals with the methodological framework and section four deals with presentation and discussion of results. In section 5, conclusion has been made in line with the findings of the study.

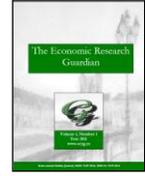
2. Literature review

2.1. Privatization and efficiency: theoretical framework

Ideas relating economic efficiency of business firms with the structure of ownership of firms are not new. Starting from the emergence of modern economics different opinions have been given by various scholars. But ideas explaining mechanisms through which such improvements would take place as a result of private ownership were not given for a long period of time (Sheshinski and Lopez, 2003). Later, different scholars had tried to explain the situation by providing different ways of techniques.

Property rights theory claims the source of the difference in efficiency of private and public firms to be the type of ownership (i.e., the enforcement of property rights). Accordingly, in public firms property rights are not put into effect because of the difficulty in transfer of property rights. What is meant by the problem of transferability is that, the cost arising because of the economic activity undertaken and the resulting benefit is less likely to accrue more directly to agents responsible for the property rights. Here, in the public firms, since the link between the public and managers is weak, monitoring measures taken to guide managers of firms will be difficult. Hence, the managers' interest may diverge from that of owners and result in inefficiency of the firm. To conclude with, according to property rights theory, the more unenforceable property rights are, the less will be productive efficiency of the firms, because weakening in enforceability weakens the rewards-penalties systems that are necessary for cost-minimizing behavior (Demsetz, 1966 and 1967; Furubton and Pejovich, 1972).

The principal agent theory, being the extension of property rights approach, starts with the kind of monitoring mechanisms and incentives private and public firms' managers' face. To begin with, it is known that private firms are in the side of profit maximization whereas the public is towards welfare maximization. Hence, for public firms the desire for economic gain is absent which will result in inefficient operation of these firms. A privatization measure taken on such firms could result in two possible outcomes: a change in the goal of the firm from adjusted welfare maximization to profit

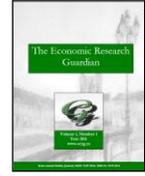


maximization and in the incentive structure by linking benefit to the level of efficiency under the private ownership. This change further could result in two final outcomes. When a shift towards profit maximization may imply higher price, hence losing allocative efficiency, at the same time productive efficiency could arise, which could reverse this unfavorable effect (Vickers and Yarrow, 1988; Bo's, 1991).

Organizational theories of firm account difference in efficiency of public and private firms to the organizational characteristics of the industry. Here, concepts used in explaining the difference are the management style, goals of the firm, kind of labor, communication and reporting systems, organizational structure, and the nature and location of business. This means, these sets of characteristics of a firm are determinants of firm efficiency and are likely to operate in an incorrect manner in the case of public firms. The possible reason for such differences could be the interest of owners (government) which is dominated by long bureaucratic line of management, which will not allow for assessments that could be made timely as a result of findings in researches undertaken to solve such problems. But for private firms, which are in most times managed by the owners themselves such issues are not difficult since an attention is towards profit maximization, and there is a huge acceptance of innovations in the world economy (Dunsire, 1991; Bishop and Thompson, 1999; Martin and Parker, 1997).

According to this theory, the bureaucracy in public firms is the main source of inefficiency, which binds the decision of managers in line with the will of politicians. Here, politicians are assumed to influence the manager to pass decisions, which could increase their vote or trust among the public. Usual variables that politicians seek to maximize include budget, risk aversion, employment and investment. Hence, incentives that could lead to efficient operation of firms are absent and the resulting effect will be the unfavorable outcome of inefficiency of firms. Among the models used to explain this theory the one that was given by Boycko et al. (1996) can be mentioned as an example. According to this model, since the will of politicians is towards maximizing the above variables politicians are always looking to bribe the managers even if the firm is controlled jointly. The possible solution, then, will be privatization of the firm, which could lead to effective restructuring. Accordingly, this could happen only if both cash flow rights and control rights pass from the government into private hands. This complete transfer of rights will result in a situation in which the government bribe to managers cannot be enough to influence managers to produce at inefficient levels (Niskanen, 1971; Buchanan, 1972; Boycko et al., 1996).

Having said this, it is also important to look at different views, which argue in support of the public ownership of firms. Among these views, a claim by Shapiro and Willing (1990) can be mentioned. Accordingly, profitability and hence efficiency of privatized firms comes at the expense of the rest of the society through the exploitation of market power which makes state owned firms preferable. The other benefit that could be gained by public firms is that state-owned firms help to solve the problem of market failure by ways of pricing policies that take account of social marginal costs. The other explanation by Cook (1997) claims the assumption of free capital market and perfect information flow for private agents is unrealistic, and hence, firms, when privatized can do nothing more than public firms. Besides, Change and Singh (1997) claim public firms are important constituents of the economy as they could manage the difficulties that are apparent in large firms. Accordingly, private



firms are less likely to have such attributes of public firms, implying the importance public ownership over private ownership.

Here, it is also important to note the kind of market the firms are operating in is not given an emphasis. But there are claims which attach economic efficiency to the existence of competitive product market, more than the ownership structure of firms (Chirwa, 2001). Hence, the kind of the product market the firm is operating in also matters and a different approach should be followed to explain such a situation which becomes complex unless treated distinguishing this aspect.

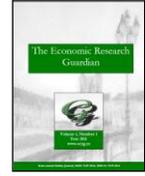
2.2. Privatization and Efficiency: Empirical Studies

Catharine et.al (1996) conducted a study involving the comparison of the privatized British Airways and other competing Air lines. The findings of the study showed that privatization has resulted in efficiency which is shown by an abnormal decrease in stock price of British Airways' competitors. Also, after privatization the airfares on the routes served by British Airways was found to decrease significantly which was assumed to show an improvement in firm productivity.

Villalonga (1999) conducted a study analyzing the effect of privatization on 24 privatized Spanish firms. The findings of the study suggested that, variables other than privatization are important in explaining the exact effect of privatization on firms' efficiency. This was shown by treating the pre-post effects of privatization by assigning a dummy variable, in which the privatization effect became inconclusive. Following this result an attempt was made to capture the effect of other variables. Later, the individual firm specific estimated parameters were used as a dependent variable, and as it is expected they were found to influence the privatization effect on efficiency. Also, a trend in efficiency growth was found to be improved in later years than in the beginning.

Chirwa (2001) conducted a study to analyze the effect of privatization on Malawian firms' technical efficiency. By the statistical results, it was shown that technical efficiency has improved progressively for privatized, state-owned and private firms. There was evidence showing increases in technical efficiency and the proportion of the variance in technical efficiency attributed to privatization to be higher for privatized firms, implying privatization is a better solution for further increase in efficiency. The econometric analysis show that the existence of inefficiency in state owned firms in the industry effects model guarantees further importance of privatized firms in working efficiently.

Worku (2000) employing a data from Ethiopian privatized, publicly owned and private firms, conducted a study which compares technical efficiency levels. The findings of the study revealed that privatized firms are inefficient as compared to public owned and other private firms. Also, estimates from the production function for the privatized firms show that mean technical efficiency of these firms was declining consistently during the same period. Another study by Getachew (2003) tried to assess the performance of Ethiopian privatized manufacturing firms, in terms of firms profitability, productivity, capital investment, output, net tax, labor impact and fiscal impact. Looking at the profit level of firms, it was found that they registered a declining trend. Unlike the result for profitability, productivity was found to increase for 76.9 percent of sampled firms. Capital investment was also



found to increase with output produced after privatization. The labor effect of privatization was found to be a declining trend.

Alemayehu (2015) conducted a study on Yekatit Paper Printing Firms, Addis Ababa Tannery and Ethiopia Hotel Firms to assess their pre and post privatization performance. The study found, significant improvements in profitability, capacity utilization, investment and employment level for Yekatit Paper Printing Firms. Also, a significant change was observed for Ethiopia Hotel Firms with respect to investment, operating efficiency and employment level. The least impact of privatization on the performance was found for Addis Ababa Tannery as it is reflected by its significant effect only on investment and sales efficiency. Muluken (2010) conducted a study, which tried to investigate the impact of privatization on the performance of Tikur Abay Shoe Company. Profitability, net income efficiency, capital investment, and liquidity were found to decline in the post privatization period.

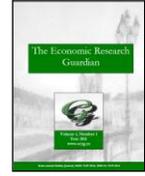
Aweke (2011) conducted a study comprising 7 privatized hotel firms of Ethiopia. Unlike the above studies which gave emphasis on the firm level effects of privatization, this study was concerned with the macroeconomic goals of the government and these objectives were also considered to be the broad legacies of the privatization program. The result of the study show that buyers of these hotel firms were not doing as it was outlined in their business plan. It was expected that the private ownership will induce capital expenditure and thereby will at least protect the existing employment. But it was found that, investment didn't increase significantly, and employment decreased by 16%.

3. Methodology

3.1. Measures of efficiency

There exists a vast literature regarding the variables to use in order to measure and compare efficiency among different firms (see OECD Manual, 2001; Mehta, 1950; Chad, 2012; Lipsey and Carlaw, 2001). According to Mehta 1950, efficiency can be measured with reasonable level of accuracy, but there exists no variable which exactly measures it. Three standards of measurement were forwarded to use in the empirical studies, each having its own limitation. One of the indices mentioned for the measurement of efficiency is the rate of profit. The other index provided was labor productivity. The third index, cost of production, was considered to be the most reliable and dependable measure for comparing the efficiency of different units. As the researcher claims, since cost is the basic input, which facilitates the production process, its lowering is highly related with improvement in efficiency.

For this study, it has been attempted to employ dependent variables labor productivity, which is measured as the ratio of gross value of production to wages and salaries, and value-added share measured as the ratio of value added to gross value of production. Measuring labor productivity as a ratio of gross value of production to wages and salaries is preferred to other measures, because of its strength in accounting for differences in labor quality. It is generally better than other measures, since it is pure number (ratio), which allows for comparison of performance of firms, which might



be different in other aspects like size. In the case of value-added share, there is an advantage of looking deep into the net effect of operation of firms on their performance. It is also basically related to the concept of cost of production mentioned above.

3.2. Data sources

The study has employed a data from Central Statistical Agency, which have been collected through its annual survey on large and medium scale manufacturing firms. The data ranges from 1995 to 2009. For the purpose of this study, 71 privatized firms, which have at least a three-year pre and post privatization data, and 333 publicly remained firms have been selected.

3.3. Model specification

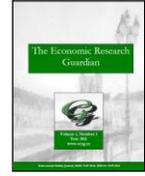
Studies concerning the analysis of efficiency of firms have mainly employed a two stage method of data analysis, in which the level of efficiency of a firm is calculated first and then testing for factors which have contributed for the improvement or deterioration in efficiency (see Brada et al., 1997; Lundvall and Battese, 2000; Albert and Maudos, 2002; Schiersch, 2013; Jinghai et al., 1996). There are also other studies which employed a one stage method of data analysis in which a comparison is made between different types of firms, after computing the level of efficiency for each of them (see Worku, 2004; Chirwa, 2001; Arora, 2014; Habtamu, 2010). In this study, analysis will be made using a method which tries to identify the possible effect (positive or negative) of some variables on the level of efficiency, by specifying a proxy variable for efficiency which is basically the same as two stage procedure (see Villalonga, 1999; Rama and Simon, 2015; Tadesse and Dawit, 2015).

The focus area of this study being the performance of firms, its proper evaluation needs a treatment of variables other than the privatization dummy variable. Hence, attempt has been made to account for other important variables which might have a significant impact on the performance of the firms, as evidenced by the previous literature review.

Generally, the following framework has been adopted in the econometric analysis part of this study.

$$\begin{aligned} \text{eff}_{it} = & \alpha_{it} + \beta_1 \text{Priv}_{it} + \beta_2 \text{Ownership}_{it} + \beta_3 \text{Lnsize}_{it} + \beta_4 \text{Experience}_{it} + \beta_5 \text{Lnexperisquared}_{it} + \\ & \beta_6 \text{ImportRM}_{it} + \beta_7 \text{SRM}_{it} + \beta_8 \text{Export}_{it} + \beta_9 \text{D}_1 \text{food}_i + \beta_{10} \text{D}_2 \text{Beverage}_i + \beta_{11} \text{D}_3 \text{Textile}_i + \beta_{12} \text{D}_4 \text{Leather}_i \\ & + \beta_{13} \text{D}_5 \text{W\&F}_i + \beta_{14} \text{D}_6 \text{P\&P}_i + \beta_{15} \text{D}_7 \text{Chemical}_i + \beta_{16} \text{D}_8 \text{R\&P}_i + \beta_{17} \text{D}_9 \text{NonMetal}_i + \beta_{18} \text{D}_{10} \text{Metal}_i + \varepsilon_{it} \end{aligned} \quad (1)$$

Where the definition of the variables is as it is stated in the appendix part.



3.4. Method of data analysis

Since the study is concerned with the comparison of efficiency of privatized firms in the before-after periods of privatization and with public firms, as it has been noted earlier, a panel data set has been employed. It is known that, this kind of data can be analyzed employing two types of models, namely static model and dynamic model. For this study, however, static model has been employed, based on the ground that, its simplicity and since it doesn't involve the problem of endogeneity. In fact, it might be questioned that, "last year inefficiency could be the cause of current year inefficiency", which necessitates the use of dynamic panel data model. For this study, however, it has been already acknowledged that, there is inefficiency and, the objective is to see if there is improvement in the post privatization period, which deprioritizes the inclusion of lagged dependent variable, and hence the use of dynamic panel data model. Therefore, static panel data regression model has been utilized. In this respect, literatures suggest two types of method of data analysis, namely fixed effect model and random effect model (Gujarati, 2004; Wooldridge, 2004).

A fixed effect model is an econometric model, which allows capturing individual specific unobserved heterogeneity (Gujarati, 2004). This is a model that is going to be employed when we are interested in analyzing the impact of variables that vary over time. The model explores the relationship of the dependent variable and the independent variable within an entity. Here, it is assumed that, there exists an individual specific characteristic that may or may not cause a change in the dependent variable. Random effect model, on the other hand, is a panel data model, where we assume that the unobserved effect of each entity is uncorrelated with each explanatory variable (Gujarati, 2004).

In the next section, it has been attempted to present the econometric results with their implication on the theme of the study. Accordingly, by the Breusch and Pagan Lagrange multiplier test for Random Effects, Random Effects model has been found to be preferable than Ordinary Least Square methods in all cases. A test whether to include time fixed effects was also performed with a test that checks whether the coefficients for year dummies are jointly zero or not. Based on the tests, year dummies have been controlled for the regressions, which take labor productivity as a dependent variable for the privatized firms' part of the analysis.

The Hausman test was also conducted to see if the unobserved individual specific effects are correlated with the explanatory variables. Accordingly, it has been found that random effects model is inefficient for both regressions of privatized firms' model. Also, for firms remained under public ownership, the Hausman test revealed that random effects model is inefficient for both cases. For the combined analysis which included both privatized and firms remained under public ownership together, random effects model is efficient for the regression involving value added share as a dependent variable, whereas it is inefficient for the regression involving labor productivity as a dependent variable. Finally, for the analysis involving the inclusion of industrial group dummies elimination of collinearity problem has been achieved by the random effects model.



4. Presentation and discussion of results

4.1. Econometric result for privatized firms

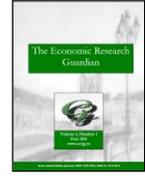
As it can be seen from the table below, privatization has insignificant effect on labor productivity. Excluding the year dummies, among the explanatory variables included in our model, only the logarithm of size of the firm has a significant effect on labor productivity, which is negative. But being an exporting firm is associated with 3.193 higher labor productivity which is significant at 10% level of significance. When we come to the year dummies, we can see that labor productivity is found to decrease in the years 2002 and 2003, which is significant at 5% level of significance. There is also a decrease in labor productivity in the year 2001, which is significant at 10% level of significance.

Table 1- Estimation result for privatized firms

Variables	Labor Productivity			Value added share		
	Coef.	t	P>t	Coef.	t	P>t
Priv	-.836040	-0.61	0.542	-.033701	-0.52	0.605
LnSize	-5.19062	-4.95	0.000	.2488342	4.35	0.000
Experience	-.004250	-0.01	0.989	.0097652	0.97	0.334
Lnexperisquared	.4095615	0.23	0.822	-.057096	-0.67	0.505
ImportRM	-2.30205	-1.07	0.287	-.160939	-1.36	0.174
SRM	-1.17993	-1.33	0.185	-.112411	-2.31	0.021
Export	3.192836	1.93	0.054	.0075177	0.08	0.933
1997	2.82551	1.36	0.175	---	---	---
1998	-.248208	-0.12	0.902	---	---	---
1999	.2218238	0.10	0.918	---	---	---
2000	-2.02522	-0.90	0.366	---	---	---
2001	-3.99856	-1.72	0.085	---	---	---
2002	-6.18735	-2.51	0.012	---	---	---
2003	-6.40332	-2.51	0.012	---	---	---
2004	-2.63022	-0.98	0.328	---	---	---
2005	-2.27692	-0.80	0.427	---	---	---
2006	-3.56305	-1.19	0.235	---	---	---
2007	-2.33859	-0.67	0.500	---	---	---
2008	.6737139	0.20	0.844	---	---	---
2009	-1.13181	-0.29	0.769	---	---	---
Constant	41.98504	5.02	0.000	-.944801	-2.09	0.037
Model test	F-test	3.67	0.000	F-test	3.77	0.000

Source: Own Computation Based on Data Obtained from Central Statistical Agency.

For the value-added share variable, the privatization effect is still insignificant. Unlike its effect on labor productivity, logarithm of size of the firm has a positive and significant effect on value added



share. Firms, which have reported shortage of raw material as first major problem, are found to have a lower value-added share, which is significant at 5% level of significance. For the remaining variables, the result found is not significant.

4.2. Econometric result for publicly remained firms

Looking at the table below, as it was the case for privatized firms, a significant effect on labor productivity is found for logarithm of size of the firm and for being an exporting firm. The result is stable that logarithm of size of the firm has a negative and significant effect at 1% level of significance. To the opposite of its effect on privatized firms, being an exporting firm is associated with lower labor productivity. For the remaining variables the result is insignificant. For value added share variable, as it can be seen from the table above, none of the explanatory variables have significant effect.

Table 2 - Estimation result for public firms

Variables	Labor Productivity			Value added share		
	Coef.	t	P>t	Coef.	Z	P>z
LnSize	-13.40497	-8.89	0.000	.0396723	0.66	0.511
Experience	-.0056231	-0.02	0.980	-.0075666	-0.83	0.408
LnExperiSquared	-.1435865	-0.14	0.887	.0452582	1.12	0.264
ImportRM	-4.676368	-1.50	0.133	.0540406	0.43	0.664
SRM	-.7025249	-0.47	0.637	.0227292	0.38	0.703
Export	-7.36801	-1.82	0.069	-.0296794	-0.18	0.854
Constant	76.5602	10.65	0.000	-.0115586	-0.04	0.968
Model test	F-test	14.86	0.000	F-test	2.31	0.000

Source: Own Computation Based on Data Obtained from Central Statistical Agency.

4.3 Econometric result for both privatized and firms remained in public ownership³

Still, the effect of privatization on labor productivity remains to be insignificant. Comparing private and public firms, in which the post privatization data of privatized firms is treated as if it is a data, which comes from private firms, i.e., the ownership dummy variable, still, resulted in insignificant effect. As it was the case for privatized firms only, logarithm of size of the firm has a negative and insignificant effect on labor productivity. Also, being an exporting firm is found to have a significant effect on labor productivity, which has an increasing effect. The same is true for the year dummies, in which years 2001, 2002 and 2003 are associated with decreasing trend in labor productivity, which is significant at 5% level of significance.

³ This analysis is made by compiling the data for the two types of firms together.

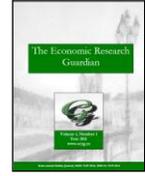


Table 3 - Estimation result for both types of firms

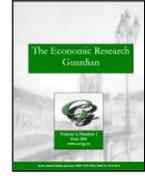
Variables	Value added share (Fixed effect)			Labor productivity (Random effect)		
	Coef.	t	P>t	Coef.	Z	P>z
Priv	-.4144944	-0.90	0.370	3.72108	0.45	0.654
Ownership	.3883719	0.83	0.405	-3.845721	-0.46	0.646
LnSize	.2490788	4.35	0.000	-4.125383	-5.14	0.000
Experience	.0088882	0.88	0.381	.0403395	0.30	0.761
LnExperiSquared	-.0526891	-0.61	0.539	-.1392355	-0.10	0.917
ImportRM	-.1674803	-1.41	0.159	-1.726862	-0.88	0.379
SRM	-.1156287	-2.37	0.018	-1.245038	-1.40	0.161
Export	.0071119	0.08	0.937	2.662475	1.73	0.084
1997	---	---	---	2.932355	1.41	0.158
1998	---	---	---	-.2725134	-0.14	0.891
1999	---	---	---	.1381758	0.07	0.946
2000	---	---	---	-2.062908	-0.99	0.323
2001	---	---	---	-4.117862	-1.98	0.047
2002	---	---	---	-6.432735	-3.06	0.002
2003	---	---	---	-6.375459	-3.04	0.002
2004	---	---	---	-2.439549	-1.14	0.254
2005	---	---	---	-1.979323	-0.89	0.374
2006	---	---	---	-3.259773	-1.45	0.146
2007	---	---	---	-2.370902	-0.91	0.364
2008	---	---	---	.1530201	0.06	0.953
2009	---	---	---	-.9990621	-0.36	0.715
Constant	-.9470445	-2.09	0.037	38.7629	5.56	0.000
Model test	F-test	3.38	0.0008	Waldchi2	74.17	0.000

Source: Own Computation Based on Data Obtained from Central Statistical Agency.

For value added share, as it can be seen from the above table, the only significant effect is found for logarithm of size of the firm and for reporting shortage of raw material as a first major problem. While the effect on value added share is positive for the former, it is negative for the latter.

4.4 Econometric result for both groups of firms controlling for industrial group dummies

As it can be seen from the table below, the privatization effect is, still, insignificant even if we control for industrial group dummy variables. To the opposite of the privatization effect, the result for logarithm of size of the firm shows a negative effect on labor productivity and positive effect on value added share. Being an exporting firm has a positive effect on labor productivity which is significant at 5% level of significance, and firms which have reported shortage of raw material as a



first major problem have 0.1141 lower value added share as compared to those which have not reported, which is significant at 5% level of significance.

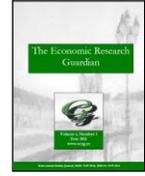
Table 4 - Estimation result controlling for industrial group dummies with random effect model

Variables	Labor productivity			Value added share		
	Coef.	t	P>z	Coef.	Z	P>z
Priv	1.432176	0.17	0.865	-.4847805	-1.11	0.269
Ownership	-2.292562	-0.27	0.787	.4749439	1.07	0.283
LnSize	-4.330839	-4.83	0.000	.1256775	3.30	0.001
Experience	-.0779871	-0.57	0.565	-.0007301	-0.14	0.888
LnExperiSquared	.2494859	0.18	0.857	.0061076	0.10	0.920
ImportRM	-1.426707	-0.68	0.498	-.1088988	-1.05	0.294
SRM	-1.137712	-1.27	0.203	-.1140496	-2.39	0.017
Export	3.656498	2.28	0.023	.0291034	0.36	0.721
D ₁ food	-15.69709	-1.27	0.203	-.2961291	-0.83	0.407
D ₂ Beverage	-13.77176	-1.08	0.281	-.0457882	-0.13	0.899
D ₃ Textile	-18.16764	-1.46	0.145	-.2756946	-0.78	0.438
D ₄ Leather	-19.58625	-1.51	0.130	-.2729856	-0.73	0.463
D ₅ W&F	-31.82299	-2.13	0.033	.2233199	0.52	0.605
D ₆ P&P	-28.79256	-1.71	0.088	.1782948	0.38	0.706
D ₇ Chemical	-19.5626	-1.47	0.142	.0567346	0.15	0.882
D ₈ R&P	-19.40713	-1.33	0.183	-.1416639	-0.35	0.730
D ₉ NonMetal	-22.11596	-1.65	0.099	-.0113769	-0.03	0.976
D ₁₀ Metal	-26.48145	-1.58	0.114	-.0635146	-0.14	0.891
Constant	57.01938	3.93	0.000	-.1841077	-0.37	0.709
Model test	Waldchi2	37.83	0.0041	Waldchi2	32.75	0.0179

Source: Own Computation Based on Data Obtained from Central Statistical Agency.

The tobacco industrial group being the reference in which being in another industrial group is compared with it, being in a wood and furniture, paper and printing and non-metal industrial groups only have a significant result for labor productivity. While being in a wood and furniture industrial group is associated with 31.823 lower labor productivity which is significant at 5% level of significance, being in a paper and printing, and non-metal industrial groups is associated with 28.79 and 22.15 lower labor productivity which is significant at 10% level of significance. Being in any industrial group has no significant impact on value added share.

In general, the findings of the study, as it can be seen from the implications of the above regressions, is an overall insignificant effect of privatization on the selected variables of efficiency. These findings are different from the literatures reviewed for the Ethiopian case, in that, what comes out is privatization has neither positive nor negative impact, but, just insignificant impact. Whereas Worku (2000) concluded that privatized firms have operated inefficiently in the post privatization period, Muluken (2010) concluded the privatized firm considered has been seen to have negative



improvement in the post privatization period. In contrary to the above studies, Alemayehu (2015) found a mixed result, where privatization is seen to have positive impact on some variables.

5. Conclusion

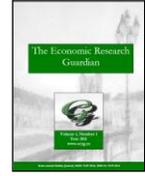
The overall findings of this study are in support of insignificant impact of privatization on the efficiency of firms. In the above analysis, privatization is found to have an insignificant effect in all cases. Also, the impact of experience of the firm is also found to have an insignificant effect on the efficiency of the firms. This is also the case for logarithm of the square of experience of the firms, which is included to show the dynamic effect of age of the firm. Being an exporting firm and reporting shortage of raw material as a first major problem, on the other hand, are found to have a significant effect on the selected proxy variables in some cases. Intensity of imported raw material is also found to have an insignificant effect.

The overall insignificant impact of privatization, perhaps, implies the existence of management and coordination problem during the process of privatization. This can also be resulted from the inability of the private sector in managing such large and medium scale manufacturing firms. This, however, needs to be supported with evidence that, the private sector is better in other areas of business such as wholesale and retail trade and other service sector businesses. It might also be the case that government was privatizing inefficiently operating firms, which needs a longer period to restructure the condition of firms.

In general, the findings of the study pose a question whether the privatization program should continue in the aim of achieving goals other than efficiency or the government should refrain itself from undertaking the program. Hence, the solution depends on which aim is given priority in the government side. If the privatization program is being implemented in the motive of increasing efficiency of firms as a major and immediate objective, it is better to stop the process, since it has nothing to do with improvement in efficiency. On the other hand, if the motives other than increasing efficiency such as promoting participation of the private sector and generating revenue outweigh as causes of implementing the program, the assessment of its effect on these goals is important to provide a realistic recommendation. Since, being an exporting firm is associated with higher labor productivity, it is advised to implement different policy measures aimed at transforming non-exporting firms to exporting firms, the assessment of cause and effect relationship of being an exporting firm and efficiency being important. Finally, shortage of raw material, which is found to affect value added share of firms' significantly, should be solved by giving priority to these firms in the provision of different incentive measures.

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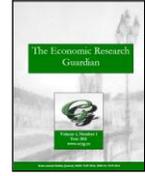
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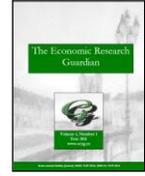
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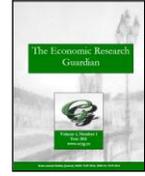
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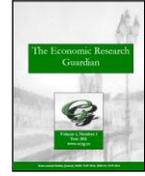
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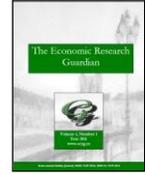
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Appendix

Table 5 - Definition of variables

Variables	Definition of variables
$effi_{it}$	Labor productivity (Labpro) which is a ratio of gross value of production to wages and salaries, or Value added share which is share of the firm's contribution to the final product measured as value added by the firm's gross value of production
$Priv_{it}$	dummy equals to 1 if year t is a post privatization period and 0 otherwise
$Ownership_{it}$	dummy equals to 1 if the firm is privately owned and 0 otherwise
$LnSize_{it}$	logarithm of size of the firm, which is measured as total number of permanent employees
$Experience_{it}$	experience of the firm measured as age of the firm since its commencement
$Lnexperisquared_{it}$	logarithm of the square of experience of the firm
$ImportRM_{it}$	imported raw material intensity measured as the ratio of imported raw material to total raw material used
SRM_{it}	dummy equals to 1 if the firm reported shortage of raw material as a first major problem and 0 otherwise
$Export_{it}$	dummy equals to 1 if the firm have exported in year t and 0 otherwise
D_1food_i	dummy equals to 1 if firm i belongs to the food subsector and 0 otherwise
$D_2Beverage_i$	dummy equals to 1 if firm i belongs to beverage subsector and 0 otherwise
$D_3Textile_i$	dummy equals to 1 if firm i belongs to the textile subsector and 0 otherwise
$D_4Leather_i$	dummy equals to 1 if firm i belongs to the leather subsector and 0 otherwise
$D_5W\&F_i$	dummy equals to 1 if firm i belongs to the wood and furniture subsector and 0 otherwise
$D_6P\&P_i$	dummy equals to 1 if firm i belongs to the paper and printing subsector and 0 otherwise



$D_7\text{Chemical}_i$	dummy equals to 1 if firm i belongs to chemical subsector and 0 otherwise
$D_8\text{R\&P}_i$	dummy equals to 1 if firm i belongs to the rubber and plastics subsector and 0 otherwise
$D_9\text{NonMetal}_i$	dummy equals to 1 if firm i belongs to non-metal subsector and 0 otherwise
$D_{10}\text{Metal}_i$	dummy equals to 1 if firm i belongs to the metal subsector and 0 otherwise
ε_{it}	the error term