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Ownership, Management Practices, Upgrading, and Productivity in the Metalworking sector: Evidence from Ethiopia

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Table of Contents

Acronyms	v
Abstract	v
1. Introduction	1
2. Conceptual framework.....	2
3. Data.....	5
4. Empirical strategy	9
5. Estimation results	11
6. Conclusions	23
References.....	24
Annex	27

List of Tables

Table 3.1. Baseline characteristics of sampled enterprises by ownership status	6
Table 3.2. Record keeping, marketing, and management practices over time by ownership status	7
Table 3.3. Upgrading, employment, and accounting-based measures of performance over time by ownership status	9
Table 5.1. Estimation of recordkeeping and marketing practices using data prior to the Kaizen training	13
Table 5.3. Estimation of enterprise performance indicators prior to the Kaizen training	16
Table 5.4. Growth between 2011 and 2009 in selected business practice and performance indicators	18
Table 5.5. Panel data estimation of management practice scores and upgrading scores.....	19
Table 5.6. Random effect estimation of enterprise performance indicators	20

List of Figures

Figure 5.1. The correlation between labor productivity and Kaizen management score by ownership status.....	15
Figure 5.2. The kernel density estimates for labor productivity by ownership status	21
Figure 5.3. The correlation between productivity and enterprise size over time	22

Annex

Annex A.1. Stability of production over time	27
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Acronyms

FDI	Foreign Direct Investment
GLS	Generalized Least Square
ITT	Intention to Treat Effects
JV	Joint Venture
MNC	Multi National Company
OLS	Ordinary Least Square
SD	Standard Deviation
SOEs	State Owned Enterprises
TFP	Total Factor Productivity
2SLS	Two Stage Least Square

Abstract

In the economics literature, it is often hypothesized that foreign owned enterprises possess advanced technological knowhow and higher quality managerial capital. Several studies have systematically contrasted FDI enterprises and local producers to explore the presence (or lack) of observable differences in size, productivity and management, and upgrading practices in the context of developing countries. Of these studies, however, many are not able to separate the effects of ownership difference from difference in the management style as they consider management skills to be unobservable in their models. We rely on rich sets of longitudinal data from the metalworking sector in Ethiopia, Addis Ababa, to explore whether and why foreign operated enterprises perform better and whether the observed differences in enterprise performance is due to differences in ownership (being foreign operated as opposed to domestic) or whether they can be explained by other confounders. We then attempt to trace the sources of these differences to variations in the ways the firms are operated. We find that foreign owned enterprises are endowed with better quality managers; a result which seems to explain considerable variations in management practices and upgrading investments among enterprises. Our findings also suggest that the presence of such significant management quality difference appears to underlie the substantial heterogeneity (by ownership status) observed in productivity, sales revenue, and profitability.

Keywords: Africa, Ethiopia, metalworking, foreign ownership, education, management practices
JEL: O14, D22, L33,

1. Introduction

After years of economic doldrums, sub-Saharan Africa has recently enjoyed high rates of economic growth accompanied by historically high levels of commodity prices and exports. Despite the impressive economic growth, production organization in the continent has, however, remained heavily dominated by the agricultural sector, and labor intensive manufacturing jobs are yet to widely emerge. Instead, studies indicate that labor has been increasingly reallocated from high productivity jobs to low productivity jobs since the 1990s (McMillan and Rodrik 2011). While the manufacturing sector's role in employment, output, and export has remained paltry, the production of low quality products has damaged the international competitiveness of African manufacturers¹.

Economists and policy makers have long recognized that structural transformation is not possible without a robust growth in the manufacturing sector (e.g., Page 2012). Without improving productivity, it is not clear how such structural transformation would occur in sub-Saharan Africa. Asian experience amply demonstrates that enterprises in sub-Saharan Africa have to persistently acquire better technological and managerial skills to improve their productivity, value-addition, and profitability (e.g., Sonobe and Otsuka 2006, 2011). Indeed, Page (2012) argues that building a firm's capability is an essential component of any strategy aimed at reinvigorating the manufacturing sector in Africa. This can be further reinforced by the devising of smart policies and strategies that promote the flow of foreign direct investment (FDI). FDI is particularly important in bridging the wide deficit in managerial knowledge and technical capability observed in many low income economies. While it is presumed that foreign enterprises are superior in terms of both management and technology and local enterprises would gain considerably from demonstration and spillover effects, some studies indicate that this effect is often derived from the presence of multinational companies (MNC) rather than foreign ownership per se (e.g., Bellak 2004; Blalock and Gertler 2008)². The recently emerging literature on technology transfer suggests that local suppliers linked to MNCs are likely to enjoy productivity gains from FDI (e.g., Javorcik and Spatareanu 2008). However, even in the presence of MNC, it is not immediately clear why and whether there is a wedge in performance between foreign owned firms operating in developing countries and domestically owned firms. This has an important policy implication for investment promotional strategies as the *raison d'être* for preferential treatment of foreign-owned enterprises is often their supposed high technological and managerial capital, and the possible spillover effects to the rest of the economy.

Using survey data from China, Murakami et al. (1994 and 1996) find significant differences in efficiency among state-owned enterprises (SOEs), township-villages, urban collectives, and joint venture enterprises. Such types of studies are, however, rarities in the context of sub-Saharan Africa; while it is routinely argued that differences in ownership structure influence measured enterprise outcomes, few studies have systematically investigated the presence of such differences in the African context. More surprisingly, the factors associated with performance differences among these groups of enterprises are largely unknown, except for some anecdotal accounts. The purpose of this paper is thus to contribute to this missing strand of literature in industrial development in low income economies.

Since the liberalization reforms initiated in 1991, SOEs, domestic private enterprises, wholly foreign owned enterprises, joint ventures, and parastatal (endowment-owned) enterprises have coexisted in Ethiopia. This paper employs longitudinal data from the metalworking sector in Addis Ababa, Ethiopia, to explore whether differences in capability between foreign and joint venture enterprises on one hand and state-owned enterprises (SOE) and domestic

¹ Africa's share in "global light manufacturing" stood at less than 1 percent (Dinh et al. 2012)

² Bellak (2004), for example, argues that there is no evidence for the existence of performance gaps between foreign and private domestic firms; thus, there is limited empirical foundation for enacting discriminatory policies targeting the promotion of foreign direct investment. Similarly, based on data from two nationwide surveys conducted in China, Xu et al. (2006) conclude that privately owned Chinese firms had much higher performance than foreign enterprises.

private enterprises on the other hand exist and which factors derive such differences. We also examine the association between human capital endowment of enterprises with management practices, investment in upgrading and enterprise performance, and explore whether such association would have varying effects depending on the ownership status of enterprises within the same industry.

The relevance of various types of management practices and their effect on enterprise performance is highly influenced by the nature of the market and the policy environment the entrepreneur is operating in. Thus, a study employing data from enterprises producing similar products in one industry would improve the validity of the empirical results obtained by relating these practices to enterprise performance. While we recognize the limits to generalizability of our study, unlike case studies that are commonly employed to explore such issues, our evidence from the enterprise survey using econometric techniques is less likely to face criticism for being atypical, or ephemeral.

A major finding is that foreign operated enterprises are endowed with higher quality managers, and thus score significantly higher in several measures of record keeping, workshop management, marketing, and Kaizen practices. The results also indicate that these groups of enterprises are more likely to engage in product upgrading and investment in technology acquisition and in the introduction of new marketing and distribution channels. We also find that foreign operated enterprises are more productive, employ higher proportion of skilled workers, have higher sales turnover and profitability compared to domestic private enterprises. The difference in managerial capital and business practices seems to explain the performance disparities observed among the two groups of enterprises. This claim is further reinforced by our finding that shows stability of labor productivity overtime in foreign companies compared to domestic private enterprises. This suggests that management practice is more standardized in the former group of enterprises, and, hence, performance measures would not fluctuate widely overtime.

The rest of the paper is organized in the following manner. Section 2 presents the conceptual framework of this study and discusses the testable hypotheses. Section 3 describes the data set used in the study. The empirical strategy employed to treat the data is outlined in section 4. Section 5 discusses estimation results in detail. The final section concludes.

2. Conceptual framework

The conventional approach until the 1990s emphasized that the lack of competitiveness of enterprises in the developing world is due to high relative cost of capital goods and the source of growth would be found in opening up of markets (Cantwell and Fei 1999). This thinking has its foundations in the neoclassical literature that downplayed the prohibitive costs that market failures impose on transferability of knowledge. Enterprises are further assumed to have unbounded information regarding all relevant production and management technologies which they can then assimilate instantaneously, effortlessly, and without cost. According to this strand of thinking, enterprises in developing countries face a set of alternative technologies and given factor prices and resource endowment, they try to optimize by choosing the best technology to use; “profit maximizing level of technology” (Romijn 1999).

This assumption of only temporal shift from optimum implies that enterprises are always on their production possibility frontiers and thus are efficient. Thus, producers would remain efficient through costless and effortless adoption of technology created elsewhere as long as international trade functions smoothly. This in turn implies that technological progress in

developing countries is entirely dependent on the technology advancement of developed countries as the former are assumed to be passive choosers of technology (Romijn 2001). By extension, this argument—when reinforced by the commonly held neoclassical belief that governments have imperfect ability to promote industrial development—suggests that there is limited room for policies aimed at industrial promotion.

Recently, however, a lighter version of this paradigm—often dubbed “soft industrial policies”, which approves non-discriminatory and price-neutral policies to promote mainly labor intensive industries in low income economies—has gained momentum (e.g., Harrison and Rodriguez-Clare 2009; Lin 2011). This renewed belief in the potency of policies is the result of the recognition of the limits to market forces in developing countries. The ubiquity of market failures, due information asymmetry, externalities and transaction costs, obstruct industries from being established or taking off in these economies. This improved understanding regarding the nature of markets in Africa is hoped to reverse the policy neglect of vital manufacturing industries that are relatively less labor intensive but have considerable latent comparative advantages (e.g., Dinh et al. 2012). One such sector that has rarely benefited from the state’s or aid agencies’ support in Ethiopia is the metalworking sector³.

The metalworking sector is instrumental to promote the growth of other labor intensive industries as it carries the potential for indigenous technological progress that enhances productivity in related industries (Romijn 1999). This involves the supply of capital goods, accessories, spare parts, and machining services to the latter. Most importantly, the metalworking sector provides better opportunity for the employment and experimentation of new technologies which creates larger scope for incremental growth and innovation. Further, this interdependence is an important conduit for the introduction and diffusion of technological information in the manufacturing sector at large. Thus, in growing economies like Ethiopia, the metalworking sector is critical for the growth and development of other industries (Sonobe et al. 2011, 36–37).

Despite the long history of iron casting and blacksmithing in Ethiopia, the metalworking industry is, however, fraught with low productivity and slow growth both in output and employment. To the author’s knowledge there are several anecdotes, but systematic studies to understand the factors associated with enterprise performance in the sector are scanty. A previous study by the author using data from this sector, for example, finds that technology transfer through the employment of foreigners is significantly correlated with higher productivity and enterprise size⁴. A corollary of the finding is that foreign-owned firms are technologically and managerially superior and hence operate enterprises more efficiently. Indeed, policy makers in developing countries are commonly observed extending generous incentive packages to attract and retain foreign direct investment, sometimes by overpaying foreigners in face of competing neighbors who also offer generous FDI incentives. Such motives are predicated on the presumption that, beyond generating employment, foreign direct investment is the source of positive externalities in the form of international procurement, technology of production, and international marketing knowledge, among others.

³ A possible explanation is that the production organization in the metalworking sector is relatively capital intensive, and prior experience from former socialist countries indicated that the push to develop the sector was a complete failure as excessive capital was mobilized to the sector while labor was almost treated as a free input (e.g., Granick 1957). In the same spirit, in the industry development strategy of Ethiopia which was drafted in 2002, the metalworking sector did not make it to the list of strategic sectors that were vetted for active state support, while the document identified other labor intensive industries, such as garment and textile and agro-processing sectors, for explicit consideration and state support.

⁴ Since cross-sectional and recalled data were employed for the analysis, a concern regarding unobserved heterogeneity arises. Thus, using such a data set, only loose claims can be made regarding the relationship between technology transfer and enterprise performance due to the possibility of reverse causality. The use of several rounds of surveys would partly mitigate this problem.

Some studies, however, suggest that such effects are often the result of MNCs with better technological capability and rich production and management experience (Bellak 2004; Moran 2007). There are, however, several reasons why foreign-owned and joint venture firms would perform better than domestically owned private enterprises regardless of their MNC status. First, there is a selection effect whereby foreigners' choice to enter into the domestic market would be motivated by their technological superiority. This advantage can be embedded in skills, machines, and management styles. Management practice in foreign companies, for example, is more standardized, and, hence, productivity and output are often stable overtime. Second, foreign and joint venture firms are more likely to overcome the credit (finance) constraint faced by local enterprises in developing countries as they often come from economies where financial markets are more developed and mature (e.g., Dunning 1981). Third, foreign and joint venture companies are better in international supply-chain management, input procurement, and international marketing⁵.

In this study, we particularly focus on management practices, improvement in product design, upgrading, productivity, and employment differences between local enterprises (both domestic private and SOEs) and foreign and joint venture enterprises in the metalworking sector. A hypothesis that can be drawn from the foregoing discussion is that in all measures of business practice and outcomes, the latter group of enterprises should perform better. Evidence in favor of this hypothesis would indicate that there is an opportunity for local enterprises to benefit considerably through technology and management learning. The diffusion of production knowledge through spillover effects, gain in efficiency due to greater competition and improvement in quality of inputs, and better labor and inventory management would result in improvement in enterprise performance⁶. For example, Javorcik (2008) finds that firms in Czech Republic and Latvia have learned about "new technologies and marketing techniques" from foreigners operating in their sector.

Another form of knowledge transfer includes short-term training programs that teach improved management and production knowledge. Like all other productive resources, the supply of capable and knowledgeable managers using and improving existing technology efficiently is limited in many of the sub-Saharan African countries, and Ethiopia is no exception. Under this circumstance, formal training can be a game changing experience for enterprises by enhancing their internal capability and enabling sustained growth. Unfortunately, however, entrepreneurs in the developing world rarely receive formal training that teaches them how to operate their businesses efficiently (Karlan and Valdivia 2011). Especially important is management training that enables entrepreneurs to acquire knowledge and skills related to their work requirements through formal, structured, and guided means (Westhead and Storey 1996). Empirical support for the beneficial effects of management training on basic management practices—including procurement and marketing, product upgrading, and productivity improvement—is increasingly available (e.g., Bloom and Van Reenen 2007; Bloom et al. 2010, 2011; Drexler, Fischer, and Schoar 2010; Field, Jayachandran, and Pande 2010; Karlan and Valdivia 2011; Mano et al. 2011; Abebe and Sonobe 2012; Bruhn, Karlan, and Schoar 2012). Many of the recent studies of this issue involve randomized controlled experiments, in which enterprises are assigned randomly to a treatment group, which receive management training or consulting service, or to a control group, which is not treated.

⁵ In contrast, foreign-owned firms may face higher costs of navigating local supply networks, dealing with local bureaucrats, high information acquisition and transaction costs, and high costs of keeping knowledge, which gives them the key edge over their local competitors, secrete in their host country. In addition, joint ventures are prone to conflicts between the foreign investors and the local partner. In China, for example, such conflicts resulting in "equity unilateralization", a situation where the joint venture eventually ends up under the complete ownership of the foreign investor consolidating his share by buying out the local partner, is common (Xu et al. 2006). This implies that foreign-owned enterprises may not always necessarily perform better than locally owned enterprises.

⁶ Bloom and Van Reenen (2007) find that the intensity of market competition is positively and significantly correlated with management practices across firms and countries.

We have similarly offered two types of training for randomly selected groups of enterprises. The first was classroom based training where entrepreneurs were taught basic management lessons in a problem-centered and participatory way. The second training was an on-site consultation offered at the production sites of selected entrepreneurs. This involved identifying routine work place problems with the help of experienced instructors and discussing possible cost-effective solutions to tackle such problems. We generally expect that such interventions would improve the performance of enterprises considerably.

Since there is an accompanying paper that discusses the details as well as the effects of the training on measured enterprise performance (Shibanuma 2012), here we will not discuss much about the training; we only mention the training for the sake of completeness. We rather elect to concentrate on discussing several types of scores we compute to capture record keeping practices, management capital, and upgrading and Kaizen scores in both pre- and post-training periods. We then explore how these measures are linked with the ownership status of enterprises.

3. Data

Prior to the first round of the metalworking survey, a preliminary survey was conducted in April, 2008. Subsequently, data on 12 basic metal enterprises, 5 state-owned enterprises, and 108 engineering enterprises that employ more than 5 workers in and around Addis Ababa were collected in May, 2008. In total, the first baseline data gathered information from 125 enterprises. We solicited information on sales, costs, management practices, owner/managers profile, and the number of local and foreign technicians. In addition, the data set contains the replacement costs of machinery and equipment and total recalled sales and costs from 2003 to 2008.

Four rounds of follow-up surveys were then conducted between 2009 and 2012. The sample size declined in these follow-up surveys due to attrition and the exclusion of basic metal enterprises in the last rounds of surveys. Annual data were extracted from these surveys to calculate TFP, labor productivity, value added, sales, gross profit, employment, and employment growth to indicate enterprise performance. Management practice score variables were constructed from questions detailing several management practices of enterprises. Since we do not have an adequate number of observations in each group of enterprises to make inference, we lump wholly foreign owned and joint venture enterprises into foreign operated (owned) enterprises rather than treating each group separately.

Tables 3.1, 3.2 and 3.3 present descriptive information on the sample of metalworking enterprises in and around Addis Ababa. Table 3.1 shows that managers operating foreign and joint venture enterprises are more educated and experienced compared to domestic private enterprises, while managers operating SOEs are equally educated and experienced as the former group. The average years of schooling of the manager in the metalworking sector is 14.5 years, which appears to be high compared to other sectors in Addis Ababa. For example, Sonobe et al. (2009) report that the average years of schooling in a sample of shoe producers in the same city is 11.8. Abebe and Sonobe (2012), however, find that the year of schooling of managers operating Ready Made Garment factories is 15.5. Education is often highly correlated with managerial quality that is crucial for running a profitable business. Foreign operated enterprises and SOEs are thus endowed with higher quality managers with better management and business skills.

Table 3.1. Baseline characteristics of sampled enterprises by ownership status

	Domestic private		Foreign and JV		SOE		All	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years of schooling	13.9	3.45	17.1***	1.73	17.8	0.84	14.48	3.55
Manager's age	43.1	12.6	50.8**	13.9	49.8	11.7	44.2	12.8
Years of operation	9.4	9.76	23.3***	20.36	39.2	13.0	12.0	13.1
Years of top management	7.18	7.86	9.50	16.89	7.50	6.52	7.40	8.94
Year of prior experience in metalworking sector	9.14	7.97	10.0	10.23	13.8	2.86	9.39	8.02
Year of prior experience in non-metalworking sector	4.18	7.60	4.00	6.11	7.80	3.49	4.24	7.31
Years prior management experience	4.13	5.83	8.67	9.26	7.00	7.18	4.71	6.35
Years of prior marketing experience	0.99	3.45	0.92	1.78	0.00	0.00	1.05	3.46
Years of residence abroad	1.00	3.41	0.58	2.02	0.20	0.45	1.14	3.87
Is a basic metal enterprise	0.08	0.28	0.17	0.39	0.20	0.45	0.10	0.30
Were invited for classroom training	0.46	0.50	0.42	0.51	0.20	0.45	0.44	0.50
Participated in the training	0.37	0.48	0.17	0.39	0.20	0.45	0.34	0.47
Were invited for on-site training	0.42	0.50	0.33	0.49	0.20	0.45	0.40	0.49
Participated in the training	0.39	0.49	0.17	0.39	0.20	0.45	0.35	0.48
Number of observations	105		13		5		124	

Source: Author's calculations based on survey data

Notes: JV = joint venture; SOE = state-owned enterprise; Test of the difference in the means (Domestic private – Foreign and JV) is conducted, *** p<0.01, ** p<0.05, * p<0.1

Table 3.1 also shows that foreign operated enterprises are significantly older compared to domestic private enterprises. Since firm survival is highly correlated with productivity (e.g., Shiferaw 2006, 2009), one possible explanation for the presence of older foreign-owned enterprises is that they are more efficiently operated and hence are long lived compared to domestic private enterprises. Alternatively, the difference could be explained by selection effects whereby our sample mostly contains foreign operated enterprises that survive, while ignoring those that exit. This would obviously inflate the average age of foreign owned enterprise upward. However, since we also do not have information on domestic enterprises that are short-lived, one can argue that a similar selection effect would be present among domestic enterprises, equally leading to the overstatement of their age in the sample. It is thus not immediately clear if the observed age differences could be wholly attributed to a selection effect in the sample or to survival induced efficiency.

Good documentation is one of the most important management tools businesses possess. Without keeping proper records of their transactions, firms cannot easily obtain accurate information on the status of their business. Beyond meeting tax obligations, this is particularly important to gather information regarding which lines of the enterprise's activity are profitable and which areas are problematic and hence are drags on profits, and what types of financial commitments are beneficial. Records also help the enterprise to keep track of its performance against own projections.

Table 3.2 presents several record keeping practices for the three groups of enterprises for the three years period. The first panel presents the mean of record keeping scores which are computed by horizontally summing the respondents' answers for yes or no questions on whether they keep records on sales, purchase, raw material inventory, finished product inventory, and transaction with workers. The results show that in years when data are available, foreign operated enterprises are more likely to keep records of their business transactions on most of the items listed above. These enterprises are also more likely to prepare periodical financial reports. The results presented in columns 5 and 6 suggest that managers in foreign and joint venture enterprises have better information regarding the

status of their business compared to managers operating domestic private enterprises. Columns 8 and 9, on the other hand, show that SOEs have a strong tradition of record keeping, perhaps reinforced by their formality and tax obligations by law.

Table 3.2. Record keeping, marketing, and management practices over time by ownership status

	Domestic private			Foreign and JV			SOE		
	2009 (1)	2010 (2)	2011 (3)	2009 (4)	2010 (5)	2011 (6)	2009 (7)	2010 (8)	2011 (9)
Record keeping practices									
Total record keeping score (max=5)	Na	3.80	3.74	Na	4.85*	5.00**	Na	5.00	5.00
Individual transactions are recorded at least once in a week (max=5)	Na	3.52	2.31	Na	4.62*	3.46*	Na	5.00	2.00
Total transactions are computed at least once in a week (max=5)	Na	2.56	0.46	Na	2.69	0.92	Na	4.20	1.00
Preparing financial reports (max=5)	Na	4.19	4.27	Na	4.62	5.00***	Na	5.00	5.00
Marketing practices									
Advertizing (%)	Na	22.0	35.0	Na	46.0**	46.0	Na	100	70.0
Signboard (%)	Na	37.0	42.0	Na	92.0***	82.0**	Na	80.0	70.0
Number of signboards	Na	0.50	0.68	Na	1.08**	2.00***	Na	1	3
Issue business card (%)	Na	80.0	73.0	Na	69.0	91.0	Na	100	100
Enumerator's evaluation (%)									
Store tools in designated places	62	62	60	77	77	81	80	80	67
Store tools in a way that workers can easily find them	73	70	81	100**	100**	91	100	100	100
Store raw materials in designated places	79	78	65	92	92	91	100	100	100
Store raw materials separately from scraps	87	87	93	100	100	100	100	100	100
Store raw materials in a way that workers can easily find them	77	73	87	100**	100**	80	100	100	100
No metal cutting scrap scattered around the floor	22	21	15	31	23	64***	40	40	67
No metal cutting scrap scattered on machines	23	20	15	39	31	55***	40	20	33
Cleaning equipment is in the workshop	94	96	88	100	92	91	100	100	100
Number of observations	105	105	83	12	12	10	5	5	5

Source: Author's calculations based on survey data

Notes: Test of the difference in the means (Domestic private – Foreign and JV) is conducted, *** p<0.01, ** p<0.05, * p<0.1. JV = joint venture; SOE = state-owned enterprise; NA = not available.

A related business tool that is important for successfully expanding or retaining market shares is the use of marketing practices, such as advertizing. As shown in Table 3.2, more than 45 percent of foreign owned enterprises advertized their product both in 2010 and 2011, while only 22 percent and 35 percent of locally owned enterprises put out ads in 2010 and 2011 respectively. Likewise, less than 45 percent of domestic private enterprises use signboards with an average of 0.70 boards in the vicinity of the enterprise. The corresponding figure for foreign operated enterprises is much higher; more than 80 percent of enterprises had a signboard in 2012 with 2 signboards on average. Table 3.2 shows that SOEs and foreign owned enterprises are more aggressive in using marketing tools to sell their products compared to domestic private enterprises.

The bottom panel of Table 3.2 shows scores for a number of management practices at the work place based on the enumerators' own evaluation. Enumerators were asked to observe and rate practices at the workplace by visiting key areas where production takes place⁷.

⁷ Since EDRI used enumerators with rich experience in enterprise survey and since they were further intensively trained to carefully observe and record workplace activities to correctly match their observations with questions on the questionnaire, a concern regarding their quality is lessened (e.g., Shibanuma 2012).

Not surprisingly, enumerators reported that all the foreign operated enterprises store tools in a manner that workers can easily retrieve them, while the corresponding figure for domestically owned private enterprise is between 70 to 81 percent as indicated in the second row of the bottom panel of Table 3.2. Enumerators observed a similar situation for the storage of raw materials. The domestic private enterprises also appear to be less careful in keeping their stores and machines clean. This would certainly increase the task of production workers as they would have to go through non-value adding activities working in messy, unpleasant, and unsafe working conditions.

Table 3.3 decomposes several upgrading and enterprise performance indicators by ownership status. Most differences in investment between domestic private enterprises and foreign and joint venture enterprises are not significant, however, in some years, foreign operated enterprises invested in additional machines and equipment and in acquisition of foreign technologies, and have also upgraded their product design (columns 4 and 6). Both the employment figures and the accounting-based measures of performance indicate that this group of enterprises are much larger and employ more skilled workers than the domestic private enterprises⁸. In 2011, for example, 6 percent of their workers have received university education compared to only 3 percent in the domestic private enterprises and 3 percent are engineers compared to 1 percent (as indicated in the third (fourth) row of the second panel, a statistically significant difference at 1 percent level of significance). A measure of labor productivity also shows that foreign operated enterprises exhibited greater productivity in all three years, a reflection of higher quality of management.

⁸ Table 3.3 shows that employment levels have significantly decreased in the foreign owned enterprises in 2011. This drop is because two enterprises, together employing 1200 workers in 2010, were not reached in the 2011 survey round, and hence were excluded in the mean employment calculation for 2011.

Table 3.3. Upgrading, employment, and accounting-based measures of performance over time by ownership status

	Domestic private			Foreign and JV			SOE		
	2009 (1)	2010 (2)	2011 (3)	2009 (4)	2010 (5)	2011 (6)	2009 (7)	2010 (8)	2011 (9)
Investment on (% of enterprises)									
Additional machines and equipment	22.0	60.0	42.0	54.0***	63.0	27.0	0.00	66.7	100
Building	2.00	7.00	7.00	8.00	18.0	9.00	0.00	33.0	0.00
Improving workers skills	11.0	23.0	12.0	8.0	36.0	27.0	0.0	33.0	67.0
Acquiring foreign technologies	3.00	1.00	0.00	8.00	0.00	9.00***	0.00	33.0	0.00
Upgrading organizational structure	16.0	8.00	16.0	31.0	18.0	9.00	0.00	67.0	33.0
Upgrading product design	18.0	29.0	25.0	46.0***	18.0	9.00	0.00	67.0	33.0
Introducing new forms of marketing and distribution	12.0	11.0	10.0	15.0	18.0	9.00	0.00	67.0	33.0
Employment									
Total number of workers	38.8	39.3	32.3	235.5***	161.6***	78.0*	513.8	604.4	606.3
Total number of production workers	27.2	28.3	23.4	193.9***	130.1***	54.4*	309.8	406.6	364.7
Proportion of workers with university education	0.02	0.02	0.03	0.05***	0.05***	0.06***	0.09	0.09	0.17
Proportion of engineers	0.008	0.009	0.01	0.02***	0.02***	0.03***	0.04	0.03	0.03
Proportion of marketing workers	0.07	0.07	0.05	0.11***	0.10**	0.10***	0.09	0.09	0.07
Accounting-based measures of performance									
Total sales revenue (in million birr)	11.7	11.3	5.97	63.2***	42.7***	49.2***	83.9	80	97.3
Value added (in million birr)	2.06	2.37	1.22	13.2***	11.3***	9.08***	30.7	29.7	18.9
Gross profit (in million birr)	1.78	2.07	1.01	9.61***	8.47***	8.06***	20.3	21.1	14
Consultant and advisors fee (in 10 ³ birr)	0.97	2.74	1.11	20.6***	28.0***	7.21***	19.2	18.1	0.00
Remuneration to foreigners (in 10 ³ birr)	0.00	1.81	2.20	0.00	0.00	0.51	85.5	72.3	0.00
Productivity									
Labor productivity	10.26	10.28	10.16	11.04**	11.22***	11.6***	11.3	11.23	11.62
TFP	-0.72	NA	NA	-0.13	NA	NA	1.76	NA	NA
Number of observations	105	105	83	12	12	10	5	5	5

Source: Author's calculations based on survey data

Notes: Test of the difference in the means (Domestic Private – Foreign and JV) is conducted, *** p<0.01, ** p<0.05, * p<0.1. JV = joint venture; SOE = state-owned enterprise;

Tables 3.1, 3.2 and 3.3 demonstrate that management quality in foreign owned enterprises is much higher than domestic private enterprises. This explains higher record keeping scores, greater intensity of marketing, and superior workstation environment observed in the former group of enterprises. Many of the foreign owned enterprises appear to have been engaged in upgrading their product by acquiring foreign technologies and employing more skilled workers. It is thus not surprising that foreign owned enterprises tend to be much larger in size with significantly higher sales turnover and profitability. The question that then arises is as to where these differences, in management quality, business practices, and workplace arrangements and upgrading, come from. After briefly discussing our empirical set up, we attempt to deal with this question in the subsequent section.

4. Empirical strategy

The main variables of interest are divided into five groups. The first group is composed of three variables that indicate record keeping practices. These are scores constructed by summing record keeping scores on sales, purchases, raw material inventory, finished product inventory, and transaction with workers; the sum is labeled total record keeping score. The second set of variables are three variables that indicate marketing practices,

such as advertizing, use of business card, and the number of sign boards in the vicinity of the enterprise. The third group consists of variables that indicate upgrading activities of the enterprise. This includes two dummies that capture whether production is consciously planned by measuring production time and whether product design has been upgraded. The remaining three variables indicate foreign technology acquisition, workers' skill improvement and structural change. For the latter, we adopt a loose definition in which we construct a variable for structural change by summing the scores that assume 1 if an enterprise has invested on machines and equipment, and on upgrading its organizational structure and introducing new forms of distribution and marketing channels.

The fourth set of variables includes Kaizen practices computed based on the enumerators' evaluation and respondents' assessment. Kaizen is a management style pioneered by Japanese producers which is literally translated as continuous productivity improvement (see Shibanuma 2012 for detailed discussion of Kaizen practices). Some of these practices are listed in the bottom panel of Table 3.2. The final sets of variables are conventional measures of enterprise size, such as number of worker, accounting-based measure of performance, such as sales revenue and profitability, and measures of productivity, such as labor productivity and TFP.

We employ two types of productivity measures: productivity using labor productivity, measured by the logarithms of the value added per worker, and total factor productivity. The latter would be computed using the following formula developed by Caves et al. (1982). The productivity measured obtained are labeled Malmquist indexes.

$$\ln TFP_{i,t} = (\ln Y_{i,t} - \overline{\ln Y_t}) + \sum_{s=2}^t (\overline{\ln Y_s} - \overline{\ln Y_{s-1}}) - \sum_j \frac{1}{2} (\alpha_{i,t,j} + \overline{\alpha_{t,j}}) (\ln X_{i,t,j} - \overline{\ln X_{t,j}}) + \sum_{s=2}^t \sum_j \frac{1}{2} (\alpha_{s,j} + \overline{\alpha_{s-1,j}}) (\overline{\ln X_{s,j}} - \overline{\ln X_{s-1,j}}) \quad (1)$$

where Y is measured by using valued added, X represents input costs (labor and capital), and $\alpha_{i,t,j}$ is the cost share of input j in period t in enterprise i . $\overline{\ln Y_t}$ represents the natural log of the average value added (output) and hence corresponds to the values of a hypothetical firm to which the value added (output) of other enterprises are compared.

Similarly, $\overline{\ln X_{t,j}}$ and $\overline{\alpha_{t,j}}$ show the average value of input j and its respective cost shares in the hypothetical enterprise. Therefore, the TFP index captures the relative productivity of enterprise i from our sample of enterprises in the metalworking sector. TFP data are only available for 2009 and for the earlier years (recalled data) as we failed to collect data on capital stock in the 2010 and 2011 surveys. There is a possibility of using investment rates in these years to produce capital stock figures by applying Perpetual Inventory method. However, since TFP is highly sensitive to the way capital is measured, a comparability issue would arise if capital stock is calculated in different ways for different periods. We thus forgo TFP index computation when data on capital stock is missing.

Depending on the nature of the dependent variable we employ several econometric techniques. Most of the score variables are left-censored at zero and right censored at certain positive values, c , where $c > 0$. The two limit-tobit model is then represented by the following generic formula.

$$Y_{it} = \begin{cases} 0 & \text{if } Y_{it}^* \leq 0 \\ Y_{it}^* & \text{if } 0 < Y_{it}^* \leq c \end{cases} \quad (2)$$

where Y_{it}^* is a latent variable that is modeled as

$$Y_{it}^* = \alpha_1 + X\beta + \delta_1 years_i + \gamma_1 Foreign_{it} + \theta_1 SOE_{it} + \rho_1 T + \varepsilon_{it} \quad (3)$$

where Y^* is a latent variable that the researcher cannot observe, and Y is an observable variable that assumes a zero or a bounded positive value based on the value of Y^* .

i subscripts enterprise, and t captures time when longitudinal data is used. X is a matrix for the human capital indicators of the manager operating the enterprise at the time of the data collection. This includes nationality, years of schooling, age, and years of prior working, management, and SOE experience. $years$ represents the years of operation of the enterprise. $Foreign$ is 1 if the enterprise is either wholly or partly owned by foreigner(s). SOE takes the value 1 if the enterprise is SOE. T is a time dummy and ε is a normally distributed homoscedastic error term⁹.

Equation (3) above can be modified to exploit the panel nature of our data and to explicit model invitations to the class room and on-site training programs. This would illuminate any Intention to Treat Effects (ITT) that may arise as the result of assignment to the treatment group. Equation (4) now contains the interaction between invitation to the classroom training (CR) and the 2010 year dummy (T_1) as well as the interaction between invitation to the on-site training (OS) and the 2011 year dummy (T_2).¹⁰

$$Y_{it} = \alpha_2 + X\pi + \delta_2 years_{it} + \gamma_2 Foreign_{it} + \theta_2 SOE_{it} + \rho_2 CR * T_1 + \rho_2 OS * T_2 + \mu_{it} \quad (4)$$

Random Effect Tobit and Random Effect Probit estimation techniques are employed when dealing with censored dependent variables. To reduce concerns associated with endogeneity, we mostly rely on the reduced form of regression. As robustness check, however, we employ two stage least square (2SLS) in some of our specifications. We also explore factors associated with the growth (or lack thereof) of Kaizen practices and standard performance indicators using data collected in 2009 and 2011.

5. Estimation results

Tables 5.1, 5.2 and 5.3 present the estimation results for record keeping, marketing, upgrading, and Kaizen practices as well as standard performance indicators using data collected in 2009. This would help us examine whether difference in ownership structure would lead to difference in measures of business practices and accounting-based measures of performance, such as sales revenue and profitability.

Table 5.1 shows foreign ownership dummy is positively but insignificantly correlated with all but one measures of record keeping and marketing practices. The most important variable that appears to explain record keeping and marketing practices is the education level of the manager. More educated managers are more likely to understand the importance of good documentation and record keeping practices. They also tend to recognize that standard marketing strategies, such as advertizing and use of signboards, are vital for their businesses' success. By catering to specific target audience, advertizing improves not only the marketability of the enterprise's product but also helps retain customers by continuously reminding them why they chose this supplier in the first place. Notice boards are also

⁹ We note a caveat associated with the application of Tobit model. Tobit estimation is often performed under the assumption of normal and homoscedastic errors. Unfortunately, however, unlike linear regression models, there is no easy way to test the violation of the homoscedasticity assumption. A way of to adjust deviations from homoscedasticity assumption in Tobit formulation could be to use bootstrapping of the standard errors. While this can adjust the standard errors, we cannot correct for the effects of heteroscedasticity on the point estimates. Our estimation is thus done with the commonly held assumption of homoscedastic errors.

¹⁰ The classroom training was conducted in 2010 and the on-site consultation was held in 2011.

relatively cheaper ways whereby the enterprise could seek recognition from prospective customers.

Table 5.1. Estimation of recordkeeping and marketing practices using data prior to the Kaizen training

	Record Keeping			Marketing		
	Total record keeping score Tobit (1)	Weekly records are kept ^a Tobit (2)	Preparing financial reports Tobit (3)	Advertisizing Probit (4)	Business card Probit (5)	Number of signboards OLS (6)
Years of schooling	0.67** (0.28)	0.42*** (0.16)	0.47 (1.18)	0.10** (0.05)	-0.01 (0.04)	0.08*** (0.03)
Age of the manager	0.08 (0.09)	-0.00 (0.05)	0.10 (0.36)	0.01 (0.01)	-0.02 (0.01)	-0.01 (0.01)
Years of operation	0.02 (0.08)	0.05 (0.05)	-0.33 (0.39)	0.00 (0.01)	-0.00 (0.01)	-0.01 (0.01)
Years prior management experience	0.11 (0.16)	0.01 (0.09)	1.68 (1.17)	0.01 (0.02)	0.01 (0.02)	0.02 (0.02)
Years of prior experience before joining the current enterprise	0.02 (0.11)	0.06 (0.06)	0.35 (0.57)	0.02 (0.02)	0.00 (0.02)	0.02 (0.01)
Years of residence abroad	0.01 (0.28)	-0.12 (0.13)	-0.34 (1.01)	-0.04 (0.05)	0.07 (0.07)	-0.03 (0.03)
Ethiopian National	1.74 (8.28)	-3.49 (3.81)	7.11 (41.62)	0.39 (0.82)	0.37 (0.94)	-0.49 (0.58)
Enterprise is foreign or JV	2.84 (8.21)	-2.41 (3.66)	17.9 (41.9)	0.80 (0.80)	0.12 (0.93)	0.10 (0.56)
Enterprise is SOE	33.84 (0.00)	24.36 (0.00)	149.9 (0.00)			0.15 (0.52)
Previous employment experience in SOE	2.07 (2.63)	-0.44 (1.39)	-1.54 (10.91)	0.39 (0.38)	0.51 (0.46)	0.20 (0.25)
Constant	-7.75 (9.91)	1.66 (4.71)	4.88 (47.16)	-3.25** (1.29)	1.27 (1.31)	0.03 (0.80)
Number of observations	123	125	125	119	119	124
Right censored observation	86	69	104			
Left censored observation	15	17	16			

Source: Author's calculations based on survey data

Note: ^a. Transactions are recorded at least once in a week; JV = joint venture; SOE = state-owned enterprise; OLS = ordinary least squares.

Similarly, in Table 5.1, years of schooling of the manager is positively and significantly correlated with the dummies that indicate measuring production time and upgrading product design. The former indicates whether production activity is performed on ad hoc bases or the production manager knows about the time cost involved in producing each product. Annex A.1 shows that production managers in the majority of sampled enterprises do not measure the current level of the average duration of each production activity. Annex A.1 also shows that cost revenue ratios appear to be weakly stable in those enterprises where production time is measured. A similar observation emerges when comparison between foreign operated and domestic enterprise is performed, a result consistent with Figure 5.2.

Table 5.2 indicates that an additional year of schooling of the manager increases the probability of upgrading product design by nearly 3 percent. This is consistent with finding of Nam et al. (2009) using data from the metalworking sector in Vietnam. They report that the manager's years of schooling is strongly correlated with the choice of producing better metal products, such as Angle Iron, instead of low end products, such as cut billets¹¹.

¹¹ Since we do not have product data we cannot be that specific.

Table 5.2. Estimation of upgrading, managerial practices, and Kaizen scores prior to the Kaizen training

	Upgrading					Kaizen Practices	
	Production time is measured Probit (1)	Upgraded product design Probit (2)	Improve workers skill Tobit (3)	Acquired foreign technology Tobit (4)	Introduced structural change Tobit (5)	Enumerator's evaluation Tobit (6)	Respondent's assessment Tobit (7)
Years of schooling	0.07* (0.04)	0.15** (0.06)	0.53 (0.32)	0.01 (0.01)	-0.00 (0.06)	0.04 (0.05)	0.01 (0.06)
Age of the manager	0.01 (0.01)	-0.05** (0.02)	-0.02 (0.07)	-0.00 (0.00)	-0.05** (0.02)	0.01 (0.01)	-0.03 (0.02)
Years of operation	-0.00 (0.01)	-0.04** (0.02)	0.00 (0.06)	-0.00 (0.00)	-0.03 (0.02)	-0.01 (0.01)	0.01 (0.02)
Years of prior management experience	0.01 (0.02)	0.09*** (0.03)	-0.07 (0.15)	-0.00 (0.00)	-0.01 (0.03)	0.04 (0.03)	0.06** (0.03)
Years of prior experience before joining the current enterprise	0.02 (0.02)	-0.03 (0.03)	-0.07 (0.10)	0.00 (0.00)	0.05* (0.03)	-0.01 (0.02)	0.07*** (0.02)
Years of residence abroad	-0.02 (0.04)	0.02 (0.04)	-17.1 (0.00)	-0.00 (0.01)	0.04 (0.06)	0.12** (0.06)	0.09* (0.05)
Ethiopian National	-0.36 (0.82)	0.84 (0.91)	0.22 (3.82)	-0.04 (0.11)	-0.47 (1.10)	-0.99 (0.94)	-0.59 (1.08)
Enterprise is foreign or JV	-0.16 (0.80)	1.54* (0.90)	-0.69 (3.82)	0.05 (0.10)	2.06* (1.08)	0.05 (0.91)	0.57 (1.05)
Enterprise is SOE	-0.87 (0.83)		-16.20 (0.00)	-0.00 (0.10)	-10.39 (0.00)	1.24 (0.89)	0.92 (0.98)
Previous employment experience in SOE	0.25 (0.36)	0.39 (0.43)	0.91 (1.70)	0.02 (0.05)	1.11** (0.54)	0.33 (0.44)	0.89* (0.52)
Constant	-1.93 (1.18)	-1.85 (1.42)	-10.51 (7.73)	0.03 (0.15)	1.64 (1.66)	5.23*** (1.37)	6.67*** (1.60)
Number of observ.	124	119	124	124	124	104	105
Right censored obs.			1	0	0	19	2
Left censored obs.			116	0	77	1	1

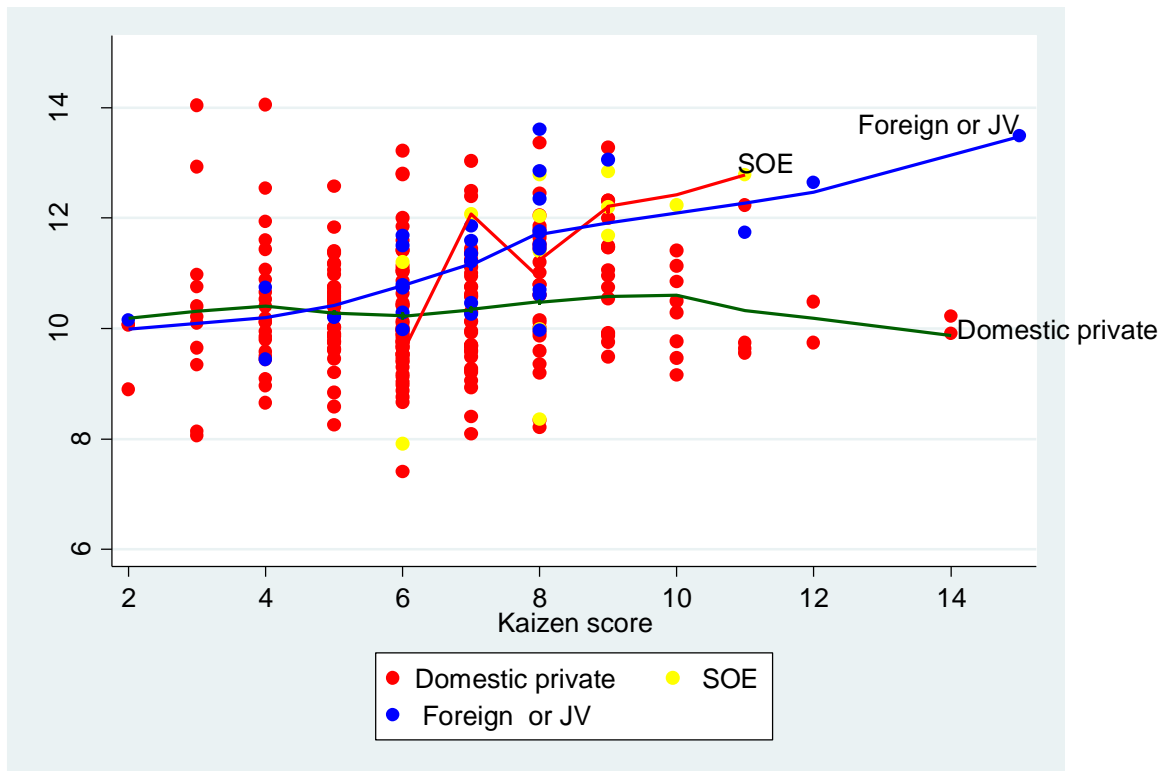
Source: Author's calculations based on survey data

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; JV = joint venture; SOE = state-owned enterprise.

Older managers and enterprises, however, seem to be less keen on improving their product design and introducing structural changes as indicated in columns 2 and 5 of Table 5.2. This is not surprising at least for the following three reasons. First, the costs of adoption of new products and practices are likely to be high for older enterprises, and as older managers are accustomed to working with traditional practices, their costs of adoption of new work practices would also be high. Second, there appears to be path dependence in the enterprise's business practices, where initial practices would have lasting impacts on future business practices of the enterprise in the presence of complementarities among practices (e.g., Ichniowski et al. 1995). Third, both managers and workers are often resistant to uncertainties induced by new changes and changes that demand learning new techniques or exerting more effort. Indeed, Ichniowski et al. (1995) find negative effect for firm age and tenure variables in the estimation of the adoption of modern human resource management practices. Similarly, Bertrand and Schoar (2003) find that older managers adopt conservative strategies that may not be necessarily desirable from the enterprise's point of view. Another variable that influences upgrading decision is the ownership status of the enterprise. As shown in columns 2 and 5, foreign ownership significantly affects product design upgrading and structural change variables positively. For example, being owned wholly or partly by foreigners increases the probability of product design upgrading by 48 percent. As

shown in Table 3.1, education and foreign ownership are significantly correlated; excluding the education variable from column 2 in Table 5.2 thus increases the effect of foreign ownership on the probability of upgrading by more than 10 percent to 60 percent. Figure 5.1 also illustrates that Kaizen practice scores are positively correlated with labor productivity in foreign operated enterprises and SOE.

Figure 5.1. The correlation between labor productivity and Kaizen management score by ownership status



Source: Author's calculations based on survey data
 Notes: JV = joint venture; SOE = state-owned enterprise

These results imply that the management style difference among foreign operated and Ethiopian owned firms is not just due to the fact that the latter managers are more educated, it is also due to some other observed or unobserved effects that bring about differences in management style. Since we don't capture corporate culture and differences in type and quality of education in our model, we cannot directly trace the source of the remaining differences. However, the decomposition of the manager's education level shows that 67 percent of foreign operated enterprises are run by managers with Business degrees, while only 18 percent of domestic private enterprises are run by managers who majored in business. This could partly explain more aggressive upgrading and structural changes in the foreign owned enterprises. For example, Bertrand and Schoar (2003) indicate that CEOs of large US firms with an MBA degree significantly pursue more aggressive managerial decisions and strategies than those without MBA degree.

According to Table 5.3, years of schooling of the manager also seems to be the best predictor of enterprise performance measures. In addition, both total years of prior experience and managerial experience are strongly correlated with many of the performance indicators. This is consistent with earlier studies using firm level data. Sonobe et al. (2002) and Nam et al. (2010), for example, respectively find that the performance of enterprises in Jili town in Zhejiang province of China and in the knitwear cluster in Northern Vietnam is significantly influenced by both the education level of the proprietor and his/her management experience.

Table 5.3. Estimation of enterprise performance indicators prior to the Kaizen training

	Number of workers	Sales Revenue	Value added OLS	Gross profit	Labor productivity	TFP
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Years of schooling	0.12*** (0.03)	0.21*** (0.06)	0.19*** (0.05)	0.20*** (0.06)	0.08** (0.04)	0.03 (0.04)
Age of the manager	0.02 (0.01)	0.02 (0.02)	0.01 (0.02)	0.02 (0.02)	-0.00 (0.01)	0.00 (0.01)
Years of operation	-0.00 (0.01)	0.00 (0.02)	-0.00 (0.02)	-0.01 (0.02)	0.01 (0.01)	-0.00 (0.01)
Years prior management experience	0.03* (0.02)	0.05 (0.03)	0.06** (0.03)	0.06* (0.03)	0.03 (0.02)	0.02 (0.02)
Years of prior experience before joining the current enterprise	0.02 (0.01)	0.05** (0.03)	0.04** (0.02)	0.05** (0.02)	0.03** (0.01)	0.00 (0.02)
Years of residence abroad	0.00 (0.03)	-0.01 (0.06)	0.01 (0.05)	-0.00 (0.05)	0.02 (0.03)	0.04 (0.03)
Ethiopian National	-0.21 (0.68)	0.07 (1.24)	-0.14 (1.04)	-0.14 (1.13)	0.30 (0.71)	-0.29 (0.94)
Enterprise is foreign or JV	0.85 (0.66)	1.65 (1.21)	1.55 (1.02)	1.45 (1.10)	0.69 (0.70)	0.28 (0.92)
Enterprise is SOE	2.31*** (0.60)	2.20* (1.12)	2.16** (0.94)	2.15** (1.07)	-0.03 (0.64)	1.97*** (0.74)
Previous employment experience in SOE	0.35 (0.30)	0.36 (0.57)	0.77 (0.49)	0.88* (0.53)	0.42 (0.33)	0.68** (0.34)
Constant	0.33 (0.93)	9.01*** (1.71)	8.84*** (1.43)	8.25*** (1.57)	8.32*** (0.98)	-1.18 (1.23)
R-squared	0.489	0.411	0.484	0.457	0.248	0.216
Number of observations	124	120	118	115	118	119

Source: Author's calculations based on survey data

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; JV = joint venture; SOE = state-owned enterprise; TFP = Total Factor Productivity; OLS = ordinary least squares.

Unlike Table 3.3, where foreign operated enterprises are found to be much larger, more profitable and productive, in Table 5.3, there is no statistical difference between foreign owned and private domestic enterprises in terms of these measures. Since education is highly correlated with several managerial and business practice indicators as shown in the earlier two tables, once we control for education, there appears to be little difference among the two groups of enterprises in 2009. A claim that we could maintain, arguably weakly, is that these performance divergences, as noticed from statistically significant education coefficients, result from difference in record keeping, marketing, upgrading, and Kaizen practices¹².

Table 5.4 presents the estimates from our growth equation. In addition, we put 2SLS estimates alongside ordinary least squares (OLS) estimates, where participation in the classroom and on-site training are instrumented by invitation, which was random. Columns 1 and 2 present the enumerator's and respondent's self assessment of a set of Kaizen practices (see Table 3.2). While positive and less precisely estimated in column 1, manager's age is found to be significantly correlated with improvements in measures of Kaizen practices in column 2. Consistent with the enterprise growth literature (e.g., Evans 1987; McPherson 1996; Mead and Liedholm 1998; Bigsten and Gebreeyesus 2007), younger enterprises are found to grow faster as shown in columns 5 and 6.

¹² We cannot directly test this claim due to the endogeneity concern that would legitimately arise on putting these variables on the left-hand side of regression equations. We also avoid experimenting with IV regression techniques for that we are not confident that we have good instruments, and, thus instead, we rely on the reduced form of regression (first stage regression).

Table 5.4 also shows that growth is positively correlated with the dummy indicating foreign ownership in many of the specifications, and statistically significant in columns 3 and 5. These enterprises have paid more for the acquisitions of foreign technologies and have significantly improved their value addition in 2011 compared to 2009. The 2SLS estimates indicated from columns 7 through 12 bear out these findings. Furthermore, in columns 10 and 11, there is evidence for the positive effect of the training on employment and value added growth.

Table 5.5 presents the panel data estimation of record keeping, marketing, Kaizen practices, and upgrading scores on the same set of explanatory variables as in Tables 5.1, 5.2, and 5.3. Table 5.5, however, includes two treatment variable indicators interacted with year dummies as illustrated in equation (4). Except in columns 7 and 10, in all the specifications the years of schooling of the manager appears to be highly correlated with the intensity of management, business, and workstation practices. Columns 9 through 11 also show that years of schooling of the manager are positively related with investment activities in product upgrading, workers' skill improvement, technology acquisition, and in procurement of machines and equipment. This is consistent with the literature on time preference that suggests that education induces delay in gratification and enhances investment by making people more patient (e.g., Becker and Mulligan 1997; Harrison et al. 2002; Bauer and Chytilová 2010). For example, Kirby et al. (2002) and Bauer and Chytilová (2010), using data from Bolivia and Uganda respectively, find a negative correlation between discount rate and years of schooling of the respondents. These results suggest that more educated managers are willing to engage in activities that increase productivity and profitability in the future.

Table 5.5 also shows that the foreign ownership dummy is positively correlated with nearly all the dependent variables. In columns 8, 10, and 12, foreign ownership is significantly and positively related with the Kaizen practice score variable computed based on respondent's self-assessment, with the dummies indicating investment in improving workers' skills and structural changes. Although estimates are accompanied by larger standard errors, foreign-operated enterprises still appear to be run better.

Table 5.6 complements Table 5.5. Estimation is performed using Random Effect GLS technique¹³. Table 5.6 also shows that years of schooling of the manager are significantly correlated with all of the enterprise performance indicators. To the extent that education enhances cognitive ability, opens up more opportunities, and augments contacts that avail information useful for running successful business, it is not surprising that more educated managers run more successful businesses. Unlike the cross-sectional results presented in Table 5.3, foreign ownership is significantly correlated with all of the performance indicators¹⁴. Our result is similar to Aydin et al. (2007), who find that foreign ownership significantly increased firm profitability in Turkey, and to the findings by Koirala and Koshal (1999) for Nepal, where foreign owned enterprises are found to be more productive.

¹³ The Hausman test statistic presented at the bottom most of the table indicate that we cannot reject the null that random effect coefficients are consistent.

¹⁴ A simple explanation for the anomaly is the gain in sample size in Table 5.6 that improves the precision of our estimates compared to Table 5.3.

Table 5.4. Growth between 2011 and 2009 in selected business practice and performance indicators

Variables	Kaizen practices		Performance				Kaizen practices		Performance			
	Enume- rator's evaluation	Respon- dent's assessment	Acquired foreign technology	Number of workers	Value added	Labor productivity	Enume- rator's evaluation	Respon- dent's assessment	Acquired foreign technology	Number of workers	Value added	Labor productivity
	OLS						2SLS					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years of schooling	-0.04 (0.03)	0.04 (0.05)	0.00 (0.00)	0.02* (0.01)	0.05 (0.04)	0.01 (0.02)	-0.03 (0.03)	0.03 (0.04)	0.00 (0.00)	0.02* (0.01)	0.05 (0.04)	0.00 (0.02)
Age of the manager	0.01 (0.01)	0.05*** (0.02)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.06*** (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.01)	0.00 (0.01)
Years of operation	-0.00 (0.01)	-0.02 (0.01)	0.00* (0.00)	-0.00 (0.00)	-0.03** (0.01)	-0.01* (0.01)	-0.00 (0.01)	-0.02 (0.01)	0.00* (0.00)	-0.00 (0.00)	-0.03** (0.01)	-0.01 (0.01)
Years of prior management experience	0.00 (0.02)	-0.03 (0.02)	0.00 (0.00)	-0.01 (0.01)	-0.03 (0.02)	-0.01 (0.01)	0.00 (0.01)	-0.03 (0.02)	0.00 (0.00)	-0.01 (0.01)	-0.03 (0.02)	-0.01 (0.01)
Years of prior experience before joining the current enterprise	0.00 (0.01)	-0.03 (0.02)	-0.00 (0.00)	-0.00 (0.01)	0.00 (0.02)	-0.00 (0.01)	0.01 (0.01)	-0.03* (0.02)	-0.00 (0.00)	-0.00 (0.01)	-0.00 (0.02)	-0.00 (0.01)
Years of residence abroad	-0.03 (0.03)	-0.07* (0.04)	-0.00 (0.00)	-0.01 (0.01)	0.00 (0.04)	0.01 (0.02)	-0.03 (0.02)	-0.07* (0.04)	-0.00 (0.00)	-0.01 (0.01)	0.01 (0.04)	0.01 (0.02)
Ethiopian National	-0.20 (0.48)	1.11 (0.88)	0.21*** (0.06)	0.33 (0.23)	1.21 (0.78)	0.25 (0.36)	-0.18 (0.43)	1.17 (0.81)	0.2*** (0.06)	0.31 (0.21)	1.12 (0.72)	0.21 (0.34)
Enterprise is foreign or JV	-0.04 (0.47)	1.00 (0.85)	0.11* (0.06)	0.33 (0.23)	1.74** (0.76)	0.49 (0.35)	-0.14 (0.43)	1.15 (0.80)	0.12** (0.06)	0.39* (0.21)	2.0*** (0.71)	0.52 (0.34)
Enterprise is SOE	0.15 (0.59)	0.71 (0.94)	-0.04 (0.07)	0.06 (0.28)	1.40 (0.98)	0.77* (0.46)	0.14 (0.53)	0.70 (0.85)	-0.04 (0.07)	0.08 (0.26)	1.42 (0.91)	0.73* (0.43)
Previous employment experience in SOE	0.05 (0.31)	-0.61 (0.51)	-0.04 (0.03)	0.07 (0.12)	0.33 (0.47)	0.01 (0.22)	-0.02 (0.30)	-0.51 (0.50)	-0.03 (0.03)	0.12 (0.12)	0.47 (0.44)	0.01 (0.21)
Participated in classroom training (instrumented by invitation)							-0.19 (0.23)	0.02 (0.33)	-0.01 (0.02)	-0.02 (0.09)	0.26 (0.34)	0.24 (0.16)
Participated in on-site training (instrumented by invitation)							-0.23 (0.21)	0.21 (0.32)	0.02 (0.02)	0.17** (0.08)	0.47* (0.27)	-0.01 (0.13)
Constant	0.61 (0.81)	-2.94** (1.30)	-0.25*** (0.09)	-0.70** (0.33)	-1.72 (1.14)	-0.25 (0.53)	0.83 (0.74)	-3.1** (1.21)	-0.3*** (0.09)	-0.8** (0.31)	-2.0* (1.07)	-0.36 (0.51)
R-squared	0.096	0.231	0.193	0.089	0.160	0.086	0.109	0.245	0.200	0.137	0.181	0.061
Number of obs	61	70	97	97	85	85	61	70	97	97	85	85

Source: Author's calculations based on survey data

Notes: JV = joint venture; SOE = state-owned enterprise; OLS = ordinary least squares; 2SLS = two stage least square.

Table 5.5. Panel data estimation of management practice scores and upgrading scores

	Record keeping			Marketing		Kaizen practices			Upgrading			
	Total record keeping score	Weekly records are kept	Preparing financial reports	Advertising	Business card	Number of signboards	Enumerator's evaluation	Respondent's assessment	Upgraded product design	Improve workers skill	Acquired foreign technology	Introduced structural change
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years of schooling	0.40*** (0.11)	0.16** (0.08)	0.68** (0.30)	0.11** (0.05)	0.05 (0.06)	0.09*** (0.03)	0.03 (0.03)	0.10** (0.05)	0.12** (0.06)	0.05 (0.05)	0.23* (0.13)	0.01* (0.00)
Age of the manager	-0.00 (0.04)	-0.01 (0.02)	0.03 (0.09)	0.00 (0.01)	-0.03 (0.02)	-0.01 (0.01)	0.02 (0.01)	-0.01 (0.01)	-0.9*** (0.02)	-0.06*** (0.02)	-0.03 (0.04)	-0.00 (0.00)
Years of operation	0.05 (0.04)	0.04 (0.02)	-0.08 (0.10)	0.00 (0.01)	0.01 (0.02)	-0.01 (0.01)	-0.00 (0.01)	-0.00 (0.01)	-0.03 (0.02)	-0.02 (0.01)	0.02 (0.04)	-0.00 (0.00)
Years of prior management experience	0.09 (0.07)	0.02 (0.04)	0.24 (0.19)	0.01 (0.02)	0.01 (0.03)	0.03* (0.01)	0.04** (0.02)	0.03 (0.03)	0.06** (0.03)	-0.02 (0.02)	-0.02 (0.07)	-0.00 (0.00)
Years of prior experience before joining the current enterprise	0.06 (0.05)	0.05 (0.03)	0.12 (0.13)	0.02 (0.02)	0.01 (0.02)	0.01 (0.01)	-0.01 (0.01)	0.07*** (0.02)	-0.02 (0.03)	0.04** (0.02)	0.05 (0.05)	0.00 (0.00)
Years of residence abroad	0.02 (0.13)	-0.12* (0.07)	0.05 (0.30)	-0.08 (0.06)	0.06 (0.08)	-0.04 (0.03)	0.05 (0.03)	0.08 (0.05)	0.04 (0.04)	-0.03 (0.05)	-0.29 (0.27)	-0.00 (0.00)
Ethiopian National	-0.23 (4.03)	-0.71 (1.64)	0.57 (9.89)	0.01 (0.85)	0.48 (1.33)	-0.11 (0.52)	-0.85 (0.63)	1.14 (1.00)	0.19 (0.88)	0.14 (0.83)	0.23 (2.02)	0.09 (0.06)
Enterprise is foreign or JV	2.26 (4.01)	0.40 (1.60)	5.69 (9.86)	0.36 (0.83)	0.44 (1.31)	0.61 (0.51)	-0.19 (0.62)	2.01** (0.98)	0.57 (0.86)	1.53* (0.81)	0.79 (1.95)	0.12** (0.06)
Enterprise is SOE	13.52 (455.0)	-0.35 (1.54)	36.57 (1,273)	1.24 (0.97)	7.29 (1,080)	0.22 (0.50)	0.70 (0.58)	1.52 (0.93)	1.20 (0.99)	0.63 (0.91)	0.28 (2.15)	0.08 (0.06)
Previous employment experience in SOE	1.61 (1.16)	0.07 (0.71)	-0.46 (2.79)	0.42 (0.40)	0.71 (0.64)	-0.03 (0.24)	0.44 (0.30)	0.60 (0.45)	0.28 (0.46)	0.69* (0.42)	-0.58 (1.17)	-0.00 (0.03)
Invited for classroom training*2010 year dummy	-0.13 (0.70)	0.90* (0.49)	0.50 (1.85)	-0.21 (0.28)	0.69* (0.39)	0.12 (0.16)	-0.15 (0.17)	0.24 (0.29)	-0.19 (0.33)	-0.20 (0.29)	-0.40 (0.74)	-0.04* (0.02)
Invited for on-site training*2011 year dummy	-1.27 (0.85)	1.05 (0.64)	-2.69 (2.33)	0.01 (0.35)	0.04 (0.44)	0.26 (0.19)	-0.15 (0.22)	0.46 (0.39)	0.22 (0.40)	0.21 (0.36)	-0.76 (0.86)	0.03 (0.03)
Constant	-1.03 (4.64)	2.47 (2.26)	-1.33 (11.45)	-3.0** (1.30)	0.70 (1.80)	-0.73 (0.74)	4.83*** (0.93)	3.11** (1.41)	0.23 (1.34)	0.82 (1.23)	-7.4** (3.48)	-0.10 (0.08)
Number of observations	220	250	250	221	221	221	265	284	318	318	318	318
Right censored obs	134	79	204				0	89		2	11	0
Left censored obs	20	55	18				0	0		158	279	0

Source: Author's calculations based on survey data

Notes: We control for time dummies for 2010 and 2011; Radom effect probit is used in Columns 4 and 5, and random effect GLS is used in Column 8; In the rest of the columns, random effect tobit is employed. JV = joint venture; SOE = state-owned enterprise.

Table 5.6. Random effect estimation of enterprise performance indicators

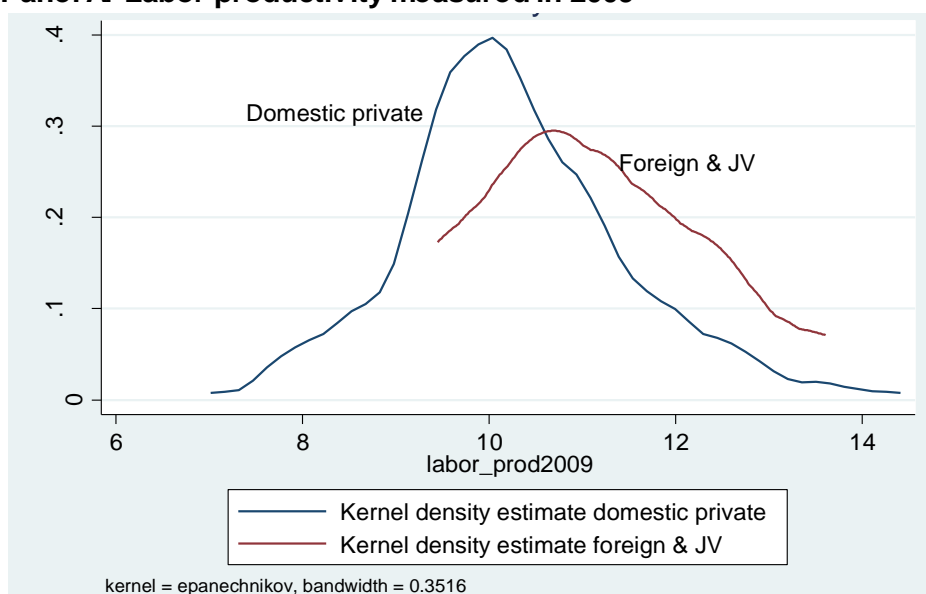
	Number of workers	Sales revenue	Value added random effect	Gross profit	Labor productivity
	(1)	(2)	(3)	(4)	(5)
Years of schooling	0.13*** (0.03)	0.22*** (0.05)	0.21*** (0.05)	0.23*** (0.05)	0.09*** (0.03)
Age of the manager	0.01 (0.01)	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)	0.00 (0.01)
Years of operation	-0.00 (0.01)	-0.00 (0.02)	-0.01 (0.02)	0.00 (0.02)	-0.00 (0.01)
Years of prior management experience	0.03 (0.02)	0.05 (0.04)	0.05 (0.03)	0.06* (0.03)	0.02 (0.02)
Years of prior experience before joining the current enterprise	0.01 (0.02)	0.05* (0.03)	0.04 (0.02)	0.04 (0.02)	0.02* (0.01)
Years of residence abroad	-0.00 (0.04)	-0.01 (0.05)	0.02 (0.06)	0.00 (0.06)	0.02 (0.04)
Ethiopian national	0.07 (0.40)	0.15 (0.63)	0.62 (0.50)	0.35 (0.54)	0.65 (0.39)
Enterprise is foreign or JV	1.04*** (0.36)	1.74*** (0.54)	2.11*** (0.44)	1.62*** (0.45)	1.15*** (0.40)
Enterprise is SOE	2.30*** (0.57)	2.34*** (0.72)	2.58*** (0.69)	2.43*** (0.70)	0.36 (0.58)
Previous employment experience in SOE	0.40 (0.28)	0.28 (0.51)	0.54 (0.43)	0.51 (0.44)	0.31 (0.24)
Invited for classroom training* year 2010 dummy	-0.06 (0.07)	-0.09 (0.11)	0.07 (0.13)	-0.07 (0.13)	0.13 (0.11)
Invited for classroom training* year 2011 dummy	0.22 (0.14)	0.17 (0.19)	0.35 (0.27)	0.29 (0.22)	0.03 (0.24)
Year 2010	0.06 (0.04)	0.11* (0.07)	0.03 (0.07)	0.12 (0.10)	-0.03 (0.06)
Year 2011	-0.24*** (0.09)	-0.11 (0.16)	-0.33 (0.24)	-0.04 (0.17)	-0.07 (0.24)
Constant	-0.05 (0.72)	8.84*** (1.21)	7.87*** (1.05)	7.32*** (1.09)	7.77*** (0.73)
Observations	345	334	327	320	327
Hausman test statistic	NA	0.86	1.75	5.82	2.92
P value of the Chi-squared statistic	NA	0.93	0.78	0.21	0.57

Source: Author's calculations based on survey data

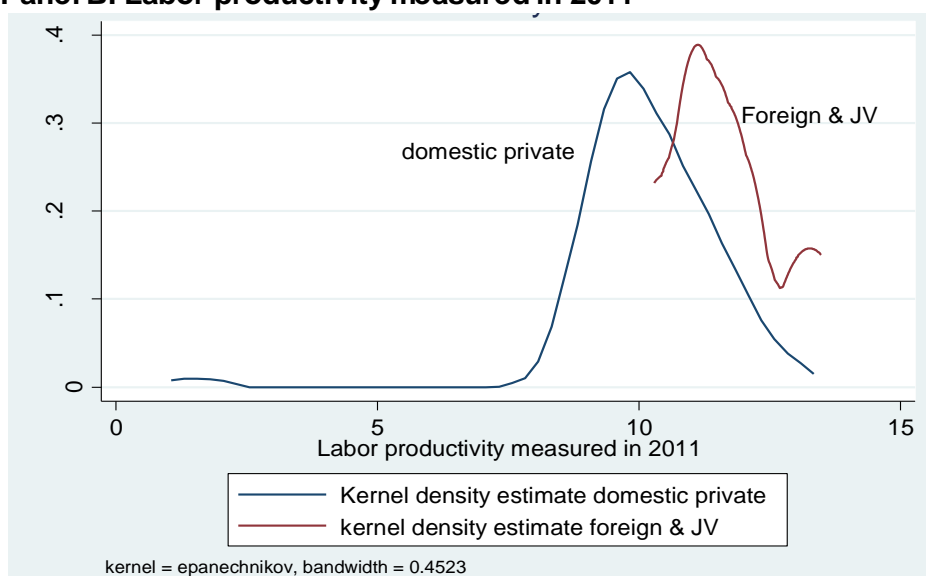
Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; JV = joint venture; SOE = state-owned enterprise.

Figure 5.2 shows significant productivity differences between foreign operated and domestic private enterprises. Labor productivity measured both in 2009 (panel A) and 2011 (panel B) are much higher in wholly or partly foreign owned enterprises. Figure 5.3 further shows a huge amount of heterogeneity in productivity distribution among domestic private enterprises. Panel B, for example, shows a long tail of several low productive firms that co-exist with firms with higher than the mean-productivity. The survival of low productive firms might be partly attributed to low competition in the sector. Figure 5.2 also indicates that labor productivity widely fluctuates overtime in domestic private enterprises compared to foreign operated enterprises. This is partly explained by the lack of standard management practices, production plans, and standard work practices that would ensure stable output and productivity overtime.

Figure 5.2. The kernel density estimates for labor productivity by ownership status
Panel A. Labor productivity measured in 2009



Panel B. Labor productivity measured in 2011



Source: Author's calculations based on survey data
 Note: JV = joint venture

Similarly, Figure 5.3 illustrates a remarkable stability in the relationship (as shown by the three fitted lines) between labor productivity and enterprise size measured by number of workers. Regardless of the data point (whether data are obtained from the 2009, 2010, or 2011 surveys) large firms have consistently higher labor productivity than smaller firms. This is consistent with Söderbom (2011), who also finds that labor productivity is positively correlated with firm size in a sample of Ethiopian manufacturers¹⁵.

A noteworthy observation in Table 5.6 (also in Table 5.3) is the larger and statistically significant coefficient associated with the state ownership (SOE) dummy; SOEs are found to be much larger, more profitable, and more productive (remind we have a small sample size).

¹⁵ We also find a significant effect of capital intensity on the measures of enterprise performance (not reported, available upon request). Even after accounting for size and capital intensity differences and economies of scale, there remain sizable productivity differences that indicate that foreign firms are more productive than local firms (e.g., Mahmood and Hussain 1991; Koirala and Koshal 1999). A possible explanation is the presence of better management practices in foreign-owned enterprises compared to domestic private enterprises.

In the literature, SOEs are often considered inefficient because they internally carry out transactions that would be better handled by the market. SOEs are also expected to mete out some policy burdens; for example, SOEs retain workers who have near zero marginal productivity, a decision often dictated by equity considerations than efficiency. Xu et al. (2006, 267), for example, show that SOEs had the lowest level of profitability compared to other type of enterprises in China. SOEs, however, could survive despite their low productivity and profitability as they are better connected to state resources and bureaucrats, and hence they can relatively easily overcome bureaucratic red tapes and credit and liquidity constraints that are often faced by domestic private enterprises (e.g., Xu et al. 2006).

Figure 5.3. The correlation between productivity and enterprise size over time



Source: Author's calculations based on survey data

However, if SOEs are managed by professionals and if the state does not directly interfere in managerial and operational issues, they could be run efficiently and hence become more productive and profitable. From our interview with the managers operating these enterprises, we learned that the government rarely intervenes except in investment and expansionary policy issues. Thus, managers exercise considerable degree of autonomy over the day to day operation and even in major business decisions of the firm. Furthermore, they are sometimes paid based on performance. This reduces the agency problem that is often observed when ownership is different from management control.

That said, in this paper, we are cautious not to treat the SOEs status of enterprises as an exogenous variable. Whether an SOE remain under state ownership or would be privatized, for example, depend on the performance of the SOE (e.g., Sonobe and Otsuka 2003). On the one hand, governments are reluctant to sell off profitable SOEs. On the other hand, individuals are disinclined to procure loss making inefficient enterprises. Our comparison of SOEs with the other enterprise groups is thus distant from causal interpretations.

Tables 5.5 and 5.6, taken together with Table 5.4, confirm that foreign operated enterprises are not only better at managing their workshop and in aggressively advertising and upgrading their product, they also tend to be much larger, more profitability, and more productive compared to private domestic enterprises. Human capital of the manager, expressed by years of schooling, and prior work experience are also positively correlated

with the indicators associated with record keeping and financial report preparation and Kaizen as well as upgrading practices. Our result is also in tune with the proposition that education enhances manager's willingness to experiment with new forms of products, business, and marketing ideas by investing in new machines and equipment and the acquisition of foreign technologies. While we cannot rule out the possibility that more profitable and productive enterprises employ highly educated managers, education of the manager is found to consistently augment several measures of enterprise performance.

6. Conclusions

It is often hypothesized that foreign operated enterprises are endowed with better technologies and managerial capital, and that local producers would benefit directly through upstream and downstream linkages and indirectly through spillover effects. While policy makers are very keen to understand whether and why foreign firms have superior technological and managerial capability, there appears to be limited empirical work exploring this issue using data from sub-Saharan African countries. This study employed longitudinal survey data collected from the metalworking sector in Ethiopia, in and around Addis Ababa, to explore whether ownership differences lead to differences in the way firms are operated.

We find that wholly or partially foreign owned enterprises differ from private domestic firms in several ways. First, foreign owned firms are managed by more educated and experienced entrepreneurs who seem to possess better managerial and business skills. Second, foreign owned enterprises adopt better management, business, and marketing practices, and are more likely to invest in activities, such as product upgrading and technological acquisition, with long-run returns. Third, labor productivity in foreign owned enterprises is significantly higher than in private domestic enterprises. Fourth, foreign owned enterprises are much larger with higher sales turnover and profitability, which is partly explained by better management practices.

There is strong evidence emerging in literature from both observational and experimental studies that shows that bad management is highly related with poor enterprise performance. A possible explanation for the significant difference in management practices among foreign operated and private domestic enterprises that we observed in our data is the difference in the human capital characteristics of managers at the helm of these enterprises. We further note that variation in the style and quality of management lies beneath the observed difference in sales revenue, profitability, and productivity among the two groups of enterprises.

Finally, our conclusions are drawn with caution as we relied on data from one sector with comparatively small sample size. Since we mostly employed reduced forms of regressions and barely deployed instruments for causal inferences, future studies would greatly improve the causal interpretation of our findings using valid instruments or experiments. We also found that SOEs have much better performance than what is in general ascribed to them in the literature. Future studies could investigate this more deeply as our sample size (5 SOEs) does not allow us to make a convincing case for the observed departure from the conventional wisdom.

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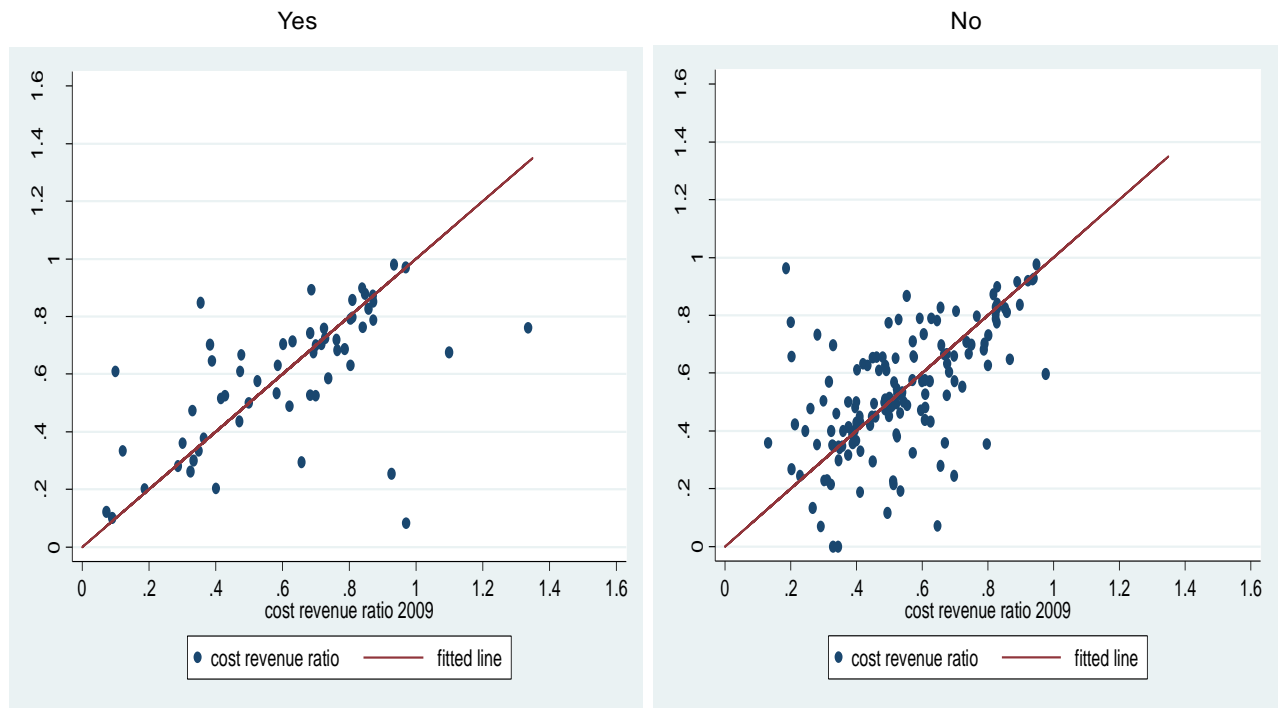
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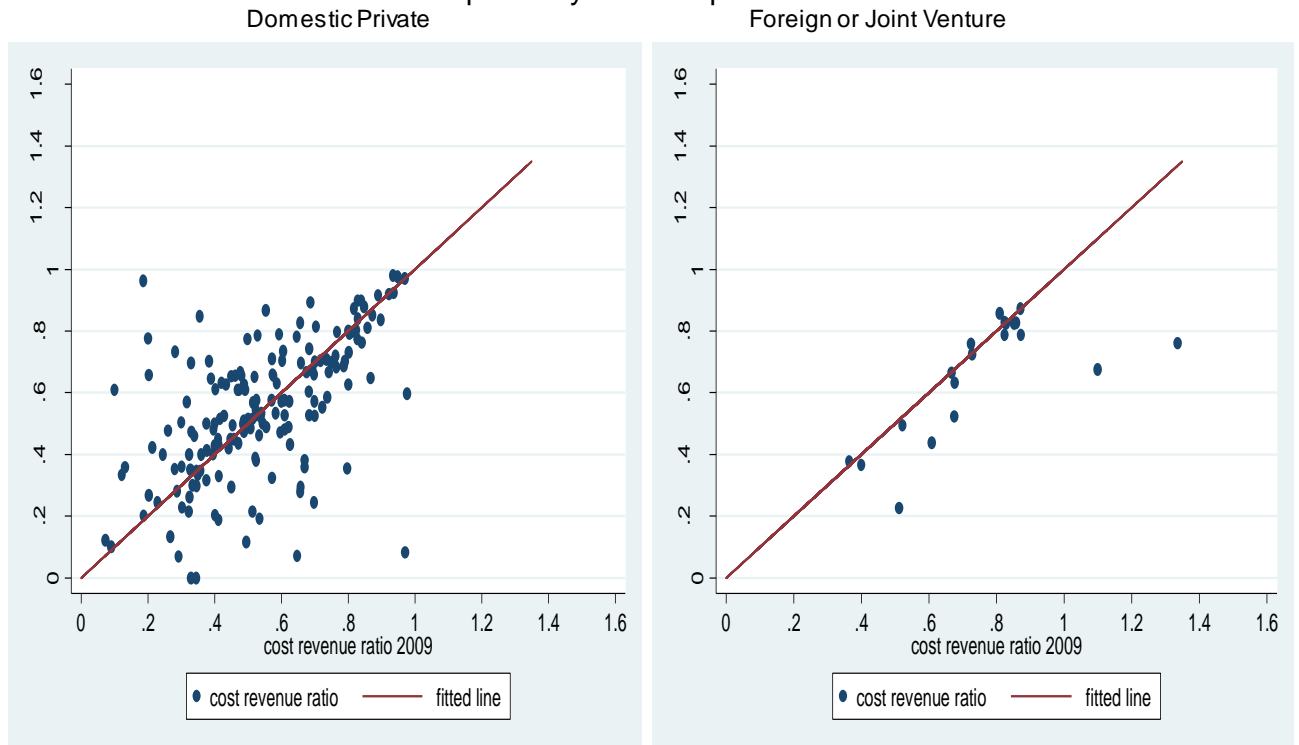
Annex

Annex A.1. Stability of production over time

Panel A. Cost revenue ratio of enterprises operated by managers who have estimated the production time required for producing their major product



Panel B. Cost revenue ratio of enterprises by ownership structure



Source: Author's calculations based on survey data

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