UNIVERSITIES OF MILAN AND PAVIA

DEPARTMENT OF ECONOMICS, MANAGEMENT AND QUANTITATIVE METHODS

Ph.D. IN ECONOMICS
XXX CYCLE

DOCTORAL THESIS

ESSAYS ON GLOBAL ENGAGEMENT, PRODUCTIVITY AND LABOR MARKET EFFECTS OF THE MANUFACTURING SECTOR

Ph.D. Candidate: ALI YIBRIE ESMAILE

SUPERVISOR: PROF. MARIA LETIZIA GIORGETTI

Ph.D. COORDINATOR: PROF. ALESSANDRO MISSALE

A.Y. 2018

Table of Contents

Chapter 1
Exports and Firm Productivity in Ethiopian Manufacturing Firms

Chapter 2
Financial Constraints, Foreign Trade, and Firm Survival in Ethiopia: Evidence from manufacturing firm Data

List of Tables

List of Figures

Appendices

Acknowledgments

This long journey would not have been realistic without the help of many people and institutions. Thus, I am pleased to acknowledge those who have guided and helped me with this success. First and foremost, I would like to express my special thanks to my supervisor, Professor Maria Letizia Giorgetti, for her thoughtful guidance, scholarly advice, encouragement and suggestions since the beginning of the thesis. I must also extend my deepest appreciation and internal gratitude to Prof. Alessandro Missale, Director of the Ph.D. program, for truly concern, motivation, unfailing ready-to-help attitude and professional behavior, reading my work and providing insightful comments that helped to improve the thesis significantly. And also for his incredible support to succeeded my academic achievements. I would also like to thank Prof. Giorgio Barba Navaretti and Dr. Emanuele Forlani for their mentoring, comments and guidance on the earlier drafts of the first chapter. I am also grateful to the doctoral examination committee members and the final examination board for cautiously reading my work and providing constructive comments that helped me to improve the dissertation.

My sincere thanks also go to Dr. Tewodros Ayenew (Sheffield University) for his valuable advice and guidance on how to structure and arrange the data that I have used for the thesis. I am also indebted to Prof. Kenzu Abdella (Trent University) for his unreserved commitment and truly concerns about my career. This Ph.D. program and participating in conferences in many European countries and training in the USA would not have been possible without the generous grant from the Universities of Milan & Pavia and the welcoming approach of the school administrator, Dr. Stefania Scuderi, which I duly acknowledge for her excellent administrative support throughout my stay in the University. In addition, I would like to express my appreciation to all staff of the Department for their valuable comments during the presentations and discussions, the Universities of Milan and Pavia for their financial support and Bahir Dar University for giving me leave of absence.

I would also like to express my sincere gratitude to all of my classmates and colleagues over all the world, which making it virtually impossible to name them all here, for their support in various ways and I am thankful to all of them.

Finally, I would like to thank my mom and my wife (Multezem), for their love, encouragement and showing confidence in me. I have also special thanks for Muna for taking care of our queen, Hafiza who is my angel, gift, strength, and meaning of life. I am also very grateful to my parents for their support and encouragement they have given to me.

Ali
Milan, Feb 2018

Chapter 1

Exports and Firm Productivity in Ethiopian Manufacturing Firms

Abstract

This study examines productivity and exporting dynamics by using unbalanced long panel dataset in the period 2000-11 for Ethiopian export-oriented three two-digit medium and large manufacturing firms. Our results indicate the presence of evidences of both self-selection and learning-by-exporting. The results are robust with different productivity measures and across various specifications. By going beyond the previous literature, this study reveals that export participation has a statistically insignificant impact on technical efficiency and scale change components of total factor productivity (TFP) change. Last but not least, it is imperative that, designing policies orienting exporting firms towards reducing poor production practice by better using the available technological know-how and improvement in the production environment is necessary to be more beneficiary from export participation.

Keywords: Productivity, self-selection, exporting, learning by exporting, Panel data

1.1. Introduction

The investigation of the linkage between international trade and productivity growth has been traced back to the very first theoretical models of absolute advantage (Adam Smith) and comparative advantage (Ricardo). This idea was subsequently enriched and continued by the works of Samuelson, Heckscher-Ohlin, Grossman, Helpman, Krugman, Melitz, and many others. Although there is still some skepticism about the positive effects of trade, many of the theoretical models suggested that trade liberalization can lead to productivity gains through different mechanisms (Grossman & Helpman, 1991; Helpman & Krugman, 1985). Since then, many empirical and theoretical studies in this field have flourished. Besides, the argument becomes the core of intense debates amongst academic researchers and policymakers since the pioneering work of A. B. Bernard, Jensen, and Lawrence (1995). These contributed great insights into the literature, with an intensive focus on the investigation of the relationship between characteristics of firms, especially firm-level productivity, and exporting behavior of firms. Firms that export are found in empirical studies to be better than firms that producing and serving exclusively the domestic markets (Wagner, 2007a). The term “exceptional export performance” initially used by A. B. Bernard and Jensen (1999a) to describe their findings of the superiority of exporters in the U.S. manufacturing sector. It is also confirmed by many other researchers in different countries both empirically like by Roberts and Tybout (1997); Clerides, Lach, and Tybout (1998); Van Biesebroeck (2005); De Loecker (2007), (Greenaway & Kneller, 2007) and theoretically by A. B.

Bernard, Eaton, Jensen, and Kortum (2003) and Melitz (2003). Currently, it is this empirical regularity often used as an evidence for active export promotion in many developing countries.

Two competing which are not mutually exclusive[1] hypothesis have been proposed to explain the superior performance of exporters, but empirical evidence is not definitive as each of them has distinctive policy implications. The first is self-selection hypothesis which considers the causation runs from firm productivity to the decision to enter the export market. This relies on the fact that better firms export because they are forward-looking in exporting decision. This implies that only the more productive ones (the most profitable) are able to recoup the sunk costs[2] of entry into foreign markets and survive by covering the fixed costs in the tough foreign competition (AB Bernard & Jansen, 1999; Roberts & Tybout, 1997). An alternative explanation is learning by exporting in which exporting activity makes firms more productive and suggests that the causation runs from exporting to firm productivity. This is due to the fact that foreign competition and exposure can also speed up technological acquisition through disembodied technology and knowledge diffusion into the rest of the economy, which non-exporters do not have. This helps to achieve economies of scale and thereby improve the manufacturing process, reduce production costs and improve product quality (Almeida & Fernandes, 2008; Bigsten & Gebreeyesus, 2009; De Loecker, 2007; Van Biesebroeck, 2005). To put differently, exporting may add to productivity growth through three ways. First, economies of scale which generally enable exporters to enjoy increasing returns via reduce costs, improve efficiency by eradicating managerial and organizational inefficiencies (Clerides et al., 1998). Second, it helps to improve efficiency (X-efficiency promotion) through 'learning by exporting' and resource reallocation from less efficient to more efficient plants firms. Lastly, it is via technical progress because of technology spillovers through relations with trade partners or competitors which may generate knowledge spillovers; accumulation of knowledge capital and encouragement of investment in research and development (R&D) and technical innovation (Fu, 2005; Grossman & Helpman, 1991).

While trying to explain the reason behind the observed blended results across countries and time of the export and productivity nexus, the empirical literature has recently moved toward other aspects of firm heterogeneity. This includes international trade associated with the macroeconomic environment; the degree of competition and entry costs in the export markets that firms are likely to face. According to Blalock and Gertler (2004), firms in countries with poor technology and low productivity can get a better advantage from export participation and thus the level of economic development may be the other reason for contradictory results. It also asserts that the variation in geographical and economic conditions of countries may be the reason for the nexus (Wagner, 2007b). Lastly, Sharma and Mishra (2011) also indicate the differing conclusions may originate

[1] Meaning that both effects can sequentially play a role, before and after firms start exporting

[2] such as additional costs, perhaps to modify domestic products to meet foreign tastes and regulations, for transportation, distribution or marketing, or for skilled personnel to manage foreign networks, which prevents less productive firms from entering foreign market.

from using a wide variety of econometric methodologies and approaches for testing these two hypotheses.

Moreover, the nonexistence of a consistent measurement of productivity can be responsible for the uncertain and mixed result of export productivity linkage. Some previous studies often use the conventional technique for estimating TFP such as the Solow residual method which defines TFP growth as the residual of output growth after the contribution of labor and capital inputs have been subtracted from total output growth. This approach depends on an established assumption which includes the form of the production function is known; all firms are working effectively with no space for any inefficiency; neutral technical change and have a constant return to scale, which means that TFP growth equal to technical progress growth. If these assumptions do not hold, TFP measurements will be biased (Arcelus & Arocena, 2000; T. Coelli, 1998). Some others also use labor productivity to denote productivity, yet this index just represents a part of the picture of productivity and should be considered as one of the attributes of exporting firms. Other previous studies often use a TFP developed by Levinsohn and Petrin methodology. It has the advantage of controlling endogeneity of input factors by using the intermediate input demand function with some assumptions, albeit it does not permit to decompose the TFP change into its different components as productivity theory suggests.

In the context of Ethiopia, while considering the relationship between export status and firm productivity, there is one study by Bigsten and Gebreeyesus (2009) using labor productivity to measure the firm performance of different industries from 1996 to 2005 and found a support for both hypotheses. Our paper extends the above study period by six more recent years and will obviously improve the accuracy of the estimation results and allow us to find any long-term effect of post-exporting. Besides, the above study and these methodologies don't permit the decomposition of TFP change into its components such as technical progress change, technical change and scale efficiency change ((S. C. Kumbhakar & Lovell, 2003)). Rather, most studies often consider productivity under a single umbrella of investigation that does not give due consideration regarding the different parts of productivity and the importance of their influence even if it helps to understand whether gains in productivity levels are achieved through the efficient use of inputs or through technological progress. This will constrain further study regarding the relationship between export participation and productivity with its decompositions just when an aggregated index for productivity is taken. The only exception in this regard is the study by Fu (2005) for China who utilized a random effects panel data model to test the effect of export status on productivity growth and its parts. Its decomposition into technical efficiency and technical progress is also made by using a frontier approach which is examined by employing the Malmquist index. But it still overlooks the contribution of export intensity on scale efficiency and used industry, not firm-level data. Furthermore, V. H. Vu (2012) also examines the causality of exporting and firm productivity using a different sample retrieved from a survey of Vietnamese SME firms by decomposing TFP change into technical progress change, technical efficiency

change, and scale efficiency. The study failed to find evidence in support of export participation on any of TFP components. However, their study based on the data surveyed, just for private small and medium firms and a short panel dataset which may not give a full picture of this relationship.

Furthermore, Ethiopia is a particularly interesting case to take given the transitional nature of its economy with high and stable economic growth rates, fast track of trade liberalization and its relatively strong export-oriented policy. Under a comprehensive but prudent reform since 1991, Ethiopia has been successfully transformed from a command economy to a market-oriented economy by the increasing openness of the economy to international trade recently, which resulted in a remarkable increase in the number of firms entering export markets more than doubled between 2000 and 2011 (see Table 1). However, Ethiopian export performance does not reach what expected or targeted for and it is still small with export revenue; export products are mainly traditional ones with low value; or export prices are below world market prices. This fact calls that more attention should be given to the setting of export strategies and export promotion activities in Ethiopia. Therefore, understanding the determinants of export behaviors of firms via the evidence from firm-level data must be necessary and implicative. Therefore, a systematic empirical study is needed to investigate the impact of exports on productivity growth and vice versa, and the transmission mechanisms in economies that may suffer from considerable market failure and government intervention. This study has the objective of dealing with such an exercise. Thus, the present study motivated by the existing empirical research crevice and the need to revisit the validity of the two hypotheses within manufacturing firms in the Ethiopian context for the period 2000-2011.

We measure productivity change by using Stochastic Frontier Approach (SFA) to release the assumption of a full efficiency of firms and decompose into its components, such as technical efficiency change, scale efficiency change, and technological progress change by following S. Kumbhakar and Lovell (1998). Although other approaches like data envelopment analysis (DEA) may divide productivity change, the SFA has been preferred in this study. This is due to its advantages with regard to controlling with inefficiencies resulted from omitted variables, measurement errors, outliers and stochastic noise, which may result in a possible upward bias of inefficiency scores (Del Gatto, Di Liberto, & Petraglia, 2011). Besides, we used an additional productivity measure which is Levinsohn and Petrin (2003) methodology (see Appendix A.5) and also labor productivity calculated by output per total employees which are in levels. We then used different econometric methods to deal with the causality between export participation and productivity change with its compositions.

Above all, this paper has the following main novelties vis-à-vis previous literature in the area of heterogeneous-firm trade empirical literature. First, in relation to decomposing productivity and dealing with the two hypotheses, to the best of my knowledge, it is the first investigation to consider the impact of export participation on each component of TFP in the context of African

firms. Second, decomposing TFP can provide another way to explain the mixed findings in empirical studies as well as provides additional insights into understanding the recent debate on TFP growth and the transmission mechanisms in economies that may suffer from considerable market failure and government intervention but totally neglected in Africa, partly due to lack of suitable data. Third, a closer and a deep look at of this issue will broaden our empirical insight into what policies and strategies should be pursued. This helps to improve productivity, encourage their entry into exporting and thus their competitiveness in the global market in line with each component given the Ethiopian government's rigorous export promotion activities and the recent rise in the number of manufacturing firms entering into the international market. Thus, the empirical results of this study may provide a basis for evaluating the efficiency of these export-promotion strategies. Similarly, the study of the self - selection hypothesis has a policy implication which helps for policy-makers to find ways to lower the sunk cost of exporting so as for encouraging their participation. Last but not least, unlike most previous studies on export participation, we control for unobserved firm heterogeneity using the dynamic random effect model proposed by J. M. Wooldridge (2005). In sum, our contention is that export participation can adversely affect productivity change, but it may create favorable effects on each component of productivity change. Thus, considering TFP as an aggregated index will conceal such fascinating points. Furthermore, we complement the evidence by studying the impact of other firm-specific characteristics as determinants of its export performance.

The remainder of the paper is organized as follows. Section 2 and 3 presents related literature and some background information about Ethiopian economy respectively. Data sources are presented in section 4 while section 5 specifies the empirical models. Finally, section 6 and 7 consecutively discusses the results and concluding remarks.

1.2. Related Literature

This section reviews the empirical literature associated with the two-way linkage between exports and firm productivity. There are a large number of empirical studies that have attempted to test the self-selection and learning by exporting hypotheses empirically, following the influential papers by AB Bernard and Jansen (1999) and Clerides et al. (1998). A common fact reported in the previous empirical research is that exporters are superior to non-exporters. This feature can be attributed to the self-selection effect or the learning effect from exporting or both, albeit they vary greatly relating to empirical methodology and measurement of firm productivity.

The literature discussing the causality of an exporting-productivity relationship shows mixed empirical support in both developed and developing countries. Some have found corroborating evidence of self-selection. These include (AB Bernard & Jansen, 1999) for the US; (J. R. Baldwin & Gu, 2003) for Canada; (Arnold & Hussinger, 2005; A. B. Bernard & Wagner, 1997a, 2001) for Germany; (Imbruno, 2008) for Italy; (Delgado, Farinas, & Ruano, 2002) for Spain; (Aw, Chung,

& Roberts, 2000; Liu, Tsou, & Hammitt, 1999b; Roberts & Tybout, 1997) for Taiwan; (Clerides et al., 1998) for Colombia, Mexico and Morocco; (Isgut, 2001; Roberts & Tybout, 1997) for Columbia; (Poddar, 2004) for India; (V. H. Vu, 2012) for Vietnam; (Sinani & Hobdari, 2010) for Estonia. At the same time, they failed to find evidence supporting an increase in productivity after entry into the export market. In other words, the above empirical studies confirm that exporting firms are more productive than non-exporting firms and revealed that higher productivity of firms occurs before entry into export markets. By contrast, there are also some other studies in which they haven't found significant effects regarding the causality from firm productivity to the decision to export ((A. B. Bernard & Jensen, 2004) for the U.S.; (Bigsten et al., 2004; Rankin, Söderbom, & Teal, 2006) for sub-Saharan Africa and (Aw et al., 2000) for Korea).

Similarly, a mixed picture also appears regarding empirical findings of the learning by exporting hypothesis in both developed and developing countries, albeit, feeble and less in number (see (Wagner, 2007a)). In contrast to the above, some others have argued that the higher productivity of exporters compared with non-exporters can be attributed to the benefits of export activities. For example, using UK data the following (Crespi, Criscuolo, & Haskel, 2008; Girma, Greenaway, & Kneller, 2003; Greenaway & Kneller, 2004, 2007) have found that firms boost their productivity advantage after being exporters. Similar results also found from Canada and Slovenia manufacturing plants by J. R. Baldwin and Gu (2003) and De Loecker (2007) respectively. In contrary to developed countries, in which evidence for learning effect is rare, in the developing countries learning by exporting effects is more popular. For instance, (Kraay, 1999; Park, Yang, Shi, & Jiang, 2010; Sun & Hong, 2011) for Chinese firms; (Blalock & Gertler, 2004) for Indonesian firms; (Yasar, Nelson, & Rejesus, 2006) for Turkey and (Bigsten et al., 2004) for Sub-Saharan African countries have found evidence of a post-exporting productivity gain. In contrast, a number of studies have found no proof of the learning by exporting effect (for instance: (Hailu & Tanaka, 2015) (A. B. Bernard & Jensen, 1999c; Hung, Salomon, & Sowerby, 2004) for the USA; (Fu, 2005) for China; (V. H. Vu, 2012) for Vietnam; (Arnold & Hussinger, 2005; Wagner, 2002) for Germany).

However, some authors also documented the coexistence of both hypotheses and thus close the room to believe that causation cannot run in both directions by showing that the exporter productivity premium derived from both the self-selection mechanism and the learning by exporting hypothesis. For instance; (Aw, Roberts, & Winston, 2007) for Taiwan; (Alvarez & Lopez, 2005) for Chile; (Kimura & Kiyota, 2006) for Japan; (Girma, Greenaway, & Kneller, 2004; Greenaway & Kneller, 2004) for the UK; (Hahn, 2005) for Korea; (Fernandes & Isgut, 2005) for Colombia; (Bigsten et al., 2004) as well as (Van Biesebroeck, 2005) for SSA Countries; and (Bigsten & Gebreeyesus, 2009) for Ethiopia. Some other studies, while, have failed to find any evidence for either hypothesis and conclude that the performance characteristics of exporters and non-exporters are remarkably similar (e.g., (Girma et al., 2003); (Kim, Gopinath, & Kim, 2009) and (Sharma & Mishra, 2011) using data from Swedish, Korean, and Indian firms, respectively).

In addition to the previously mentioned reasons, some other researchers also consider particular behavior of firms involved in international activities for the existence of a mixed result, for example, product and country diversification ((Andersson, 2001) for Sweden and (Wagner, 2007b) for Germany); import behavior ((Castellani, Serti, & Tomasi, 2010) for Italy); Geo-economic orientation ((Damijan, Polanec, & Prašnikar, 2004) for Slovenia) and FDI behavior ((Helpman, Melitz, & Stephen, 2004) for USA).

All in all, to this point there has been numerous empirical literature reflecting the association between exporting and productivity but evidence of a nexus is inconclusive. Thus, one must adopt an empirical technique that enables to handle the two-way causation. The issue, it would seem, is very much at the informative stage where no dominant explanation has prevailed, despite the many studies on the subject (Sharma and Mishra, 2011). Furthermore, most authors often examine productivity from a narrow point of view that does not give enough consideration to the different components of productivity and the importance of their influence in dealing with the linkage between export and productivity growth.

1.3. Data Source

This study used firm level panel data of large and medium manufacturing industries (LMMI) collected annually by the Ethiopian Central Statistical Agency (CSA) between year 2000 and 2011. Data after 2011 are excluded due to the changes in data coding by the Ethiopian CSA and unable to form panel with the earlier one. The coverage of these censuses is basically restricted to medium- and large-scale establishments which have at least 10 employees and use electricity in production. It provides detailed information on the basic information of the establishment, gross value of production, export status and its value, ownership types, costs of materials, number of employees, total wages paid, energy expenditure, fixed capital, among other issues in all over the country. Manufacturing establishments are categorized based on 4-digits ISIC[3] but in this study for analytical purposes firms is classified into industrial groups by using the two digit ISIC codes by making use of ISIC Revision 3.1.

The data also have detailed establishment level regarding location indicators from the region to the smallest administrative location. The industrial sectors involve manufactures of food and beverage, textile, apparel, leather and footwear, wood, paper and printing, chemicals, rubber and plastic, non-metal, fabricated metal, and furniture.

[3]International Standard for Industrial Classification

Table 1. 1: Number of establishments, exporters, employment, output and their growth, 2000-11

			Growth of manufacturing sector			
Year	No. of firms	No. of Exporters	No. of firms	No. of Exporters	Empl't	Output
2000	739	40				
2001	722	38	-2.3	-5.0	-9.9	-2.8
2002	883	32	22.3	-15.8	16.8	8.1
2003	939	41	6.3	28.1	3.2	-4.6
2004	997	47	6.2	14.3	1.8	23.1
2005[4]	763	51	-23.5	8.5	-6.3	11.1
2006	1153	56	51.1	9.8	187.9	14.9
2007	1339	58	16.1	3.6	-50.9	11.3
2008	1734	62	29.5	6.9	-4.2	-2.9
2009	1948	78	12.3	25.8	11.3	9.0
2010	1958	88	0.6	12.8	132	47.6
2011	1936	84	-1.2	-4.5	-56.6	24.8
Average			10.7	7.7	20.5	12.7

Source: own calculation of CSA data

Table 1.1 shows the number of establishments, exporters, output and their growth including employment between 2000 and 2011. The number of establishments in the sector almost tripled in the sample period, amounting to an average annual growth rate of 11 per cent. The number of exporters, output and employment also grew by an annual average rate of 7.7, 20.5 and 12.7 per cent respectively in the same period, though highly variable. But due to equivalent growth in the total number of firms in the sector, the share of exporters has remained small. Table 1.2, while, reports the share of firms and distribution of exporters and percentage of exports in total sales and also employment, output, and export-shares by sector defined by 2-digit ISIC classification. In general, less than 5 per cent of manufacturing firms exported. The percentage of exports in total manufacturing was not more than 11 per cent and among exporting firms about 27 per cent of production was exported. More importantly, distribution of exporting varied a lot by sector and concentrated in a few sectors such as food and beverages, textiles, apparel, leather and tanning, accounting for more than 86 per cent of the number of exporters in the manufacturing industry during the sample period. From all exporting sectors, the share of leather and tanning, and textile declined from 72 and 11 in 2000 to 34 and 8 per cent in 2011 respectively, while food and beverages picked up from 15 to 39 percent in the same period and the above order remain the same

[4]Note: The low number of firms and thus employment too in 2005 resulted from the statistics office decision to take samples in specific sectors, such as bakery products, furniture, and manufacture of articles of concrete, cement, and plaster. The total population of formal manufacturing establishments in 2005 is above 1100.

for output movement too. The same holds true for employment, except for leather and tanning, which shows some increment. These four two-digit industries also accounted for 60 per cent of formal generating manufacturing employment for more than 1.8 million people and 54 percent of formal manufacturing output. Since the four group sectors providing a reasonably comprehensive picture of the manufacturing sector in Ethiopia, the empirical analysis relies on these exports oriented industries and the other industries are excluded from the rest of the analysis.

Table 1. 2: Export participation and percentage of exports in total production, plus employment, output, and export-shares by industry, 2000–2011

		Export participation and %age of exports to total sales average (2000-11)			Employment, export and output share by sectors (%)					
					Employment[5]		Export		Output[6]	
Sectors	Share of firms	Distribution of exporters (%)	All firms	Exporting firms	2000	2011	2000	2011	2000	2011
Food & Beverages	27.6	4.6	4.4	13.5	31.3	32.7	14.9	39.4	42.1	44.9
Textile	2.9	24.2	11.9	23.1	17.7	9.9	11.4	8.2	8	3.4
Apparel	2.6	15.7	17.9	32.9	2.7	3	0.4	0.4	0.7	0.7
Leather &Tanning	5.6	26.6	48.1	71.6	5.1	6.8	72.8	34	7.4	4.8
Subtotal	38.7	9.9			57.8	52.4	99.6	82	58.2	53.8
All others	61.3	0.9			42.2	47.1	0.4	18	41.8	46.2
Total	100	4.5	10.5	26.87	100	100	100	100	100	100

Source: Own Calculation from CSA data

The original data and/or the 12-year unbalanced panel comprise 15111 firms'/year observations, of which the four two-digit sectors accounting for 38 percent. Observations with missing output and/or input variables and also those who observed only for one year were deleted since the empirical part relies on lagged values of the regressor for identification purposes. Moreover, since the CSA census was conducted only for establishments which employ ten persons or more, observations of micro firm establishments with fewer than 10 persons also deleted and left with 4363 observations comprises 72 and 29 percent of the four group industry and the whole Ethiopian manufacturing firms respectively over the sample period. We grouped the four two-digit sector firms into three broad sectors for analysis purpose: food and beverage, textile and apparel, and leather and tanning and accordingly the first group accounts for 70% while the other two group sectors take the remaining share almost equally (15%) in our sample.

[5] It is the sum of permanent and casual employees and the latter adjusted to year equivalent labor.
[6] Note: Output is computed as sales deflated by LMMI deflator obtained from the MoFED database using 2000 prices as a base.

A potential problem with time variant data is that it is often expressed in current prices. Therefore, our data on current variables are deflated to 2000 prices using the various deflators to avoid biases that might arise because of inflation. More specifically about the dataset and measurements of variables in the regression analysis are presented in the appendix A.7.

1.4. Some background and Review of Ethiopian Economy

1.4.1. Ethiopia's economic policy and export performance

After independence, most countries in sub-Saharan Africa (SSA) generally choose an import-substitution (IS) industrialization strategy. It seemed to work initially during the 1950s and 1960s, although after years of implementation, IS failed to act as an appropriate trade development strategy. This is due to the fact that the heavy protection and subsidization had resulted in a paralyzed and inefficient industry requiring permanent subsidization with little prospect of achieving international competitiveness which is consistent with a study by (Wade, 1990). Since then the idea of export expansion strategy has gained popularity as a major path to industrialization and instruments that useful in boosting economic growth for developing countries (Krugman & Obstfeld, 2003). In other words, due to increasing pressure to liberalize trade and open up domestic markets to international competition, domestic industries in SSA can no longer be effectively shielded from foreign competition and even resulting inefficiency. Thus, since the 1980s, most countries in Sub-Saharan Africa introduced economic reform programs like structural adjustment programs (SAPs) to address the mounting internal and external economic imbalances under the auspices of the international financial institutions as preconditions for donor funding.

Correspondingly, Ethiopia also adopted this program, including trade liberalization to transform the structure of its economy by making a decisive break with its command economy in many following the fall of the Derg government in 1991. This was accomplished by selectively pursing the SAPs put forward by the IMF and WB with the main theoretical premise that government interventions were inefficient because they distorted market signals. The new reform program declared in 1993 initiated a comprehensive trade reform, and it is committed to several measures that go beyond stabilization and liberalization. The prices of domestic inputs and finished goods were decoupled from arbitrary government regulation and interference. The government has also a strong sense of public sector reform that accorded autonomy to the state-owned enterprises was implemented and some enterprises were privatized. The export tariffs were abolished; export subsidies to domestic and export-oriented firms were eliminated and were replaced by incentives that provided the duty-free importation of raw materials. Last but least, the new reform program involved a large devaluation of the local currency aimed at dismantling quantitative restrictions and gradually reducing the level and dispersion of tariff rates in 1993 (Abegaz, 1999).

In 1998, the government further launched an Export Promotion Strategy in which some manufacturing like textiles, leather, and agro-industry sectors were chosen for preferential treatment. This is justified on the ground that they are labor-intensive and provide strong linkage with the agricultural sector and comparative advantage to compete in the export market. Furthermore, the government has given due attention to the policy emphasis on export-led manufacturing growth and providing a wide range of incentives. Export Trade Duty Incentive Scheme issued in 2001, which includes duty draw-backs, vouchers, and bonded manufacturing warehouses, where exporters are refunded 100% of any duty paid on raw materials. Furthermore, the government issued directives in 2004 to reduce taxes and other costs of salaries paid to foreign experts to further encourage exporters to acquire foreign technology and expertise are part of this measure (Bigsten & Gebreeyesus, 2009). In sum, it is expected that the increased openness to international trade would increase firm-level efficiency and promote economic growth because foreign trade would make it possible for them to exploit economies of scale, access to new technologies and knowledge and thus improve their productivity (Helpman & Krugman, 1985; Melitz, 2003).

The government has already accomplished two programs which are sustainable development and poverty reduction program (SDPRP) from 2002/03 to 2004/05, and plan for accelerated and sustained development to end poverty (PASDEP) from 2005/06 to 2009/10 with different targets. They aimed to strengthen the private sector and bring rapid export growth that includes high-value agricultural products and export oriented manufacturing sectors were the prioritized one. Currently, the Ethiopian government implementing the second five-year growth and transformation plan (GTP) covering the period from 2015/16 to 2019/20 following the first one by giving due emphasis on improving physical infrastructure through public investment projects and promoting the manufacturing sector and export performance. In order to meet the targets, the government has played an important role in improving the investment climate and providing direct support to the selected sectors. This support includes providing economic incentives for exporters/investors by granting cheaper credit, easy access to land at lower lease prices and longer tenure periods, and duty and tax exemptions. The plan also involves promoting export-oriented cluster developments by flourishing industrial zones around major cities with the necessary infrastructures such as roads, power and telecommunications and capacity building in terms of increasing the supply of skilled manpower for the sectors (World Bank, 2016). To exploit this opportunity, a number of foreign companies from China, India, Turkey, and Japan are currently jostling in the country, which has led to a sudden upsurge in FDI inflow in the last four to five years (Hailu & Tanaka, 2015).

Despite the huge potential opportunity for manufacturing industries and the government's commitment to its development, the sector has not been performing up to expectations. Unlike it has recently been seen in East Asian countries, in Africa, particularly in Ethiopia the sector regrettably plays a rather limited role to bring about the structural change in this regard. In other

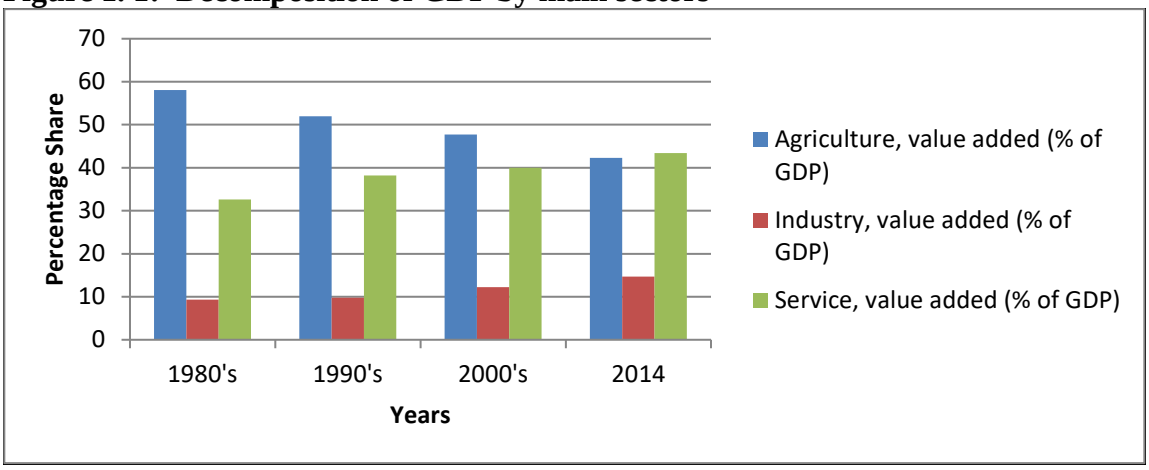
words, while Ethiopia's economy continues to register strong and robust growth, which explained by the real GDP grew by more than 10 percent for almost a decade, the contribution of the industrial sector to the Economy is at its infant stage and lagged by far from agricultural and service sectors. Its share, composed of LMMI, small scale industry, construction, mining and quarrying, electricity and water, remains stagnant for a long time at about 14% of the GDP and that of the manufacturing sector is only 4.4% share of total GDP in 2013 (NBE, 2013/14). The sector is limited to simple agro-processing activities (sugar, grain milling, edible oil production, leather tanning) and production of basic consumer goods (beer, footwear, textiles and garment). Industries that might help accumulate technological capabilities and create dynamic inter-industry linkages – such as chemical, electrical and electronics, metal-processing and other engineering industries – are almost non-existent. Besides, most manufacturing exports are agriculture-based, which include clothing, semi-processed hides, footwear, and beverages while the main imports are capital goods and manufactured consumer goods from other countries and are heavily dependent on fuel imports (Hailu & Tanaka, 2015).

1.4.2. Overall macroeconomic performance and sectoral composition

With a population of more than 100 million, Ethiopia is the second and the twelfth most populous country in Africa and world respectively as of 2017. It has a land area of 1.1 million km^2 and is the largest landlocked country in Africa. Ethiopia remains a predominantly rural country, with only 20.3% of the population living in urban areas, mainly Addis Ababa. Ethiopia experienced a steady population growth rate of 2.5% between 2009 and 2016. It has the fastest a growing economy and income per capita has tripled from US$270 in 2006/7 to US$800 in 2016 but still substantially lower than the Sub-Saharan average of about US$1600 in 2016. Yet, while extreme poverty is still high which is 27.2% in 2015 (as measured by the international poverty line of less than $1.90 per day), the Ethiopian government aspires to reach lower-middle income status over the next decade (WB, 2015).

Despite strong policy emphasis on agriculture, its contribution to overall growth has been not only limited but also declining recently. The share of agriculture value-added in GDP, as shown in figure 1.1, has shown a decline over the past three decades from 52% in 1990's to 42% in 2014. On the other hand, the service sector continued to be the main engine of growth of the economy and its share has been increasing and become slightly higher than the share of the agricultural sector in 2014 while the industry sector has remained quite small compared to other developing countries even if it has increased from 10% in 1990's to 14.7% in 2014. The share of manufacturing in GDP is another indicator of the country's underdeveloped industry, even declined from 5% in 1990's to 4.2% in 2014. This is by far the lowest even by the SSA standard where the contribution of the manufacturing sector was not an average lower than 9% of GDP over the past three decades. This indicates that despite the country has shown impressive growth, the manufacturing sector loses momentum.

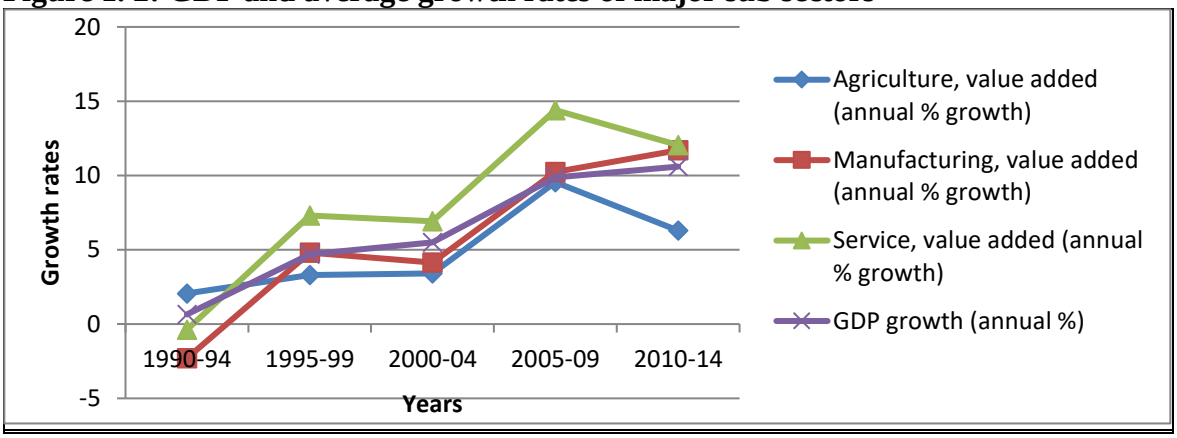
Figure 1. 1: Decomposition of GDP by main sectors



Source: Own computation from (World Bank, 2016)

Ethiopia has registered strong and robust growth for the past decade. Average annual GDP growth increased from 0.65% between 1990 and 1994 to over 10% in the period from 2010 to 2014. Due to the different strategies implemented by the government, the country has maintained nearly double-digit GDP growth since the early 2000s. At the same time, the annual growth in the service sector was quite significant (12 percent) mainly driven by exuberant performance in hotel and tourism, financial intermediation, trade, and transport and communication. Growth rates of the agriculture and manufacturing sectors were estimated to be 6.3 percent and 11.7 percent respectively (Figure 1.2).

Figure 1. 2: GDP and average growth rates of major sub sectors



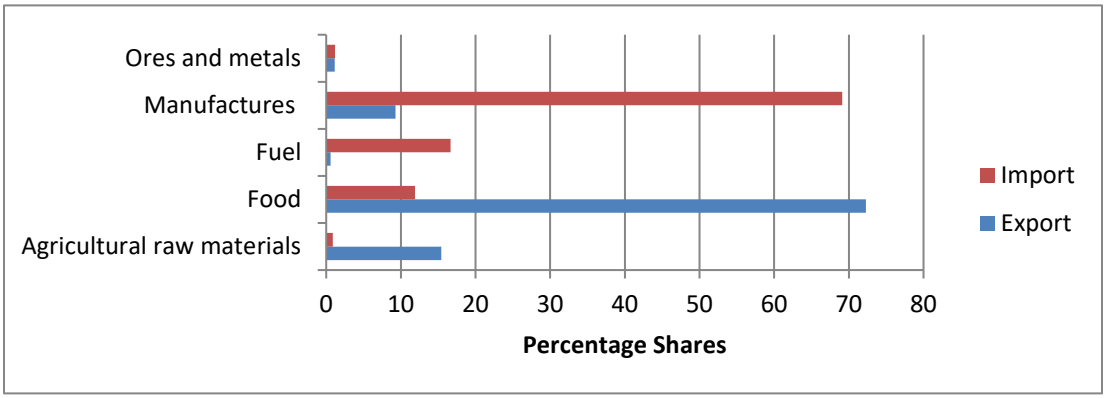
Source: (World Bank, 2016)

1.4.3. Structure of foreign trade and export destinations

Ethiopia's foreign trade did not show a significant change in the past decade and continued to be primary commodity export and capital goods import-dominated though many trade reforms have been made to economic liberalization since the 1990s and fast economic growth of the country. Primary products still remain preponderant in the country's export earnings. Food and agricultural

raw materials took the largest share accounted for about 87 % of the merchandize export of the country between 2000 and 2013 (Figure 1.3) while the manufacturing export remained low at an average of 9 % in the total merchandise export in the same period. This implies export diversification is at a very low stage. This predominance of the primary sector showed that in spite of advancements in the industry sector, industrialization was geared more towards import-substitution. On the other side, Ethiopian merchandise imports hardly changed and dominated by manufacturing goods and fuel, which accounted for 69 and 16 percent respectively between 2000 and 2013 due to the growing and high import demand as a result of investment in infrastructure and different construction activities. This situation significantly worsened the country's overall trade deficit. According to NBE statistics, the overall annual trade deficit was, on average, 16.7% of GDP between the periods 1999 to 2010 (NBE, 2011).

Figure 1. 3: Ethiopian export & import (% of merchandise exports & import): 2000-13 (%)



Source: (World Bank, 2016)

Table 1.3 also shows the average share of the major commodities in export revenue in depth. Comparing the average for the periods between 2000/01 and 2013/14, there is no significant change in terms of the structure of the main export items except some degree of horizontal export diversification within the primary export products, rather than vertical diversification towards the manufacturing sector. Export expansion can be achieved in two ways: through the extensive margin (e.g. new products or new markets) or the intensive margin (e.g. more of existing products) (Ofa, Spence, Mevel, & Karingi, 2012). In economically weak countries, export diversification helps to build resilience to external economic shocks.

In 2000/01, the top five export items were coffee, leather and leather products, chat, oilseeds, and gold accounting for 93.8% of total merchandise exports in which coffee alone accounted for 45% of total exports. In 2013/14, some kind of diversification within the primary export products has been taking place towards higher-value agricultural products such as gold, cut flowers, and oilseeds. Coffee is still the leading item though its dominance gradually declined, accounting for only 23 % of total merchandise exports in 2013/14. On the other hand, gold, cut flowers, and live animals export contribution have shown an increasing trend in the period under review. Finally, the export performance of the manufacturing sector is unsatisfactory. It is not only concentrated in

a few sectors, but also its contribution is very minimal. Leather industry appeared to have a noticeable export share initially, but in recent years its share declined to 4.1 % in 2013/14 from 18.8% in 200/01. On the other hand, the share of meat and textile products showed encouraging trend and their contribution increased respectively to 2.3% to 3.5% in 2013/14. In sum, Ethiopia exports very few manufactured commodities compared with the Eastern African average and selected Asian countries, indicating both a low manufacturing production base and a lack of competitiveness of the sector (AfDB, 2014).

Table 1. 3: Share of major export items (% of total merchandise exports)

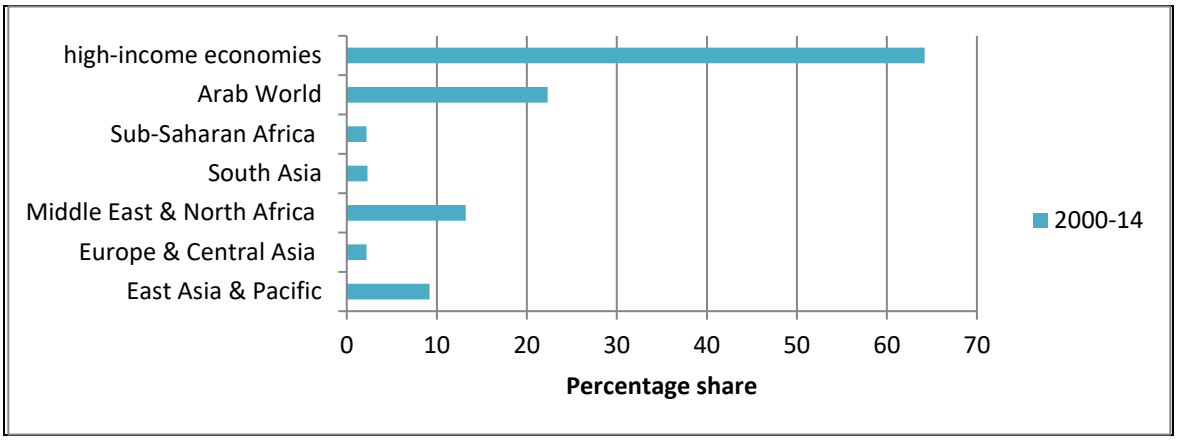
	2000/01	2005/06	2010/11	2013/14
Coffee	45.0	38.3	32.4	23.0
Oil Seeds	8.0	22.9	12.6	20.9
Leather & Leather Products	18.8	8.1	4.0	4.1
Chat	15.1	9.6	9.1	9.5
Gold	7.0	7.0	18.0	14.6
Pulses	2.2	4.0	5.3	8.0
Meat products	0.4	2.0	2.4	2.4
Live Animals	0.0	3.0	5.7	6.0
Flowers	0.0	2.4	6.8	6.4
Fruits & Vegetables	1.4	1.4	1.2	1.5
Sugar	2.0	0.0	0.0	0.0
Textile and textile products	0.0	1.2	2.4	3.5
Bee's Wax	0.2	0.2	0.1	0.1

Source: Adopted from (Ferede & Kebede, 2015): ERCA data

1.4.4. Foreign market destinations

High-income economies are the main outlet for Ethiopian goods, thanks to the preferential trade agreements (PTAs) between the European Union and Ethiopia in the Lomé conventions. Between 2000 and 2014, on average, 64 % of the total merchandise exports of the country went to high-income countries (Figure 1.4). The Arab world, Middle East and North Africa, and East Asia and Pacific bought 22%, 13 % and 9% of exports, respectively. On the other hand, only 2% of the total merchandise export made with sub-Saharan African economies, though several Sub-Saharan regional economic integration agreements, like TFTA, COMESA FTA, IGAD, and SFC, have been made. However, the country depends on few countries for its imports. In 2012, the share of imports originating from the top five countries (i.e. China, Saudi Arabia, India, USA, and Italy) increased to 55% (Ferede & Kebede, 2015).

Figure 1. 4: Ethiopian major export destinations, 2000-14 %)

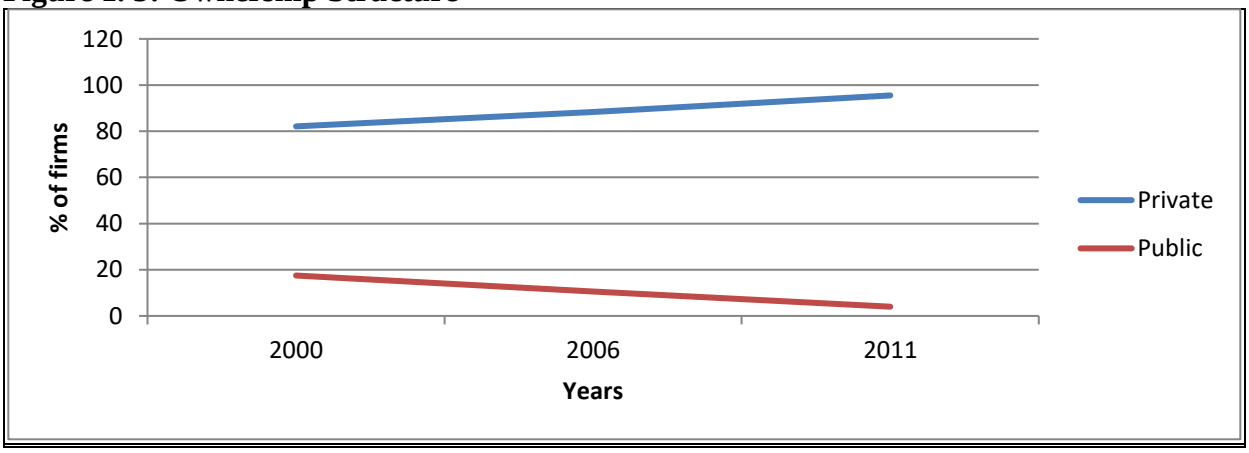


Source: (World Bank, 2016)

1.4.5. Distribution of manufacturing firms by Ownership and region

Another feature of the Ethiopian manufacturing sector is its ownership structure. Over time, the extent of privatization gets strength at the expense of the public enterprises and the proportion of public sector has seriously shrunk leaving the position for the private counterpart. This is partly the result of the progressive privatization measures that the government has undertaken since the early 1990s following the shift from social-oriented centrally planned economy to market-oriented mixed economy approach as a part of SAP. The number of public establishments declined from 17.5 % in 2000 to 4 percent in 2011, while the number of private establishments grew by 13% over the same period (Figure 1.5).

Figure 1. 5: Ownership Structure

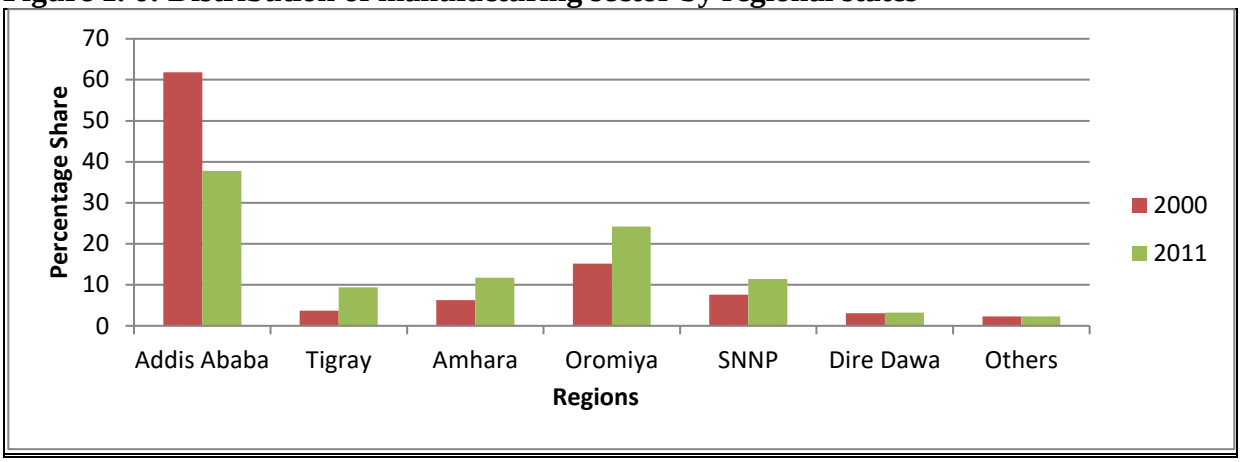


Source: Own computation of CSA data

Considerable regional variations are observed in the distribution of firms in Ethiopia (Figure 1.6). Among the regions of the country, Addis Ababa contributed 61.8 percent of the total establishment during 2000. This high concentration of industries in Addis Ababa is due to proxy to the central

market, high demand, choice of labor force type and infrastructural developments are major ones. Following Addis Ababa, Oromia, SNNP, Amhara, Dire Dawa and Tigray are the next five regional states that constitute 15.2, 7.6, 6.3, 3.7 and 3.1 percent of the total establishments respectively in the same period. In 2011, the same trends observed in terms of regional distribution with some fluctuations. Though the highest share of LMSMI still dominated by Addis Ababa in terms of regional distributions, but its share of the total regional distributions declines to 37.8% while other regions except Dire Dawa shows an increases trends. Among these, Oromia, Amhara, and SNNP have a share of 24.2%, 11.7% and 11.4% respectively and the rest 2.3% is shared by the remaining five regions.

Figure 1. 6: Distribution of manufacturing sector by regional states



Source: Own computation of CSA data

1.5. Methodology

We examine the impact of export participation on productivity change in a two-stage process. First, we estimate TFP change through a SFA and then decomposing it into its components: changes in technical efficiency, technical progress, and scale efficiency. The Levinsohn-Petrin approach and labor productivity also used to measure productivity. Second, we examine the impact of exports on productivity and TFP components and vice-versa using regression techniques.

1.5.1. Stochastic frontier analysis

The methodologies for productivity estimation can be broadly categorized into the frontier and non-frontier[7] approaches. The former models are superior by incorporating inefficiencies that may arise in the production process in many cases and also differ from the latter in the assumption that observed production units do not fully utilize their existing technology (Del Gatto et al., 2011). Productivity change results not only from technical change but also from improvements in the

[7] Employs either deterministic techniques, which include growth accounting and index numbers, or econometric methods, which include growth regression and proxy numbers

efficiency of production when there is inefficiency. Thus, the frontier approach is preferred to the non-frontier approach so as to decompose change in TFP into its components.

There are two competing frontier models to estimate TFP at the firm level, though it is difficult to argue SFA (parametric econometric method) is superior to DEA (a deterministic or non-parametric mathematical programming method) or vice versa. The present study used SFA so as to overcome the following drawbacks of DEA. First, DEA is sensitive to small measurement errors. Second, DEA is a non-parametric technique and statistical hypothesis tests are difficult. Third, DEA doesn't incorporate the stochastic nature of production rather attributes any discrepancy between observed and potential output to inefficiency. In addition, DEA analysis may lead to unexpected results and is suspicious to outliers. DEA neglects inefficiencies resulted from omitted variables, unobserved measurement errors, and stochastic noise, which may result in a possible upward bias of inefficiency scores (Del Gatto et al., 2011; Jacobs, Smith, & Street, 2006). Furthermore, the data used in this study are relatively large and hence it is possible to avoid outliers and the analysis is not vulnerable to problems related to small sample size.

Following S. C. Kumbhakar and Lovell (2003), this study employed a translog[8] production function specification in order to calculate TFP change and its components:

$$\ln y_{it} = \beta_0 + \beta_k \ln K_{it} + \beta_l \ln L_{it} + \beta_m \ln M_{it} + \beta_t t + \frac{1}{2}\left[\beta_{kk}(\ln K_{it})^2 + \beta_{ll}(\ln L_{it})^2 + \beta_{mm}(\ln M_{it})^2 + \beta_{tt}t^2\right]$$
$$+\beta_{kl}\ln K_{it}\ln L_{it} + \beta_{mk}\ln M_{it}\ln K_{it} + \beta_{ml}\ln M_{it}\ln L_{it} + \beta_{kt}t\ln K_{it} + \beta_{lt}t\ln L_{it} + \beta_{mt}t\ln M_{it} + v_{it} - u_{it} \quad \ldots\ldots 1$$

Where the subscript i indicates the firm, y is observed output, t is a time variable which serves as a proxy for technical change; L, K *and* M index labor, capital and intermediate[9] inputs respectively; $\beta's$ denotes the parameters to be estimated. The error term is composed of two components. The first is a statistical random disturbance term, *v*, which captures producer specific external shocks on observed output and assumed to be identically and independently distributed (IID) $N(0,\sigma^2_V)$ and independent of the u *'s.* The latter (u_{it}) is defined by the truncation (at zero)[10] of the $N(u_{it},\sigma^2_u)$ distributions and captures production loss due to firm- specific technical inefficiency and assumed to vary over both firms and time period.

[8] We made the generalized likelihood ratio test to choose the appropriate functional form specification between translog and Cobb-Douglas and found the latter is proper.

[9] We used the aggregated value of raw materials, fuel and lubricating oil, electricity, wood and charcoal for energy and water and deflated by GDP deflator obtained from WB's ADI by using year 2000 as a base like in Lundvall and Battese (2000) and Hailu and Tanaka (2015).

[10] i.e. half-normal distribution are assumed for the *u*

According to S. Kumbhakar and Lovell (1998) TFP change, denoted by *TFP*, can be decomposed into four components. The first is the rate of technological change (*TP*)[11] which shifts the production function upward or downward (which is a measure of innovation) while the second component is a scale component (*SC*) which represents the scale elasticity contribution to the TFP change. The last two parts consecutively are a change in technical efficiency (*TE)* which shows the movement of producers towards the frontier (a measurement of catching-up with the best performance) and allocative efficiency which captures the impact of deviations of input prices from the value of their marginal products. The last one is not considered in this study due to the unavailability of price information and its assumption of the perfect competitive market which is unlikely in developing countries like Ethiopia. Furthermore, they define a rate of technological change as the partial derivative of the logged production function with respect to time; scale component is the scale elasticity contribution to the TFP change, and technical efficiency change is the derivative of technical efficiency with respect to time. Hence, for the translog production function specified in equation (1), the productivity change components can be expressed as:

Technological change:

$$\Delta TP = \frac{\partial \ln(y_{it})}{\partial t} = \beta_t t + \beta_{tt} t^2 + \beta_{kt} \ln K_{it} + \beta_{lt} \ln L_{it} + \beta_{mt} \ln M_{it} \quad \text{.....2}$$

Technical efficiency change:

$$\Delta TE = -\frac{\partial u_{it}}{\partial t} \quad \text{.....3}$$

Scale efficiency change:

$$\Delta SC = (\varepsilon - 1)\left[\left(\frac{\varepsilon_k}{\varepsilon}\right)\dot{K} + \left(\frac{\varepsilon_l}{\varepsilon}\right)\dot{L} + \left(\frac{\varepsilon_m}{\varepsilon}\right)\dot{M}\right] \quad \text{.....4}$$

Where $\varepsilon = \varepsilon_l + \varepsilon_k + \varepsilon_m$; $\varepsilon_l = \frac{\partial \ln(y_{it})}{\partial \ln(L_{it})}$, $\varepsilon_k = \frac{\partial \ln(y_{it})}{\partial \ln(K_{it})}$ *and* $\varepsilon_m = \frac{\partial \ln(y_{it})}{\partial \ln(M_{it})}$; output elasticity with respect to inputs and $\dot{K}, \dot{L}$ *and* $\dot{M}$ denotes the rate of change of inputs.

Total factor productivity change: $\Delta TFP = \Delta TP + \Delta SE + \Delta TE$.....5

The model which is given by equation (1) is estimated by the maximum likelihood method using FRONTIER 4.1 software written by T. J. Coelli, Rao, O'Donnell, and Battese (2005). Then, components of TFP change is calculated using the estimated coefficients by equations (2), (3) and (4). The estimation regression results and statistical tests are displayed in the Appendix A.1.

[11] It is positive (negative) if exogenous technical change shifts the production frontier upward (downward) for a given level of inputs.

1.5.2. Model specification and estimation method of the self-selection effect

The main idea of this hypothesis is to identify firm-specific characteristics that make a firm more likely to export and then searching the dividing line between firms that sell only domestically and those that export to foreign markets. The empirical framework of the export market participation decision of this study drawn from the work of Roberts and Tybout (1997), Clerides et al. (1998), Tybout (2003) and Melitz (2003). They argue that exporters turn out to be more productive than non-exporters before their entry into the international market. This is justified by the existence costs composed of two components: sunk costs and fixed costs. The former refer to the costs associated with exporting in conjunction with firm heterogeneity to enter into foreign markets. These are costs related to transport, distribution, marketing searches, production to adapt domestic goods for foreign consumers' tastes or country-specific regulations, workers with skills oriented to manage foreign networks (Melitz, 2003). The latter occur as long as a firm remains in the export market, e.g. transport and service costs and marketing costs. Besides, low pricing strategy, reducing the marginal cost or mark-up, helps them to be more competitive than other firms at an international level (A. B. Bernard et al., 2003). Then, exporting experience and thus persistence increases substantially the probability of staying and exporting next year (Basile, 2001; Roberts & Tybout, 1997). Therefore, the author of this study followed a dynamic probit model specification, which has been widely adopted in most econometric studies of firm's decision to enter into exporting, similar to the method of Roberts and Tybout (1997).

In their model, for a given firm, the export status of the firm i is given by E_{it} where it equals 1 if firm i exports at time t and 0 otherwise. In each period, firm i exports in period t if the expected gross revenue and profit of the firm exceeds the current cost including the sunk entry cost. A firm's export behavior is modeled as a discrete choice equation:

$$E_{it} = \begin{cases} 1 \ if \ \ p_{it} q^{*}_{it-1} \geq c_{it}(X_t, Z_{it}, \dfrac{q^{*}_{it-1}}{q^{*}_{it}}) + S(1 - E_{it-1}) \\ 0 \ otherwise \end{cases} \quad \text{.....6}$$

Where p_{it} denotes the price of goods sold abroad; c_{it} denotes the cost of producing optimal export quantity q^{*}_{it}. S indicates the sunk entry costs and varies across firms; X_t indicates vectors of exogenous factors affecting the firms' profitability. Z_{it} indicates vectors of firm-specific characteristics affecting the firms' profitability. Finally, E_{it-1} denotes the export status of the firm i at time $t-1$ or first lag of firm's export status which is a significant predictor of current export status and thus enables to capture the effect of sunk entry costs or the persistence (hysteresis) of exporting (Roberts & Tybout, 1997). According to this specification, the firm will not have to incur the entry cost again in time t once it has exported in the period time $t-1$.

The reduced-form of the above binary choice model is therefore written as:

$$E_{it} = \begin{cases} 1 \ if \ \ \lambda_x X_{it} + \lambda_z Z_{it} - S(1 - E_{it-1}) + \varepsilon_{it} \geq 0 \\ 0 \ otherwise \end{cases} \text{.....7}$$

Following this framework, we specify the following model to estimate the export status of firm's conditional on the previous export status and observed characteristics that potentially affect firm profitability. This framework assumes that firms have to decide every year whether or not to export, conditional on their past export status and other lagged value of firm attributes.

Decision of export participation is thus made every year as follow:

$$E_{it} = \beta_E E_{it-1} + \beta_P Q_{it-1} + \beta_c Z_{it-1} + F_{year} + F_{\text{sec}tor} + F_{Location} + \eta_i + \varepsilon_{it} \text{.....8}$$

Where E_{it} *and* E_{it-1} denote respectively a dichotomous dummy variable indicating the firm's current and previous export status. The latter is employed in order to control for the presence of sunk costs as indicated by previous studies (see (A. B. Bernard & Jensen, 2004; Bigsten & Gebreeyesus, 2009; Roberts & Tybout, 1997)). The key variable of interest is the lagged productivity (Q_{it-1}), which is believed to have an impact on the current export status of firms as only firms that are more productive and/or has a higher productive change are willing to pay the additional costs to enter the foreign markets. It is measured with three methods. These are TFP predicted from the stochastic frontier methodology in rates; and Levinsohn and Petrin (2003) methodology, and also labor productivity to test the robustness of the result in levels. In other words, if there is support for self-selection-into-exporting, i.e. productive firms become exporters, β_P would be positive and statistically significant. If there are fixed costs associated with exporting, so that firms tend to continue exporting once they have entered the international market, β_E would be positive and significant (Roberts & Tybout, 1997). Further η_i *and* ε_{it} represent the time-invariant firm-specific unobservable characteristics such as managerial ability, technological opportunities or attitudes towards risk and an idiosyncratic error that is assumed to be normally distributed and uncorrelated with the regressors respectively.

The estimation of the above dynamic specification of export decision requires addressing two important issues. First, the possible correlation between η_i & Z_{it} and thus applying the standard maximum likelihood estimation would lead to inconsistent estimates. Second the "initial condition problem" which implies that η_i and E_{io} (initial export status) are correlated which will overstate the extent of state dependence (the magnitude of β_E) if using the standard random effects model

(that assumes exogenous). The initial period in the sample data does not coincide with the initial period of the dynamic process and thus, obtaining consistent estimates requires a special treatment of E_{i0}. To deal with these issues, this model follows the conditional maximum likelihood estimator proposed by J. M. Wooldridge (2005) that models the unobserved time-invariant heterogeneity (η_i) as a function of E_{io} and the time-average of all past and future values of exogenous covariates. Again, firm specific time averages of the time variant variables are included in the model to allow for a correlation between these variables and time-invariant unobserved heterogeneity. Accordingly, the unobserved heterogeneity is modeled as:

$$\eta_i = \alpha_o + \alpha_1 E_{io} + \alpha_2 \bar{Z}_i + \alpha_3 \bar{Q}_i + \alpha_i$$

Where $\bar{Z}_i$ *and* $\bar{Q}_i$ denote the time-average of a set of exogenous variables and productivity for each firm respectively which are defined as: $\bar{Z}_i = T^{-1}\sum_{t=1}^{T} Z_{it-1}$; $\bar{Q}_i = T^{-1}\sum_{t=1}^{T} Q_{it-1}$ and $(\alpha_i / E_{io,} \bar{Z}_i, \bar{Q}_i) \approx N(0, \sigma_\alpha^2)$. T denotes the number of time periods.

Substituting the above equation into equation (8) to obtain:

$$E_{it} = \beta_E E_{t-1} + \beta_P Q_{it-1} + \beta_c Z_{it-1} + F_{year} + F_{\text{sector}} + F_{location} + \alpha_o + \alpha_1 E_{io} + \alpha_2 \bar{Z}_i + \alpha_3 \bar{Q}_i + \alpha_i + \varepsilon_{it} \quad \text{.....9}$$

The estimate of α_1 is of interest as it shows the association between the initial value of firm export participation and the unobserved effects.

According to past studies and the characteristics of the dataset we use, export decisions of firms are determined by a combination of firm-specific and exogenous characteristics, besides the lagged dependent variable. Firstly, standard firm characteristic variables such as firm size, input intensity, age, labor skill, ownership and average wage were included in the majority of past studies (e.g., (Aw et al., 2007; Roper, Love, & Hígon, 2006; Wagner, 2001)). Time-invariant variables are added to the model to decrease the error variance and appear either in the vector Z_{it} *or in* $\bar{Z}_i$. This includes industry dummies to capture sectoral difference in productivity. Effects of time-specific factors such as macroeconomic conditions (like the possible influence of the business cycle and exchange rates) that affect all the firms are also captured by using time dummies for panel data as suggested by J. Wooldridge (2009). Region dummies are also included to capture region-specific characteristics.

Attention also is given to the relationship between a firm's production technology, represented by its capital intensity, and export participation of firms. We define capital intensity as the ratio of capital to the total number of employees. Firms in developed countries are believed to export capital-intensive products (Ranjan & Raychaudhuri, 2011), while their counterparts in developing

countries like Ethiopia (a labor abundant and low-wage country) export labor-intensive ones. Besides, ownership dummy, whether it is state owned or not, also included in the model.

The foundation year of firms is also available in the census data, allowing us to calculate the age of each firm which is related to firm experience, performance, and size. Its effect is paradoxical. On the one hand, it is usually argued that the older firms are more likely to export, because the longer a firm has been in business, the more likely it is to look for foreign markets to grow further. All of these favor their exporting activities. On the other hand, the opposite has also been suggested. This is explained by the argument that young managers may have stronger global orientation and capability. These firms are called "born globals", and start to export after a short time of start-up (Moen, 2002). We include both age and age squared to examine the effect of firms' experience, with an aim to test the effect of firms' experience and its deterioration with time. Further, we also interested in the effect of quality of human resource and firm size which are usually proxies by the average wage and number of employees respectively. Accordingly, these indexes are also included in the model.

When we come to the estimation methods, we test the above two equations by using two specifications. First, by using probit model in the pooled data set even if it is more likely to give upward biased and inconsistent estimates due to ignores any unobserved effects like product attributes or managerial ability which might have an effect of firm's export decision. These can induce persistence in the decision to export or not to export by the firm, and then may lead us to overestimate the parameter of the lagged dependent variable and thus an exaggerated conclusion regarding the size of the entry costs in the model (A. B. Bernard & Wagner, 1997a). However, we can yield the upper bound of the effect of past export status via this test. Second, we use the J. M. Wooldridge (2005) dynamic probit framework that assumes a distribution of the unobserved heterogeneity such as firm management quality conditional on observed covariates (exogenous variables) and the initial value and follows the conditional maximum likelihood estimator. This estimate is important to control both for the initial conditions problem of the non-linear dynamic model and the correlation between η_i and observed characteristics. Besides, it is expected to give the best estimates of the availability and structure of data used in this analysis and thus it is the most preferred model in this paper.

Lastly, many previous studies about determinants of export participation often lagged firm characteristics by one or more periods to reduce the simultaneity. Therefore, a series of one-period lagged explanatory covariates is used in our regression estimation are used to control for reverse causation running from exporting to firm performance following Roberts and Tybout (1997). For robust checking, we also estimated for each group sectors with different productivity measures (see Appendix A.2).

1.5.3. Model specification and estimation method of the learning by exporting effect

Contrary to the self-selection hypothesis, the main objective of this section is to examine whether productivity change and its decompositions might be boosted after entering export markets. This may due to reduction of x-inefficiency via increased competition, access to new technology, or economies of scale arising from participating in world market, which in turn improves their productivity as argued by Clerides et al. (1998). Thus, I follow the extended dynamic choice model of Roberts and Tybout (1997) on export decisions to allow for learning effects which is adopted by Clerides et al. (1998) and subsequent studies. Thus, the model of this study is estimated using the following equation by including export history in a regression of firm productivity:

$$Q_{it} = \delta Q_{i,t-1} + \rho E_{i,t-1} + \beta Z_{it} + F_{year} + F_{\text{sec}tor} + F_{location} + \mu_{it} \ldots\ldots\ldots\ldots\ldots 10$$

Where Q_{it} *and* Q_{it-1} denote current and lagged output respectively. And in which we entered the estimated TFP change predicted from stochastic frontier production function (TFP_{SF}) and from Levinsohn-Petrin methodology (TFP_{SF}), change in technological progress (TP_c), change in technical efficiency (TE_c), and scale efficiency change (SE_c) alternatively. The lagged dependent variable is introduced to control for high persistency in the productivity change from both Levinsohn-Petrin in levels and stochastic frontier in rates. In light of the evidence that more productive firms self-select into exporting, the lagged export dummy can also pick up a previous productivity effect if the latter is not controlled for.

The main interest variable is prior export status being captured by a dummy variable (E_{it-1}) which allows to consider the effect of average treatment and minimizes the biases due to measurement errors as indicated by Stampini and Davis (2009). A positive and significant ρ indicates a learning effect from export participation. A set of control variables and a pure random error term respectively denotes by Z_{it} *and* μ_{it}. Control variables include total employment, capital, intermediate inputs, age, and ownership. It is expected that firms with higher size and more experience in business are more likely to gain higher productivity. Lastly, as discussed earlier, $F_{year}, F_{\text{sec}tor}$ *and* $F_{location}$ represent the year, sector and location-fixed effects that might impact differently on the relationship between export participation and productivity growth also controlled in the model.

Going to estimating the relationship between export participation and productivity growth and its components, normal OLS estimators are biased upwards due to non-randomness which arises from different possible biases, namely the endogeneity[12] bias and selection bias. The first bias happens

[12]It is important to note that endogeneity arises when an explanatory variable is correlated with the error term and may be caused by simultaneity or reverse causality, omitted variables, and measurement error. The dependent variable can

due to time-invariant unobserved heterogeneity which is likely embedded in firms' and sector's history. These are associated with managerial skills, firms' relationship with their business communities and relevant authorities, which may differ across firms and vary over time. Further, it is likely that there are unobserved factors in equation (10) that are correlated with a firm's input choices. This is the standard simultaneity problem that arises in the econometric estimation of production functions. To address these problem, **s**ome previous studies (e.g., (Fryges & Wagner, 2010; V. H. Vu, 2012; Wagner, 2012)) have used fixed-effect (FE) regression with panel data to consider the impact of export participation on firm performance. This method can overcome the bias in estimated results, where the unobservable characteristics are treated as time-invariant factors of the error (Cameron & Trivedi, 2009) but not solve time variant unobserved firm or industry characteristics that might cause an endogeneity problem (Sun & Hong, 2011).

In order to address the issue of endogeneity, this paper applied a one-step System-GMM approach with the export-status included directly in the production function of Blundell and Bond (1998)[13] (like (Bigsten & Gebreeyesus, 2009; Van Biesebroeck, 2005),…). This is derived from the estimation of a system of two simultaneous equations, one in levels (with lagged first differences as instruments) and the other in first differences (with lagged levels as instruments). Specifically, we used the first and earlier lags of all the inputs and the second and earlier lags of the dependent variable. The other control variables as instruments for the first difference equation, and the lagged first difference of all explanatory variables were used as instruments in the level equations. In order to have a benchmark on the coefficients estimated using system-GMM, we also estimated the production function using pooled OLS which gives the upper bound for the lagged dependent variable. To take into account the biases of estimated input coefficients due to the heterogeneity of production technology across sectors, we estimated the production function at the 2-ISIC digit level. The results are reported in Appendix A.3.

The other issue that should be addressed in estimating the learning by exporting model is selection bias. This would occur if firms self-select to export in anticipation of higher productivity in the future or selection into the exporting group is non-random, meaning that exporters may have very different characteristics from non-exporters. That makes difficult to specifically detect the effect of treatment (exporting status) since we do not know the result of the treated (exporters) when it is not under treatment (exporting). In that case the effect cannot be evaluated simply by comparing the average productivity of exporters and non-exporters and the result might be biased. In other words, this arises when making comparisons between the group of treated firms and the control (non-exporting) groups using all observations may be inappropriate or estimating learning effects

also be an endogenous variable. A typical method in econometrics for dealing with endogenous explanatory variables is to use instrumental variables.

[13]The Bover and Arellano (1997)/Blundell and Bond (1998) estimator augments Arellano-Bond (difference GMM) by making an additional assumption, that first differences of instrumenting variables are uncorrelated with the fixed effects. This allows the introduction of more instruments, and can dramatically improve efficiency. It builds a system of two equations—the original equation as well as the transformed one—and is known as "system GMM."

using traditional econometric routines would lead to biased results. Matching method is used as an efficient instrument to deal with problems arising from selection bias and to derive clean estimates of the causal effect of exporting of the outcome variables. This method relies on building a suitable control group from among non-treated that are used as counterfactuals for exporters. That is, each exporter is matched to an untreated unit that is as similar as possible in terms of observable (similar) characteristics before treatment. This control group should have n-1 (out of n) features similar to the exporter's group and differ only in the n^{th} characteristic, which is the decision to export. Accordingly, by following previous studies (see (Altăr & Cazacu, 2016; Arnold & Hussinger, 2005; Bigsten & Gebreeyesus, 2009; Girma et al., 2003; Park et al., 2010; Wagner, 2002)), we applied the matching method. This method involves pairing each treatment (exporter) and comparison (non-exporter) units that are as close as they can be, allowing us to drive out effects that can be reliably attributed to exporting.

First, we better to identify those variables that make a firm more likely to export. This includes firm age and its square, size, capital-intensity, wage, type of ownership, and industry and year dummies (Arnold & Hussinger, 2005; Bigsten & Gebreeyesus, 2009; Roberts & Tybout, 1997). We then estimated the probability of exporting (the propensity score) using the following export participation equation with psmatch2 in Stata (Leuven & Sianesi, 2015) by regressing the export status dummy on a 1-year lag of the above variables.

$$E_{it} = \ln(age)_{t-1} + \ln(age^2)_{t-1} + \ln(size)_{t-1} + \ln(K/L)_{t-1} + \ln(wage)_{t-1} + ownership + F_{year} + F_{sector} + F_{Location} + \eta_i + \varepsilon_{it} \quad \text{.....11}$$

1.6. Empirical results and discussion

1.6.1. Descriptive results

Table 1.4 shows the descriptive statistics which is explained by unconditional mean differences between exporters and non-exporters in a range of characteristics for LMMI in Ethiopia. The first column lists the characteristics in which the differences are examined. The results reported in Table 1.4 shows (without controlling for differences in other characteristics, industry or location of firms) exporters are found to be superior to non-exporter in terms of productivity irrespective of whether it is measured by the stochastic frontier in rates or Levinsohn-Petrin and labor productivity in levels. All these differences are statistically significant at standard level and also this is consistent with the existing literature. The TFP change of exporters, which can be achieved by the three components; technical change, scale component, and technical efficiency change, is higher than that of non-exporters. On average, export industries enjoy higher technical efficiency, about 9%, than non-export industries while its change is deteriorating for both and severe for non-exporters. It reveals that inputs have not been used effectively. Comparing the technical progress of the export industries with that of the non-export industries, on average, the former exhibits a superior

performance to that of the latter industries while no statistically significant evidence for the difference in scale efficiency across the two groups. This fact suggests that exporting enables the export industries to enjoy progressive shifts in the manufacturing sector's production technology. In both groups, much of the growth is due to technical progress, which is a shift in technology, and following with scale efficiency change while technical efficiency change shows negative contribution. Further, exporters produce more outputs and use more inputs (i.e. employ a larger number of workers, paid higher wages per worker which is a proxy for skill, are more capital-intensive and use larger raw material and capital inputs). These results are in line with the findings of A. B. Bernard et al. (1995) for USA, Van Biesebroeck (2005) for sub-Saharan Africa and Bigsten and Gebreeyesus (2009) for Ethiopia among others.

Table 1. 4: Mean differences in productivity and inputs usage between exporters and non-exporters (2000-11)

Variables	Export	Non-export	Diff	Std.Dev
TFP_{SF}	1.514	1.002	0.512**	0.059
TE_c	-0.122	-0.133	-0.011**	0.002
TEC. Eff	0.603	0.512	0.090**	0.022
TP_c	1.036	0.598	0.074***	0.04
SE_c	0.6	0.537	0.063	0.047
LP	11.664	10.673	0.991***	0.074
TFP_{LP}	3.429	2.852	0.577***	0.057
Output	17.288	14.563	2.665***	0.092
Capital	15.718	13.335	2.383***	0.113
Employment	5.519	3.868	1.650***	0.061
Raw materials	16.008	13.8	2.208***	0.09
Average wage	9.009	8.225	0.783***	0.054
Capital intensity	10.737	9.798	0.939***	0.095

Notes: TFP_{LP} is obtained by the Levinsohn and Petrin (2003) approach with revenue as a dependent variable .LP is labor productivity. TFPc is productivity growth from stochastic frontier and its components include: TE_c, SE_c and TP_c denote technical efficiency change, scale efficiency change and technical progress change respectively and given in percentage. TEC.Eff is the technical efficiency. Productivity measures, output, capital, employment, average wage and raw materials are in logs.

1.6.2. Productivity trajectories

A possible concern with the above result is that all the exporters are treated equally and do not follow export history of firms. That is, it does not consider whether they were always exporting, newly exporting, or switched back and forth. To understand the dynamics of productivity changes better, we classified firms into the four categories by following AB Bernard and Jansen (1999). There are firms that exported during the entire sample period, which are grouped as "always." Similarly, the "never" group consists of plants that never exported. The "starter" group represents firms that began exporting during the sample period (possibly new firms entirely). The "switcher" firms are those that changed their status more than once during the sample period.

We test the self-selection and learning by exporting hypotheses using the following equation:

$$\ln Y_{it} = \sum_{e \in E} \sum_{x \in X} \beta_{ex} D_i^e D_{ijt}^x + \gamma Control + \varepsilon_{it} \quad \text{.....12}$$

Where Y is a firm performance measure which is used to denote three different measures of firm performance for separate estimations such as labor productivity (Q/L) and $TFP_{LP,}$ both in levels and TFP_{SF} in growth. The coefficient β_{ex} denotes the mean value of each group e at each location x, controlling for industry, region, and year effects. D_i^e *and* D_{ijt}^x are dummy variables denoting export firm groups (E = (always, entrant, switchers, and never exporting)) and location in the five-year window (X = (-2, -1, 0, 1, 2)), respectively. This makes us to track firms from two years before entry and (or exit). That is, $D_{ijt}^x = -2$ through entry (or exit); $D_{ijt}^x = 0$ to two years after entry (or exit), $D_{ijt}^x = 2$. Its interaction with the status variables will give us a picture of the trajectories of the productivity.

Equation 2 was estimated to show movements of the productivity level of different measures of the four firm export groups, expressed as the difference from the never exporting in the period (–2) which is a control category. In all estimations, we control for industry, year, and location effects. The full results with the corresponding coefficients and standard errors are presented in Appendix A.6.

In large, those always exporting, newly exporting, and switchers performed better than those never exporting on all three measures. Starters had a significantly higher productivity level and growth even before they begin to export for the two given years and they continued to widen the gap, relative to those never exporting during and after entry to exporting. Almost all their post-entry coefficients are significant at least at the 10% level. Also, those firms that drop out of the export market exhibit persistently lower and deteriorating productivity compared with always. That is, they too start below always and above never exporters, but ends with lower productivity compared with never exporters for labor productivity and TFP_{SF} measures.

Figure 1.7a also shows the two competing hypotheses. The right side of the vertical line deals with the learning by exporting hypothesis (at scale equal zero) while the left side of the vertical line represents the self-selection hypothesis. We find an evidence in favor of the learning-by-exporting hypothesis. That is, firms that start exporting found to increase the labor productivity in the post-export period (at least during the following year), and to remain higher, with a widening gap from those never exporting. Its difference is also statistically significant as we can see from Appendix A.6. The result also confirms the existence of self-selection evidence in the entry into and exit from the export market. Firms that start exporting have somewhat higher productivity levels compared to those that never export (at least two years) before they enter the export market. Similarly, using TFP_{LP} and TFP_{SF} yielded similar patterns, with only some changes in scale as we can see in figure 1.7b and 1.7c.

Figure 1.7: Productivity trajectory for different exporting groups: Before and after

Figure 1.7a: Patterns of labor productivity by export history

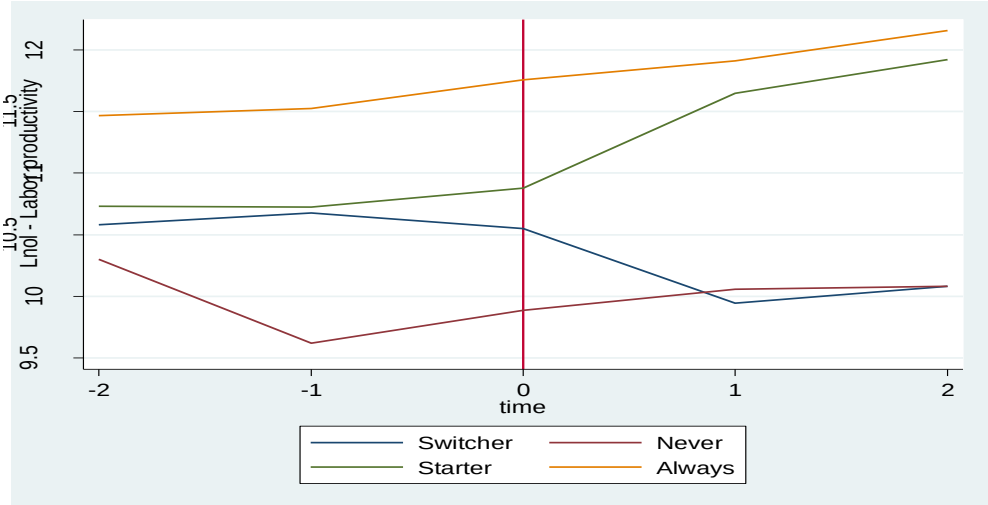


Figure 1.7b: Patterns of TFP_{LP} by export history

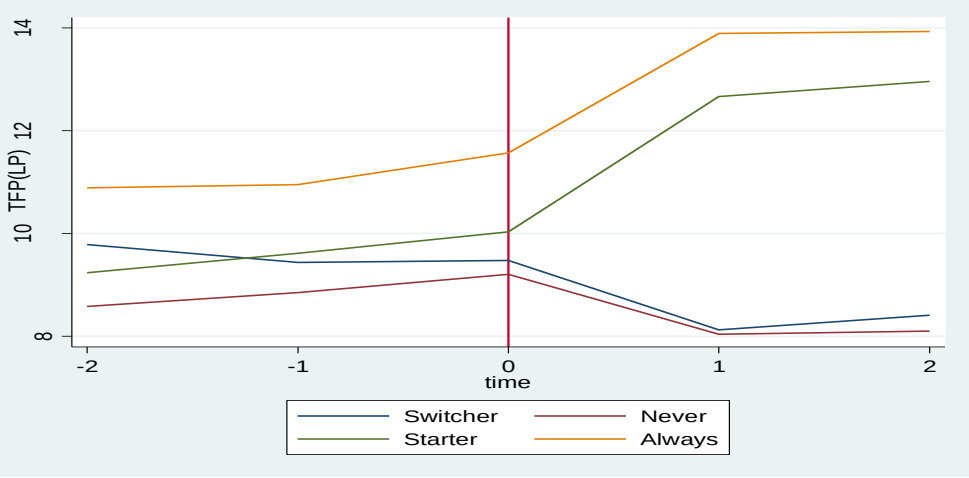
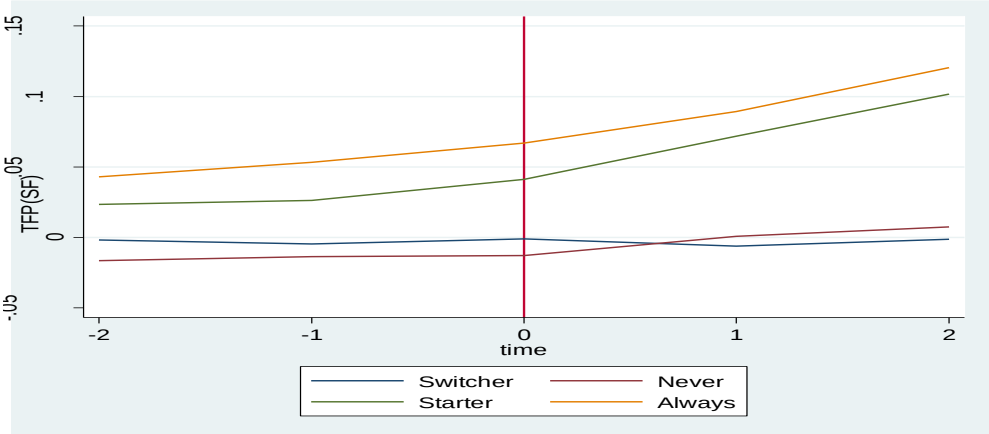


Figure 1.7c: Patterns of TFP_{SF} by export history



In the following sections, we presented the econometric evidence that allows us to control for other relevant factors and verifies the above intuition.

1.6.3. Econometric results

1.6.3.1. Self-selection into the export market

This section displays the empirical findings of testing the self-selection hypothesis of firms by using pooled probit and dynamic probit models.

Table 1. 5: Testing Self-selection hypothesis using Probit and Dynamic Probit

Variables	Export Participation					
	(1)	(2)	(3)	(4)	(5)	(6)
$Export_{t-1}$	1.772***	0.983***	1.704***	0.960***	1.767***	1.148***
	(0.097)	(0.156)	(0.091)	(0.150)	(0.111)	(0.160)
$Ln(LP)_{t-1}$	0.332***	0.403***				
	(0.029)	(0.045)				
$TFP_{(LP)t-1}$			0.129**	0.080*		
			(0.038)	(0.059)		
$TFP_{(SF)t-1}$					0.115*	0.117*
					(0.056)	(0.068)
$Ln(age)_{t-1}$	0.174	0.293	0.222	0.363**	0.530**	0.632**
	(0.149)	(0.266)	(0.143)	(0.251)	(0.227)	(0.375)
$Ln(age^2)_{t-1}$	-0.029	-0.051	-0.044	-0.067*	-0.098**	-0.103*
	(0.030)	(0.061)	(0.029)	(0.057)	(0.043)	(0.081)
$Ln(size)_{t-1}$	0.273***	0.332***	0.374***	0.221***	0.331***	0.398***
	(0.035)	(0.112)	(0.036)	(0.109)	(0.044)	(0.141)
$Ln(K/L)_{t-1}$	0.015	0.058	0.050**	0.067*	0.066***	0.102**
	(0.027)	(0.044)	(0.025)	(0.040)	(0.032)	(0.051)
$Ln(wage)_{t-1}$	0.101**	0.066	0.119**	0.149	0.020	-0.065
	(0.046)	(0.074)	(0.051)	(0.064)	(0.057)	(0.079)
Ownership	0.015	0.061	-0.000	0.067	-0.039	-0.052
	(0.113)	(0.144)	(0.109)	(0.135)	(0.127)	(0.150)
$Export_{io}$		1.274***		0.152***		0.383***
		(0.214)		0.189)		(0.212)
Average $Ln(LP)_{t-1}$		-0.232***				
		(0.092)				
Average $TFP_{(LP)t-1}$				0.113		
				0.100)		
Average $TFP_{(SF)t-1}$						0.211
						(0.150)
Average $Ln(size)_{t-1}$		-0.039		0.096		-0.114
		(0.130)		(0.131)		(0.153)
Average $Ln(K/L)_{t-1}$		0.009		0.021		0.015
		(0.076)		(0.066)		(0.856)
Average $Ln(wage)_{t-1}$		0.404**		0.586***		0.137

		(0.375)		(0.131)		(0.163)
Year, Industry and Location Dummies			Included in all models			
Observations	3430	3430	3432	3432	3092	3092
Log-likelihood	-592.612	-556.2	-664.894	-612.9	-439.2	-400.2
Chi-squared	1396.5	410.4	1260.25	469.8	938.9	388.9
Number of firms	796	796	796	796	769	769
Psudo R2	0.5409		0.486		0.516	
Rho		0.363		0.305		0.246

Notes: Standard errors in parentheses; and (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively.

Table 1.5 presents the results. Odd (even) column numbers present the pooled probit (dynamic probit) model estimates. The pooled probit model reveals that sunk cost proxies by lagged export status is a good predictor of exporting this year by raising the probability of staying in export by about 177 percentage points, all other things remaining constant. This level is the upper bound of the parameter estimate due to the upward bias of the estimations using pooled data without controlling for unobserved firm-level effects and initial conditions, as explained in the methodology part above. The result still maintains when unobservable effects are controlled by using the dynamic probit random effect model in the Wooldridge specification[14] even if the coefficient value of the lagged export is much lower with the dynamic model. The result holds the same with different productivity measures. This asserts the presence of high entry and exit costs (export persistence) in the export market, as argued by Roberts and Tybout (1997) for Columbian firms and more recently Arnold and Hussinger (2005) for German manufacturing. In other words, this implies prior involvement in the export market increases the likelihood of maintaining the same status by lowering the fixed costs of engaging in exporting in subsequent periods. Further, the coefficient of the initial export status ($Export_{io}$) is statistically significant and positive. This implies that there is a correlation between the initial value of export participation and unobserved firm heterogeneity. This also confirms the importance of the J. M. Wooldridge (2005) approach.

Coming to the variable of main interest, the role of productivity in determining export participation is found to be robust to measuring productivity with different methods. When considering labor productivity (LP) lagged with one-period, the estimated coefficient is positive and statistically significant from both models, confirming that productivity has a positive influence on entry into exporting due to the potential adoption of better governance strategies, best-practice technologies... The result remains significant even if there is an evidence for the presence of correlation between this variable and the unobserved heterogeneity which can be seen from the significant coefficient of the firm-specific mean value from the dynamic probit model. Similarly, we obtained a positive significant effect on exporting when we used TFP by Levinsohn-Petrin (TFP_{LP}) which is known for its benefits in controlling with endogeneity problem of input factors as a measure of productivity**.** As shown in column (3) and (4), there is a statistically significant effect of

[14] Note: this approach cannot yield estimates for time-invariant covariates (as the time average of these variables is the same as their value), and thus we do not include the time average of ownership and firm age.

productivity on a firm's future export decision. These results are similar to both models when controlling for both observable and unobservable heterogeneity of firms. Furthermore, if using productivity change calculated from the stochastic frontiers methodology but not productivity level, we still find evidence of more productive firms self-selecting into the export market. The above results are not sensitive to different productivity measure in levels (TFP_{LP} and LP) and indicate that not only productivity but also productivity change does increase the probability of export participation. Thus, these findings unsurprisingly support both for selection into exporting and export persistence in Ethiopia. Other empirical studies on exporting behaviors in Ethiopia also find the persistence of export status of firms (Bigsten & Gebreeyesus, 2009; Bigsten, Gebreeyesus, Siba, & Söderbom, 2011). Our finding further confirms this result.

Besides, capital intensity and firm size are factors that have strong evidence as good predictors for the export status of firms. The significant positive coefficient on lagged capital-intensity suggests that firms with a relatively high capital-labor ratio is more like to engage in exporting. This implies those firms that use capital-intensive technology has a higher probability to export. This evidence can be confirmed by the results of all the estimation specifications that we run except with labor productivity measure in which it is positively insignificant. This finding is consistent with the majority of other research (such as (A. B. Bernard et al., 1995; Bigsten & Gebreeyesus, 2009; Van Biesebroeck, 2005)), and seems to reflect a fact that Ethiopian medium and large manufacturing firm's export capital-intensive products even if it is labor abundant country and contrary to our expectation. Further, we estimated the main specification with each Subsector and we confirmed the presence of strong evidence about self-selection for exporting in all productivity measures except with TFP_{LP} for leather and tanning and TFP_{SF} productivity measures for textile and apparel as it is reported in appendix A.2. Similarly, firm size in terms of the number of laborers is favorable to exporting. Larger sized firms which have a large scale of production and sales may enjoy lower fixed costs associated with exporting and much more likely to enter into exporting compared to smaller ones and this is in line with the findings of Helpman et al. (2004) and Bigsten and Gebreeyesus (2009).

We have also evidence to argue that firms with more skilled labors (proxies by average wage) are more likely to export with probit estimates that do not account for unobserved heterogeneity. This, however, vanishes in the dynamic probit model when we control for unobserved heterogeneity, suggesting the presence of correlation between this variable and the unobserved heterogeneity. This is observed by the positive and significant coefficient for the firm-specific mean value of wage that indicates that pooled probit estimates overestimate the impact of wage effect. It is also shown in the estimation results, especially those with TFP_{LP} and TFP_{SF} productivity measures, that firm age is a predictor of export probability. The signs of coefficients of age and age squared are positive and negative, respectively. This fact implies that firms with more years of experience and the marginal value of this experience deteriorate over time. As expected, firm age seems to have a nonlinear effect, positive but decreasing at the margin. This implies, the latter could be attributed to the lower ability of older firms to adapt to the dynamics of industrial changes and evolution

while they become older and older. Especially, the variety of these firms managed by seasoned veterans that may stick to the use of old managerial strategies and/or are more risk averse to the adoption of new technologies or new ways of producing. While with the labor productivity measure, the coefficient of firm age and its square is statistically insignificant, implying the unclear effect of firm age on the export decision of the firm. Finally, public ownership as well does not seem to have direct impact on exporting in all of our preferred specifications. Unobserved heterogeneity is substantial and explains between 25 and 36 per cent of the variance of the dependent variables as indicated by the estimate for rho.

1.6.3.2. Learning by exporting

The other objective of this study is to examine whether firms improve their productivity change and its components subsequent to their entry into export markets with unmatched and matched samples.

Table 1. 6: Estimation results of the learning by exporting -Unmatched sample

Variables	Levin-Petrin		Stochastic frontier							
	TFP_{LP}		TFP_{SF}		TE_c		TP_c		SE_c	
	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TFP_{LP_1}	0.045**	0.038								
	(0.014)	(0.040)								
TFP_{SF_1}			0.271***	0.251***						
			(0.025)	(0.058)						
$Export_{t-1}$	0.250*	1.191**	-0.044	0.820**	0.032	0.011	0.001	0.015***	0.019	0.737
	(0.051)	(0.394)	(0.076)	(0.411)	(0.038)	(0.087)	(0.002)	(0.005)	(0.066)	(0.474)
LnL	0.875**	0.864**	0.261**	0.692**	0.074**	0.022	0.017***	0.014***	0.241**	1.00***
	(0.019)	(0.058)	(0.028)	(0.193)	(0.013)	(0.022)	(0.001)	(0.002)	(0.023)	(0.177)
LnK	0.029**	0.066**	0.013	-0.047	0.062**	0.031**	0.001	0.004	0.046**	0.025
	(0.009)	(0.031)	(0.014)	(0.105)	(0.006)	(0.013)	(0.001)	(0.002)	(0.011)	(0.121)
LnM	0.475**	0.446**	0.106**	0.419**	0.014*	0.001	0.027***	0.028***	0.058**	0.567*
	(0.012)	(0.051)	(0.018)	(0.152)	(0.088)	(0.023)	(0.003)	(0.003)	(0.015)	(0.219)
$Lnage_{t-1}$	0.043	0.084	0.152	0.296*	0.005	-0.657*	-0.002	0.020***	-0.095**	-0.044
	(0.015)	(0.09)	(0.025)	(0.177)	(0.011)	(0.05)	(0.004)	(0.002)	(0.019)	(0.163)
Ownership	0.002	0.165	0.150**	0.161	-0.391**	-0.745*	0.015***	0.021***	0.269***	0.534**
	(0.050)	(0.112)	(0.074)	(0.166)	(0.036)	(0.081)	(0.001)	(0.004)	(0.064)	(0.258)
Year, Industry and Location Dummies			Included in all models							
Observations	3434	3434	2223	2223	3434	3434	3434	3434	3434	3434
No. of firms		796		538		796		796		796
Instruments		107		101		77		74		74
AR(2)		0.936		0.283		0.508		0.516		0.195
Sargen		0.856		0.195		0.63		0.523		0.305

Notes: All specifications controlled for dummy variables for location, industry and time. Clustered standard errors in parentheses; (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively.

The estimated results from table 1.6 reveal the effect of export participation on productivity change and its decompositions with OLS and SYS-GMM with the unmatched sample, the former serving as a benchmark. In the SYS-GMM estimation, we use the first and earlier lags of all the inputs and the second and earlier lags of the dependent variable and other control variable as instruments for the first difference equation, and the lagged first difference of all explanatory variables was used as instruments in the level equations. The null hypothesis which represents instruments is valid not rejected using the Sargen test, which is a minimized value of the two-step GMM criterion function and robust to heteroscedasticity and also found no evidence of second-order serial correlation.

Going into the detail of each coefficient, in the SYS-GMM estimations with both productivity measures provide a positive and statistically significant coefficient for the one-year lag export dummy. This suggests that previous exporting boosts' current productivity growth in both the change in productivity calculated from Levishon-Petrin or Stochastic Frontier methodologies. Obviously, this supports for the hypothesis of learning effects by exporting of Ethiopian firms. Moreover, this basic pattern remains stable across different subgroups estimation results (see Appendix 3.A for detail). Further, it is similar to recent empirical works in Ethiopia by Bigsten and Gebreeyesus (2009), in Mozambique by Cruz, Newman, Rand, and Tarp (2017) and in Senegal by Fatou and Choi (2013). It is contrary to works in Vietnam by V. H. Vu (2012) and in China by Fu (2005) in which they got positive but statistically insignificant result.

In terms of the relationship between other explanatory variables and productivity change, lagged productivity change are positive and significant in all cases, suggesting persistence in productivity change. The firm age which indicates the firm's survival as a one component of the firm's performance may well indicate the benefits of the knowledge involved in productivity change but our findings indicate insignificant coefficient of firm age on the learning process in all specifications except with TFP_{SF} for the SYS- GMM estimation in which we found positively significant result. In other words, firms with more years in the business had little or no influence on productivity change. We then run similar regressions for each 2-ISIC digit subsectors (see Appendix 3.A). Unlike the above results, we now find positive and significant firm age coefficient for the stochastic frontier productivity measure of all group sectors, but only for food and beverages with Levishon-Petrin measure. Moreover, type of ownership is insignificant in any of the estimations except for TFP_{SF} in OLS estimation with positive significant.

Moving to each component of TFP change, the coefficient relating to the influence of export participation on technical efficiency is positive and statistically insignificant. This suggests that exports do not impart a significant positive impact on efficiency improvement at the firm level. The competition and resource reallocation effects of exports at the firm level are insignificant in the case of Ethiopia. This is likely due to the fact that the knowledge gained from exporting diffuses in the long run across exporters as a result of labor mobility among firms. Diffusion effects would,

therefore, make it less likely to observe efficiency differences across the two groups of firms. This is in line with a study conducted by Aw et al. (2000); Fu (2005); Aggrey, Eliab, and Joseph (2010) and V. H. Vu (2012), while inconsistent with the empirical evidence of Bigsten et al. (2004); and Granér and Isaksson (2002), who suggest that export participation has a positive and statistically significant effect on technical efficiency. Similarly, the coefficient relating to the influence of export participation on scale efficiency is positive and statistically insignificant. In other words, there is not a considerable difference between exporters and non-exporters in this regard.

Lastly, export participation seems to be a good predictor for the change in technical progress (column 7 and 8). The estimated coefficient of export participation displays a positive and statistically significant effect on technological efficiency. Evidence of greater participation in the export market encourages firms to upgrade technology and innovation that is contrary to the results of Fu (2005) and V. H. Vu (2012). These authors have got a statistically insignificant effect on export activity on technical progress by using Chinese industry-level panel data and Vietnam's SME respectively. As exporting is a knowledge-transmission channel, the ability of exports to promote innovation may result from several sources. This includes information exchange with foreign markets, personal contacts with foreign buyers and intermediaries and higher competition pressure.

In sum, TFP change of the Ethiopian manufacturing industries appears to be significantly associated with its export activity. The results of the TFP change equation show that the estimated coefficient of the export variable is positive and statistically significant. Unsurprisingly, the above result also confirms with the separate regression for each group sectors. In other words, the results suggest that greater export-orientation appears to lead to significant TFP growth which may stem from some reasons. Firstly, exporting firms can more easily access new technologies of production or new designs. Secondly, these firms can also receive technical assistance either from their foreign buyers or from international technical and professional services that are more easily available to exporting firms. Thirdly, exporting firms in contacts with their foreign counterparts and competitors can also more easily access advanced managerial skills or marketing techniques that may enhance innovation and technology. But there is still spare capacity related with technical and scale efficiency gains with Ethiopian firms' export if possible to avoid supply side constraints. These are infrastructure, weak instructions, substantial inability to attract FDI, outdated machines, poor communication, absence of vibrant public-private dialogue, risk-averse nature of the producers and nature dependence which make it difficult to bring productivity growth than the current one due to foreign trade.

Then we check whether our baseline results are robust to addressing the potential problem of selection bias by applying the matching method as explained in the methodology part. Thus, we run similar regressions for the matched sample (Table 1.7) after the propensity score was estimated with a logistic model, k=5 nearest-neighbors matching, and common support conditions also imposed. A total of 393 non-exporting observations were assigned as matches to the 494 exporting

observations of which 63 exporting firms were excluded due to the imposition of common support that drops exporters whose *pscore* is out of its region. The first step estimation result of (export participation) and productivity differential between exporters and non-exporters after matching are also presented in Appendix A.4.1 and A.4.2, respectively. The logistic regression results show that except the type of ownership, all including size, age with concave relation, capital intensity, and average wage had statistically significant positive effects on export-participation (Appendix A.4.1.). Further, in the *psmatch2* estimation, the productive from both measures of exporters was higher than that of non-exporters, and this difference is significant in both unmatched and matched samples (Appendix A.4.2). Thus, even controlling for selection-bias exporters had higher productivity than non-exporters.

Table 1. 7: Estimation results of the learning by exporting - Matched sample

Variables	Levin-Petrin		Stochastic frontier							
	TFP_{LP}		TFP_{SF}		TE_C		TP_C		SE_C	
	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TFP_{LP_1}	0.076**	0.038								
	(0.033)	(0.080)								
TFP_{SF_1}			0.256***	0.173***						
			(0.049)	(0.047)						
$Export_{t-1}$	0.275***	0.433**	0.087*	1.019***	0.051*	0.002	0.004*	0.005*	0.135	0.524
	(0.078)	(0.387)	(0.105)	(0.309)	(0.006)	(0.007)	(0.002)	(0.0028)	(0.102)	(0.280)
LnL	0.793**	0.841**	0.310**	0.935**	0.002	0.005	0.016***	0.015***	0.294***	1.024***
	(0.041)	(0.138)	(0.053)	(0.146)	(0.003)	(0.005)	(0.001)	(0.015)	(0.052)	(0.192)
LnK	-0.031	-0.062	-0.089**	-0.121	0.042**	0.040**	-0.004	-0.001	0.116**	0.028
	(0.023)	(0.186)	(0.032)	(0.127)	(0.002)	(0.002)	(0.006)	(0.000)	(0.030)	(0.110)
LnM	0.416**	0.316**	0.113**	0.231*	0.050*	0.001	0.030***	0.034***	0.027**	0.020*
	(0.027)	(0.235)	(0.037)	(0.149)	(0.002)	(0.005)	(0.007)	(0.002)	(0.036)	(0.203)
$Lnage_{t-1}$	0.055	-0.308**	-0.372**	-0.98***	-0.002	0.002	0.000	-0.003	-0.302**	-1.540**
	(0.036)	(0.148)	(0.052)	(0.185)	(0.003)	(0.007)	(0.000)	(0.003)	(0.048)	(0.321)
Ownership	-0.037	-0.306**	0.036	0.004	-0.023**	-0.024**	0.015**	0.010*	0.106	-0.213
	(0.087)	(0.140)	(0.114)	(0.163)	(0.006)	(0.010)	(0.002)	(0.003)	(0.108)	(0340)
Year, Industry and Location Dummies			Included in all models							
Observations	693	693	693	693	693	693	693	693	693	693
No. of firms		254		254		254		254		254
Instruments		85		85		73		73		73
AR(2)		0.601		0.331		0.833		0.245		0.673
Sargen		0.941		0.806		0.335		0.314		0.211

Notes: All specifications controlled for dummy variables for location, industry and time. Clustered standard errors in parentheses; (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively.

Our next task is to test the learning-by-exporting hypothesis for the matched sample using OLS and system-GMM. The result confirmed that unlike the unmatched results, we now find positive and significant lagged export status not only for the SYS-GMM but also for the OLS estimation for both productivity measures. This shows that addressing the selection bias through matching improves the effect of export engagement on productivity. Moreover, the basic pattern and sign remain the same across the three components of the TFP in the matched estimations compared to the unmatched one except for TE_c which is positive significant with OLS. In sum, in spite of the magnitude difference, all these results support the presence of learning by exporting effect in the Ethiopian manufacturing sector even with stronger evidence.

1.7. Summary of findings

This paper aims to revisit the evidence on the self-selection and learning by exporting with a unique firm-level panel data from Ethiopian medium and large scale manufacturing sectors in 2000-2011 periods. We used it to exploit its length to trace the trajectory of TFP and other productivity measures of groups of firms classified by their export history. We also investigated these questions using a two-step strategy. In the first step, we use a dynamic translog production function to compute productivity change and its components. In a second step, following of Roberts and Tybout (1997) and Clerides et al. (1998) approach respectively, we jointly estimated both equations of productivity and probability to export by pooled probit and dynamic probit for selection to exporting and pooled OLS and SYS-GMM for learning by exporting.

In general, exporting firms in Ethiopia were more productive than non-exporters, and even before joining into the export market. Starters showed a significantly higher productivity level and growth relative to those never exporting during and after entry to exporting. This is evidence of both self-selection and learning-by-exporting. It is also confirmed by our econometric results which is consistent with many econometric evidences from other study findings. It indicates that higher productivity of exporters in the Ethiopian manufacturing firms comes from both ways: the more productive firms became exporters (self-selection) and firm's productivity increases by exporting (learning by exporting). More specifically, several interesting results are found in testing the both hypothesis.

Regarding the first hypothesis, results are consistent with the inclusion of several firm characteristics such as firm size, skilled labor, capital structure, ownership structure and industry classification. Our finding suggests that larger firms and those with more qualified workers are generally much more likely to export, and this again points to a need to invest in highly productive resources that lead to a greater ability to internalize external knowledge in order to overcome barriers to exporting. Exporting firms acquire external knowledge through various channels. Our results also suggest that firms with skilled workers are able to reap the benefits of exposure to export markets in the OLS specification but it vanishes in the dynamic probit model when we control for unobserved heterogeneity. Another interesting finding is that firms with previous

exporting are also more likely to export subsequently, providing evidence for export hysteresis and the presence of high entry costs. Besides, firm age has a nonlinear impact, positive but declines overtime, on export probability. The more capital enterprises have higher chances of participating in exporting market which is somehow contrary to our expectation. Finally, a statistically significant impact of productivity on the exporting decision of firms is confirmed after controlling unobservable firm characteristics heterogeneity and using of measurable productivity in different methods.

Concerning the second hypothesis, we extend the literature by decomposing TFP growth into its components by using SFA to deal with the role of export participation on productivity growth and its components. Our empirical results reveal that the export status of firms is statistically significantly positively associated with TFP growth and technical progress while insignificantly related to scale change and technical efficiency, even stronger when using the matched sample. This confirms the importance of export-oriented growth and export promotion efforts that might have long-term effects in terms of sustaining exports and industrial competitiveness in Ethiopia. Furthermore, the non-existence of evidence of post-exporting efficiency change requires improving the technical efficiency and scale efficiency of manufacturers that can further strengthen the productivity growth after exporting.

The evidence of post-exporting productivity change is stronger when estimation is based on the matched sample that controls for selection bias in all specifications. Our results are largely consistent with the emerging evidence from other developing countries reviewed above. In sum, the finding from learning by exporting suggests that Ethiopia has much to gain from promoting its manufacturing sector towards exporting by increasing the ability of domestic firms to overcome foreign market barriers as well as assimilate further benefits arising from exporting by designing policies orienting firms towards reducing poor production practice are necessary. More specifically, policies that promoting efficiency by creating an environment which makes that employee advance their technical know-how, management skills, entrepreneurial and innovative skills and improve the scale of operation by improving the proportion of their inputs is very important to be more beneficiary from exporting.

Last but not least, export dummy may not adequately capture to learning by exporting process. The reason is that learning effects of exporting may depend on exporting market destination, whether they are developed countries or developing countries. However, the limitation of the dataset has prevented us from considering such scenarios. Hence, future research needs to take account of this limitation.

Appendix A

Appendix A.1: Maximum likelihood estimates of the translog stochastic frontier model

Variables	Coefficient	Standard-error	t-ratio
Constant	2.682	0.602	4.453
T	0.14	0.034	4.168
LnL	-0.451	0.092	-4.91
LnK	0.038	0.053	0.724
LnM	0.784	0.089	8.822
T^2	0.018	0.002	9.072
$(LnL)^2$	-0.036	0.008	-4.322
$(LnK)^2$	0.001	0.002	0.516
$(LnM)^2$	0.017	0.004	2.533
(LnL)T	0.01	0.003	3.232
(LnK)T	0.004	0.002	2.132
(LnM)T	-0.022	0.002	-9.204
(LnL)(LnK)	0.044	0.006	7.399
(LnL)(LnM)	0.016	0.009	1.804
(LnK)(LnM)	-0.015	0.005	-3.203
σ^2	0.92	0.06	15.386
γ	0.593	0.024	24.372
μ	1.477	0.195	7.561
η	-0.213	0.015	-14.37
log likelihoodfunction		**-4461.09**	
Obs. Number		**4363**	

Appendix A.2: Self-selection estimates for the three group sectors

Appendix A.2.1: Self-selection estimates – Labor Productivity (LP)

Variables	Export participation$_{(t)}$					
	Food and beverage		Textile and Apparel		Leather and Tanning	
	(1)	(2)	(3)	(4)	(5)	(6)
Export$_{t-1}$	2.105***	1.260***	1.212***	0.624**	1.860***	1.371***
	(0.163)	(0.281)	(0.173)	(0.261)	(0.238)	(0.357)
Ln(LP)$_{t-1}$	0.282***	0.290***	0.321***	0.525***	0.378***	0.432***
	(0.046)	(0.067)	(0.053)	(0.094)	(0.072)	(0.102)
Ln(age)$_{t-1}$	0.269	0.185	0.327	0.261	0.333	0.644
	(0.219)	(0.381)	(0.355)	(0.652)	(0.352)	(0.562)
Ln(age2)$_{t-1}$	-0.039	-0.056	-0.101	-0.014	0.052	-0.145
	(0.044)	(0.084)	(0.073)	(0.151)	(0.074)	(0.144)
Ln(size)$_{t-1}$	0.206***	0.374***	0.332***	0.441**	0.613***	0.161***
	(0.049)	(0.162)	(0.064)	(0.225)	(0.131)	(0.298)
Ln(K/L)$_{t-1}$	0.055	0.074	0.008	0.101	0.001	0.022
	(0.041)	(0.065)	(0.046)	(0.074)	(0.082)	(0.122)
Ln(wage)$_{t-1}$	0.045	0.001	0.062	0.087	0.293	0.160
	(0.067)	(0.108)	(0.088)	(0.137)	(0.125)	(0.206)
Ownership	-0.038	0.045	-0.110	-0.027	0.500	0.345
	(0.157)	(0.204)	(0.211)	(0.260)	(0.377)	(0.424)
Export$_{io}$		1.577***		0.874***		1.164***
		(0.426)		(0.315)		(0.437)
Average Ln(LP)$_{t-1}$		-0.156		-0.357**		-0.445
		(0.131)		(0.156)		(0.238)
Average Ln(size)$_{t-1}$		-0.311		-0.016		0.550
		(0.197)		(0.247)		(0.357)
Average Ln(K/L)$_{t-1}$		0.112		-0.095		-0.008
		(0.112)		(0.128)		(0.205)
Average Ln(wage)$_{t-1}$		0.459*		0.108		0.310
		(0.254)		(0.260)		(0.360)
Year and Location Dummies			Included in all models			
Observations	2397	2347	514	514	519	519
Log-Likelihood	-257.6	-240.4	-178.687	-167.2	-116.225	-139.5
Chi-squared	546.15	181.5	201.27	90.1	422.57	92.54
Number of firms		585		104		107
Psudo R2	0.5146		0.360		0.645	
Rho		0.233		0.453		0.430

Notes: Standard errors in parentheses; (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively. (1), (3) and (5): Pooled data probit models; (2), (4) and (6): Wooldridge's dynamic probit model.

Appendix A.2.2: Self-selection estimates – TFP from Levin-Petrin

Variables	Export participation$_{(t)}$					
	Food and beverage		Textile and Apparel		Leather and Tanning	
	(1)	(2)	(3)	(4)	(5)	(6)
$Export_{t-1}$	2.014***	1.147***	1.106***	0.723***	1.870***	1.352***
	(0.154)	(0.266)	(0.163)	(0.239)	(0.226)	(0.325)
TFP_{LP_1}	0.140**	0.138*	0.037**	0.139*	0.002	0.002
	(0.06)	(0.097)	(0.066)	(0.097)	(0.002)	(0.003)
$Ln(age)_{t-1}$	0.296	0.322	0.250	0.422	0.421	0.694*
	(0.215)	(0.377)	(0.337)	(0.570)	(0.327)	(0.547)
$Ln(age2)_{t-1}$	-0.051	-0.072	-0.095	-0.056	0.056	-0.151*
	(0.043)	(0.084)	(0.070)	(0.129)	(0.069)	(0.141)
$Ln(size)_{t-1}$	0.322***	0.449***	0.295***	0.191*	0.681***	0.769*
	(0.051)	(0.172)	(0.067)	(0.190)	(0.125)	(0.269)
$Ln(K/L)_{t-1}$	0.083*	0.099	0.030**	0.031	0.121*	0.093
	(0.037)	(0.062)	(0.042)	(0.064)	(0.076)	(0.108)
$Ln(wage)_{t-1}$	-0.008	-0.144	-0.024	-0.155	0.085	-0.202
	(0.062)	(0.100)	(0.082)	(0.111)	(0.107)	(0.150)
Ownership	-0.059	-0.073	-0.086	0.026	0.544	0.265
	(0.154)	(0.205)	(0.200)	(0.223)	(0.357)	(0.415)
$Export_{io}$		1.631***		0.715***		1.118***
		(0.414)		(0.237)		(0.385)
Average TFP_{LP}		0.027		0.302*		-0.268
		(0.162)		(0.161)		(0.225)
Average $Ln(size)_{t-1}$		-0.316		-0.288		0.534*
		(0.203)		(0.227)		(0.328)
Average $Ln(K/L)_{t-1}$		0.080		0.056		-0.091
		(0.108)		(0.098)		(0.187)
Average $Ln(wage)_{t-1}$		0.693***		0.161		0.522
		(0.237)		(0.192)		(0.321)
Year and Location Dummies			Included in all models			
Observations	2347	2347	514	514	519	519
Log-Likelihood	-282.196	-256.8	-256.8	-190.1	-131.611	-119.0
Chi-squared	508.15	172.2	172.2	111.9	391.79	144.8
Number of firms		585		104		107
Psudo R2	0.473		0.284		0.598	
Rho		0.258		0.259		0.373

Notes: Standard errors in parentheses; (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively. (1), (3) and (5): Pooled data probit models; (2), (4) and (6): Wooldridge's dynamic probit model.

Appendix A.2.3: Self-selection estimates – TFP_{SF} from Stochastic frontier

Variables	Export participation$_{(t)}$					
	Food and beverage		Textile and Apparel		Leather and Tanning	
	(1)	(2)	(3)	(4)	(5)	(6)
$Export_{t-1}$	2.071***	1.414***	1.289***	0.929***	1.897***	1.604***
	(0.164)	(0.267)	(0.199)	(0.256)	(0.23)	(0.329)
TFP_{SF_1}	0.032	0.062*	0.098	0.120	0.199*	0.263*
	(0.045)	(0.062)	(0.118)	(0.142)	(0.121)	(0.148)
$Ln(age)_{t-1}$	0.406*	0.433	0.449	0.798	0.316	0.588
	(0.242)	(0.391)	(0.686)	(0.979)	(0.341)	(0.557)
$Ln(age2)_{t-1}$	-0.075	-0.093	-0.115	-0.147	-0.047	-0.124
	(0.049)	(0.086)	(0.127)	(0.204)	(0.073)	(0.144)
$Ln(size)_{t-1}$	0.311***	0.481***	0.289***	0.589***	0.630***	0.493*
	(0.052)	(0.168)	(0.075)	(0.088)	(0.128)	(0.276)
$Ln(K/L)_{t-1}$	0.116**	0.142	0.049*	0.084	0.118*	0.068
	(0.042)	(0.067)	(0.055)	(0.141)	(0.081)	(0.120)
$Ln(wage)_{t-1}$	-0.029	-0.143	-0.024	0-.008	0.161	-0.158
	(0.067)	(0.100)	(0.107)	(0.278)	(0.120)	-(0.161)
Ownership	-0.095	0.044	-0.125	0.024	0.468	0.164
	(0.158)	(0.189)	(0.236)	(0.326)	(0.364)	(0.414)
$Export_{io}$		1.331***		1.429***		1.049***
		(0.371)		(0.326)		(0.321)
Average TFP_{SF}		0.069		-0.119		0.574
		(0.117)		(0.297)		(0.537)
Average $Ln(size)_{t-1}$		-0.352*		-0.385		0.671*
		(0.184)		(0.306)		(0.337)
Average $Ln(K/L)_{t-1}$		0.034		0.179		-0.246
		(0.109)		(0.140)		(0.205)
Average $Ln(wage)_{t-1}$		0.542**		-0.202		0.346
		(0.221)		(0.286)		(0.430)
Year& Location Dummies		Included in all models				
Observations	2135	2135	383	383	483	483
Log-Likelihood	-249.91	-228.5	-139.28	-116.2	-123.18	-101.0
Chi-squared	485.86	215.8	148.29	88.93	359.86	165.5
Number of firms		565		74		105
Psudo R2	0.492		0.347		0.593	
Rho		0.356		0.118		0.314

Notes: Standard errors in parentheses; (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively. (1), (3) and (5): Pooled data probit models; (2), (4) and (6): Wooldridge's dynamic probit model.

Appendix A.3: Learning to export estimates for the three group sectors

Appendix A.3.1: Learning by Exporting estimates –Food and Beverages

	Levin-Petrin		Stochastic frontier							
Variables	TFP_{LP}		TFP_{SF}		TE_C		TP_C		SE_C	
	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TFP_{LP_1}	0.114	0.113**								
	(0.017)	(0.052)								
TFP_{SF_1}			0.264***	0.258***						
			(0.031)	(0.070)						
$Export_{t-1}$	0.468***	1.035**	0.215*	0.417	0.063	0.097	0.003	0.022***	0.115	0.254
	(0.080)	(0.504)	(0.129)	(0.488)	(0.061)	(0.109)	(0.002)	(0.008)	(0.109)	(0.507)
LnL	0.907***	0.883***	0.296***	0.603***	0.049***	0.025	0.017***	0.016***	0.255***	0.967***
	(0.022)	(0.067)	(0.038)	(0.217)	(0.016)	(0.023)	(0.001)	(0.003)	(0.029)	(0.197)
LnK	0.044***	0.081***	0.027	0.062	0.073***	0.033**	0.001**	0.007***	-0.036**	-0.132
	(0.011)	(0.032)	(0.019)	(0.124)	(0.008)	(0.014)	(0.001)	(0.002)	(0.014)	(0.099)
LnM	0.535***	0.525***	0.137***	0.379**	0.053***	0.055**	0.026***	0.017***	0.079***	-0.156
	(0.014)	(0.056)	(0.025)	(0.155)	(0.011)	(0.024)	(0.004)	(0.002)	(0.019)	(0.197)
$Ln(age)_{t-1}$	0.0503***	0.088	0.122**	0.351*	0.006	0.550***	-0.002	0.014***	0.077***	-0.092
	(0.016)	(0.089)	(0.031)	(0.202)	(0.013)	(0.051)	(0.005)	(0.002)	(0.023)	(0.195)
Owners	0.012	0.161	0.141	0.077	0.386**	0.747***	0.015***	0.032***	0.264***	0.872***
Hip	(0.060)	(0.14)	(0.098)	(0.206)	(0.046)	(0.089)	(0.018)	(0.048)	(0.081)	(0.312)
Year and Location Dummies					Included in all models					
Observations	2401	2401	2088	2088	2401	2401	2401	2401	2401	2401
No. of firms		585		492		585		585		585
Instruments		105		99		75		72		72
AR(2)		0.280		0.221		0.112		0.312		0.271
Sargen		0.404		0.222		0.305		0.196		0.165

Notes: All specifications controlled for dummy variables for location and time. Clustered standard errors in parentheses; (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively.

Appendix A.3.2: Learning by Exporting estimates –Textile and Apparel

	Levin-Petrin		Stochastic frontier							
Variables	TFP_{LP}		TFP_{SF}		TE_C		TP_C		SE_C	
	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TFP_{LP_1}	0.120**	-0.041								
	(0.059)	(0.069)								
TFP_{SF_1}			0.588***	0.566***						
			(0.089)	(0.089)						
$Export_{t-1}$	0.427***	0.975*	-0.034	0.741	0.238*	0.097	0.009***	0.001	0.084	0.581
	(0.145)	(0.518)	(0.172)	(0.487)	(0.089)	(0.105)	(0.004)	(0.005)	(0.157)	(0.521)
LnL	0.801***	0.690***	0.180**	0.434**	-0.076*	0.098**	0.018***	0.0210***	0.206***	0.874***
	(0.075)	(0.136)	(0.081)	(0.203)	(0.041)	(0.045)	(0.002)	(0.002)	(0.073)	(0.311)
LnK	0.059*	0.108	0.038	0.0211	0.066***	0.007	0.001	0.002***	0.081**	0.0516
	(0.035)	(0.101)	(0.042)	(0.105)	(0.021)	(0.019)	(0.001)	(0.001)	(0.037)	(0.099)
LnM	0.367***	0.507***	-0.054	0.051	-0.001	0.046	0.028***	0.032***	0.033	0.308*
	(0.045)	(0.137)	(0.052)	(0.112)	(0.028)	(0.049)	(0.001)	(0.002)	(0.049)	(0.174)
$Ln(age)_{t-1}$	0.0673	0.092	0.381**	0.688**	-0.043	0.008	0.002	-0.001	0.268***	0.214***
	(0.070)	(0.209)	(0.092)	(0.213)	(0.042)	(0.135)	(0.002)	(0.005)	(0.076)	(0.363)
Ownership	0.208	0.437*	-0.087	0.046	-0.391***	0.224***	0.016***	0.009***	-0.048	0.182
	(0.155)	(0.256)	(0.179)	(0.242)	(0.086)	(0.070)	(0.003)	(0.003)	(0.151)	(0.311)
Year, Industry and Location Dummies			Included in all models							
Observations	277	277	200	200	277	277	277	277	277	277
No. of firms		53		40		53		53		53
Instruments		102		96		92		96		96
AR(2)		0.696		0.233		0.508		0.346		0.223
Sargen		1.000		1.000		1.000		0.613		1.000

Notes: All specifications controlled for dummy variables for location and time. Clustered standard errors in parentheses; (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively.

Appendix A.3.3: Learning by Exporting Estimates – Leather and Tanning

	Levin-Petrin		Stochastic frontier							
Variables	TFP_{LP}		TFP_{SF}		TE_C		TP_C		SE_C	
	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM	OLS	SYS-GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TFP_{LP}_1	0.056*	0.093								
	(0.032)	(0.087)								
TFP_{SF}_1			0.251***	0.250***						
			(0.053)	(0.073)						
$Export_{t-1}$	0.206**	0.900**	0.083	0.925**	0.038	0.232*	0.002	0.014**	0.108	1.260*
	(0.092)	(0.418)	(0.108)	(0.427)	(0.066)	(0.111)	(0.003)	(0.006)	(0.111)	(0.653)
LnL	0.790***	0.656***	0.243***	0.572***	0.132***	0.023	0.019***	0.015***	0.225***	0.498**
	(0.041)	(0.142)	(0.047)	(0.183)	(0.028)	(0.035)	(0.001)	(0.003)	(0.047)	(0.226)
LnK	0.025	0.039	0.031	0.156	0.027*	0.048*	0.001**	0.001	0.049**	-0.239
	(0.019)	(0.078)	(0.023)	(0.129)	(0.014)	(0.028)	(0.001)	(0.002)	(0.023)	(0.179)
LnM	0.363***	0.180**	0.0537*	0.214*	0.080***	0.129***	0.0315***	0.038***	0.042	0.476***
	(0.026)	(0.073)	(0.032)	(0.128)	(0.019)	(0.036)	(0.001)	(0.002)	(0.031)	(0.168)
$Ln(age)_{t-1}$	0.008	0.074	0.206**	0.379*	-0.0128	0.315***	0.001	0.015***	-0.088*	-0.271
	(0.038)	(0.178)	(0.048)	(0.199)	(0.027)	(0.074)	(0.001)	(0.003)	(0.046)	(0.275)
Ownership	0.048	0.303	0.260*	0.388	-0.487***	0.383***	0.019***	0.013**	0.428***	-0.154
	(0.138)	(0.272)	(0.152)	(0.314)	(0.095)	(0.123)	(0.004)	(0.006)	(0.159)	(0.542)
Year, Industry and Location Dummies			Included in all models							
Observations	756	756	535	535	756	756	756	756	756	756
No. of firms		158		106		158		158		158
Instruments		105		99		75		72		72
AR(2)		0.491		0.244		0.584		0.586		0.975
Sargen		0.683		0.364		0.744		0.981		0.423

Notes: All specifications controlled for dummy variables for location and time. Clustered standard errors in parentheses; (***), (**), and (*) indicate levels of significance at 1%, 5% and 10% respectively.

.

Appendix A.4: Propensity score matching

Appendix A.4.1: Logistic regression results of the propensity score to export

Dependent variable: Export dummy	Coefficient	Std. Err.
lnage_1	0.845***	0.242
$Ln(age2)_{t-1}$	-0.177***	0.048
$Ln(size)_{t-1}$	0.863***	0.049
$Ln(K/L)_{t-1}$	0.234***	0.041
$Ln(wage)_{t-1}$	0.189***	0.065
Ownership	-0.056	0.147
Constant	-10.83***	0.719
Year, Industry, Region dummies	controlled	
Observations	3432	
Pseudo R2	0.233	

Appendix A.4.2: Productivity difference between exporters and non-exporters after psmatch2 matching

Variables	Sample	Treated	Controls	Difference	S.E	T-stat
TFP_{SF}	Unmatched	1.113	1.035	0.078	0.06	1.98
	ATT	1.143	1.041	0.102	0.11	1.69
TFP_{LP}	Unmatched	86.79	32.44	54.35	30.46	1.78
	ATT	80.7	32.68	48.02	35.35	2.08

Appendix A.5: Estimation TFP using Levinsohn-Petrin methodology

In previous studies, this approach is popular method in productivity measurement because of advantages in controlling endogeneity of input factors. In this research, TFP is predicted from Levinsohn-Petrin methodology using the procedure "Levpet" program in Stata with 250 time bootstrap replication developed by (Levinsohn & Petrin, 2003) for Stata®. Here, revenue is used as output while the capital variable proxies by net value of fixed assets at the end of the census year for production, labor variable measured by the total employees are input factors. The freely inputs are raw material costs and energy cost that stand for unobservable productivity shocks. In addition, all variables in regression model are deflated and employed in natural logarithmic forms accordingly.

Dependent variable: Revenue	Coefficient	Std. Err.
Ln(Raw material)	0.403***	0.019
Ln(Energy)	0.018*	0.014
Ln(Capital)	0.098***	0.021
Ln(Labor)	0.876***	0.041
Chi2	189.39	

Appendix A.6: Labor productivity, TFP_{LP} and TFP_{SF} before, during and after entry (or exit)

		Firm Export history group			
Variable	Firm Location	Never	Switcher	Starter	Always
Lnol	-2	0.000	0.416	0.561*	1.278***
		0.000	0.235	0.252	(0.326)
	-1	-0.337**	0.422*	0.464**	1.436***
		(0.115)	(0.229)	(0.241)	(0.326)
	0	0.420	0.382	0.518**	0.668***
		(0.104)	(0.200)	(0.162)	(0.238)
	1	0.019	-0.240*	0.740***	1.252***
		(0.102)	(0.231)	(0.270)	(0.326)
	2	0.032	0.030	0.936***	1.168***
		(0.099)	(0.293)	(0.325)	(0.326)
TFP(LP)	-2	0.000	0.217*	0.151	0.375**
		0.000	(0.166)	(0.244)	(0.871)
	-1	0.048	0.137	0.359*	0.383**
		(1.938)	(0.136)	(0.483)	(0.911)
	0	0.038	0.101	0.426*	0.452**
		(1.384)	(0.387)	(0.458)	1.349
	1	-0.119	-0.112	0.674**	0.758***
		(1.298)	(0.994)	(1.015)	(0.898)
	2	0.019	0.026	0.753**	0.761***
		(1.138)	(1.191)	(0.838)	(0.915)
TFP(SF)	-2	0.000	0.032	0.258*	0.268*
		(0.000)	(0.529)	(0.642)	(0.699)
	-1	0.015	0.023	0.267*	0.403
		(0.268)	(0.535)	(0.559)	(0.6990
	0	0.020	0.034	0.508*	0.537**
		(0.267)	(0.495)	(0.396)	(0.521)
	1	0.019	0.022	0.738**	0.445**
		(0.255)	(0.499)	(0.581	(0.698)
	2	0.026	0.112	0.385**	0.501**
		(0.240)	(0.643)	(0.695)	(0.699)

Notes: The control group consists of firms that never exported at period (-2). In all estimations we controlled region, year and industry. Value in parentheses are standard errors; * significant at 10%, ** significant at 5%; and *** significant at 1%.

Appendix A.7: Variable description

All variables in monetary terms adjusted for the constant price of year 2000

Variables	Description
Dependent variable for stochastic frontier	
Output	Total sales deflated by LMMI deflator obtained from MoFED
Dependent variable for Self-selection hypothesis	
Exporter	1 if firm has export activities; 0 otherwise
Dependent variables for learning by exporting hypothesis	
TFP_{SF}	TFP change predicted from stochastic frontier production function
TP_c	Technical change predicted from SFP function
TE_c	Technical efficiency change predicted from SFP function
SE_c	Scale efficiency change predicted from SFP function
TFP_{LP}	Total factor productivity predicted from Levinsohn-Petrin methodology
Explanatory variables	
Capital	Net value of fixed assets at the end of the census year and deflated by the implicit capital formation obtained from WB'S ADI
Raw materials	Sum of costs of raw materials, fuel and lubricating oil, electricity, wood and charcoal for energy and water and other inputs deflated by the GDP deflator obtained from WB's ADI
Firm size	Total number of permanent and adjusted casual employees
Sunk cost	Lagged export status
TFP_{LP}	TFP predicted from Levinsohn-Petrin methodology
TFP_{SF}	TFP calculated from stochastic frontier methodology
LP	Labor Productivity calculated by output per total employees
Capital intensity	Ratio of capital over total employment
Firm age	Number of years since established
Average Wage	Ratio of total wage to total employees
Public ownership	1 if state owned, 0 otherwise
Fixed-Effect Dummies	
Sector dummies:	There are three sector dummies including: Food and Beverage, Textiles and Apparel, Leather and Tanning products in which the last as the reference group
Region dummies:	1 if situated in Addis Ababa, 0 otherwise

Chapter 2

Financial Constraints, Foreign Trade, and Firm Survival in Ethiopia: Evidence from manufacturing firm Data

Abstract

We use unbalanced firm-level data over the period 2000-2011 for the Ethiopian context to assess the effects of financial and global engagement variables on firms' survival probability. We examine whether firms at different stages of export activity (starters, exiters, continuers, switchers) react differently to changes in financial variables by using Probit and Cox proportional hazard models. In general, export starters and exiters experience much stronger adverse effects of financial constraints on their survival prospects. By contrast, the exit probability of continuous exporters is less negatively affected by financial characteristics. The results are robust to alternative model specification and data set.

Keywords: Survival, exporting, financial constraints, cox proportional, panel data

2.1. Introduction

A vast theoretical and empirical works of literature document a pronounced rise of the benefits of international trade on firms' survival prospects from various perspectives. This, in turn, provides a rationale for various countries' government for intervention to help firms develop their exporting activities in a way to enjoy better productivity and survival prospects. That is, yet, while a number of studies have analyzed the direct effects of internationalization on productivity, relatively few have focused on its indirect effects through entry and exit. This paper tries to analyze the two reasons why export participation may benefit and improve the survival[15] probability of firms: First, sales in both foreign and home markets may help firms diversify and reduce risks in the presence of a negative demand shock in domestic markets as explained by Wagner (2013). Second, the higher productivity and profitability of exporters, which then contribute to overall productivity growth through various channels. These include the entry of higher productivity exporters; existing exporters becoming more productive over time and/or intra-industry resources are reallocated to higher productivity exporters; and the shutdown of lower productivity firms - especially non-exporters with the least efficient levels as predicted by some recent heterogeneous firm trade models (A. B. Bernard et al., 2003; Melitz, 2003). However, sometime export markets represent a further source of uncertainty for the firm, which makes sales more vulnerable to international demand shocks and thus exporting may not always necessarily be attached with higher survival

[15] Throughout the paper, we use the terms survival and failure interchangeably, keeping in mind that one is the flip side of the other

rates (Dzhumashev, Mishra, & Smyth, 2016). Thus, the overall impact of exporting activity on firm survival can be regarded as unclear.

Similarly, financial health has been found to play an increasingly important role in the ability to grow and stay in the market (see (Bunn & Redwood, 2003; Clementi & Hopenhayn, 2006; Musso & Schiavo, 2008; Zingales, 1998)). In contrast, highly leveraged firms are less likely to survive, even when controlling for other observable firm characteristics (Zingales, 1998). In many developing countries, where financial markets are not well developed, access to finance is often identified by firms as a major obstacle to their operation in these economies (Kuntchev, Ramalho, Rodríguez-Meza, & Yang, 2012) although there is little systematic empirical evidence on the subject.

What is less researched is how finance, export and firm survival interacts, albeit knowing firm dynamics in these aspects would go a long way in explaining the evolution and competitiveness of manufacturing industries. Although some empirical studies have looked at the effect of export participation and financial constraints on firm survival separately, these studies utterly focused on developed countries except a study by NKURUNZIZA (2005) for Kenya. Yet, while global engagement can shield firms from liquidity constraints, none have considered the combined effect of export status and financial constraints on firm closure sub-Saharan countries context. Moreover, empirical investigations have not yet taken into account the effect of the export modes on firm survival alongside with their need of external finance, perhaps due to data limitations relating to export modes. To the best of our knowledge, the only study that does examine the possible relationship between exporting, financial health and firm survival is Bridges and Guariglia (2008) for UK firms and Görg and Spaliara (2014) for British & France. They looked at the impact of financial and global engagement variables and their combined effect on firms' survival probabilities by estimating with various model specifications.

Thus, this paper seeks to fill these gaps in the literature by investigating the interplay between financial variables and global engagement on the one hand and survival probabilities on the other in Ethiopian manufacturing firms using panel data. Ethiopia is a particularly interesting case to take given the country has implemented reforms since the beginning-1990s by deregulation and liberalization to encourage foreign trade and investment while the huge variation in entry and exit over time. Besides, the empirical results from this study will broaden our empirical insight into what policies and strategies should be pursued to improve firm survival. It may have potential policy implications beyond the academic interest since firm dynamics, and the associated reallocation patterns, have moved center stage recently in the theoretical and empirical international economics literature. Besides, since each aspect of firm dynamics involves a decision-making process, it is very important to understand factors that determine the firm's risk of closure to evaluate the efficiency of export-related policies and financial institutions. In other words, identifying the determinants of firm dynamics in terms of exit or survival is particularly

important for countries in Sub-Saharan Africa, where dysfunctional markets are believed to have stifled the entry and growth of small enterprises while tolerating inefficient large incumbents (Collier & Gunning, 1999). We also managed to distinguish between the simple and detail exporters effects on survival. In other words, we do not only have concerned with exporting per se but rather dig deeper and split firms into export starters, exiters, switchers, continuous exporters and continuous non-exporters. Accordingly, we find that while both financial variables and foreign trade significantly affect survival probabilities, firms with different export status exhibit a variable sensitivity of their survival probabilities to financial variables.

Above all, this study is the first to consider such a linkage in a developing economy context where empirical evidence in this regard is exceptionally scanty even in the developed one. Accordingly, this paper will make a contribution by providing the first hazard estimates to deal with the combined effect of exporting and financial variables on survival probabilities for a Sub-Saharan African country, Ethiopia, using a census-based panel data. Moreover, although hazard models have become popular in the analysis of spells of unemployment, their application to the analysis of firm resilience in developing economies is still very limited and thus our study contributes in this regard too.

The rest of the paper is organized as follows. Section 2 and 3 present the related literature and the data source to be used in the econometric analysis respectively. Section 4 presents the econometric methodology and section 5 discusses the overview of foreign trade and financial market in Ethiopia. The last two sections consecutively present the estimation results and summarize the main findings.

2.2. Related Literature

In this section, we provide a brief survey of extant studies on how exporting and financial situation explaining the variation in firms' survivability. The paper engages with two streams of the international trade literature.

The first stream focuses on the studies that investigate whether being an exporter affects firms' survival probabilities where the evidence often varies greatly across different contexts and only starting to emerge. Some scholars indicate a positive and precisely determined the effect of export participation in the fate of firms as it can also help to acquire (external) knowledge through participating in export markets: for instance; (Andrew Bernard & Jensen, 2005; A. B. Bernard & Jensen, 1999b; A. B. Bernard & Wagner, 1997a) for US; (J. Baldwin & Yan, 2011; Bosco Sabuhoro, Larue, & Gervais, 2006) for Canada; (Hölzl, 2005) for Austria; (Pérez, Llopis, & Llopis, 2004) for Spain; (Kimura & Fujii, 2003) for Japan and (Alvarez & Vergara, 2013) for Chile. In contrast, some other studies didn't find or found a negative linkage between export participation and the firm survival (e.g., (Giovannetti, Ricchiuti, & Velucchi, 2011) for Italy; (Wagner, 2013)

in Germany; (Vartia, 2004) for Finland; (Shiferaw, 2006) for Ethiopia; (Álvarez Espinoza & Görg, 2005; López, 2006) for Chile). Consequently, it is hard to make generalized inferences. Besides, it should be noted that all the above research has focused on a dummy variable with the value 1 if firms export and 0 otherwise to deal with the relationship between firm survival and export participation. While recent studies consider the relationship between firm survival and exporting status at different stages (exiting exports, beginning exports, and continuing exports). For instance: Görg and Spaliara (2014) for UK & France; R. I. Harris and Li (2010) for the UK and H. Vu and Lim (2013) for Vietnam reveal that continuing exporters enjoy a higher probability of survival while firms exiting exports suffer from a lower probability of survival than non-exporters. These results are robust to different specifications and estimations.

A second relevant stream of the literature is those studies that investigate the relationship between financial aspects and firm survival. Among these, Zingales (1998) for US; Bridges and Guariglia (2008) for the UK and Fotopoulos and Louri (2000) for Greece reveal firms' debt to assets ratios have a significantly negative effect on their survival probabilities; while the last one also found the ratios of tangible assets to total assets and profitability enhances firms' survival probabilities. Similar evidence has also been produced for other industries and countries, see, for example, Bunn and Redwood (2003) for UK manufacturing and services industries; Musso and Schiavo (2008) for French manufacturing firms; Geroski and Gregg (1997) and Vartia (2004) for Finland firms. These findings are consistent with the view that serving relatively high debt (financial distress) is an obstruction for the operation of existing firms leading to potential exit and that relatively high amount of fixed assets indicates a higher commitment by a firm. Further, using data for UK and France firms, Görg and Spaliara (2014) also found that the impact of access to finance on firm survival indeed differs depending on a firm's export status and accordingly they shows export starters and exiters experience much stronger adverse effects of financial constraints on their survival prospects while the likelihood of survival of continuers and switchers is less affected by financial constraints.

However, there is scant empirical evidence on how financial variables affect firm survival, particularly in Sub-Saharan Africa. In this regard the only study that involves financial condition is by NKURUNZIZA (2005) for Kenya a particular emphasis on the effect of credit on firm resilience. The key finding is that the burden of past loans precipitated firm failure in the 1990s, but overdrafts did not seem to have had a significant impact on firm failure. A study by Shiferaw (2006), which models firm dynamics in terms of entry, survival, and growth of Ethiopian manufacturing over the period 1996-2002, has estimated hazard model by the exit and survival as discrete choice variables. However, it differs from ours in two aspects, firstly, the two paper models two different factors in which our paper involves additional determinant of firm survival (i.e., financial constraints) and also the effect of export status at various stages. Secondly, the period of observation and a sample of firms being used are different where ours cover a richer dataset from 2000-11 and focusing only on export-oriented sectors instead of all sectors. However,

no study so far has examined the linkage between the joint impact of financial condition with exporting activities at different categories and the firms' probability of closure

To summarize, the role of foreign trade in a firm's survival seems to be mixed and most studies have been focused on developed countries. The current study is expected to fill this gap by providing the first empirical evidence about the role of exporting and adding the financial effect on firm resilience in the Sub-Saharan Africa context by using Ethiopian manufacturing firms'.

2.3. Data source

The dataset used in this analysis is a census of large and medium scale manufacturing (LMSM) conducted annually by the Ethiopian Central Statics Agency (CSA) from 2000 to 2011. Each firm is identified by a unique identification code. Our dataset provides information on all enterprises which engaged 10 persons and above and are using power-driven machines to produce their goods. The main purpose of this annual census is to gauge quantitatively the activities of Ethiopian manufacturing enterprises, including the level of production, amount, and value of local and export sales, input usage, investment, employee composition and their benefits, asset structure of firms, year and location of the establishment and their legal status. The ownership of the firm as foreign or domestic by the share of the initial paid up capital is also one of the main variables in our estimation. If the share of non-Ethiopian in the initial paid up capital is greater than 50% of the firm's total initial paid up capital, we can categorize the firm as foreign-owned firm. Besides, the data also contains a source of financing for different kinds of firms' fixed investments and working capital. Firms were also asked to list the major problems associated that hinder their activities. The census covers all major manufacturing sectors in all regions of the country based on 4-digits international standard industrial classification (ISIC) - Revision 3.1. The industrial sectors involve manufacturers of food and beverage, textile, apparel, leather and footwear, wood, paper and printing, chemicals, rubber and plastic, nonmetal, fabricated metal, and furniture.

Table 2.1 shows the number of establishments, exporters, output, churning and their growth including employment between 2000 and 2011. The number of establishments in the sector almost tripled in the sample period, amounting to an average annual growth rate of 11 percent. The number of exporters, output, and employment also grew by an annual average rate of 7.7, 20.5 and 12.7 percent respectively in the same period, though highly variable. But due to an equivalent growth in the total number of firms in the sector, the share of exporters has remained small. In general, less than 5 percent of manufacturing firms exported. The percentage of exports in total manufacturing was not more than 11 percent and among exporting firms about 27 percent of production was exported. More importantly, distribution of exporting varied a lot by sector and concentrated in a few sectors such as food and beverages, textiles, apparel, leather and tanning. They accounting for more than 86 percent of the number of exporters in the manufacturing industry during the sample period. From all exporting sectors, the share of Leather and Tanning and textile

declined from 72 and 11 in 2000 to 34 and 8 percent in 2011 respectively, while food and beverages picked up from 15 to 39 percent in the same period and the above order remains the same for output movement too. The same holds true for employment, except for leather and tanning, which shows some increment. These four two-digit industries also accounted for 60 percent of formal generating manufacturing employment for more than 1.8 million people and 54 percent of formal manufacturing output. Since the four group sectors providing a reasonably comprehensive picture of the manufacturing sector in Ethiopia, the empirical analysis relies on these exports oriented industries and the other industries is excluded from the rest of the analysis.

Table 2. 1: Number of establishments, exporters, employment, output, churning and their growth, 2000-11

					Growth of the manufacturing sector (percent)					
Year	No. of firms	No. of Exporters	New Entry	Exit	No. of firms	No. of Exporters	Empl't[16]	Output	Entry	Exit
2000	739	40	168	---	---	---	---	---	---	---
2001	722	38	133	150	-2.3	-5.0	-9.9	-2.8	18.8	20.7
2002	883	32	289	128	22.3	-15.0	16.8	8.1	32.7	14.4
2003	939	41	182	126	6.3	28.1	3.2	-4.6	19.3	13.4
2004	997	47	194	136	6.2	14.3	1.8	23.1	19.4	13.6
2005[17]	763	51	118	352	-23.5	8.5	-6.3	11.1	15.4	46.1
2006	1153	56	485	95	51.1	9.8	187.9	14.9	42.0	8.2
2007	1339	58	480	294	16.1	3.6	-50.9	11.3	35.8	21.9
2008	1734	62	515	120	29.5	6.9	-4.2	-2.9	29.7	6.9
2009	1948	78	686	472	12.3	25.8	11.3	9	35.2	24.2
2010	1958	88	1065	1077	0.6	12.8	132	47.6	54.3	55.0
2011	1936	84	868	----	-1.2	-4.5	-56.6	24.8	--	--
Average					10.7	7.7	20.5	12.7	30.2	19.8

Source: Own calculation of CSA data

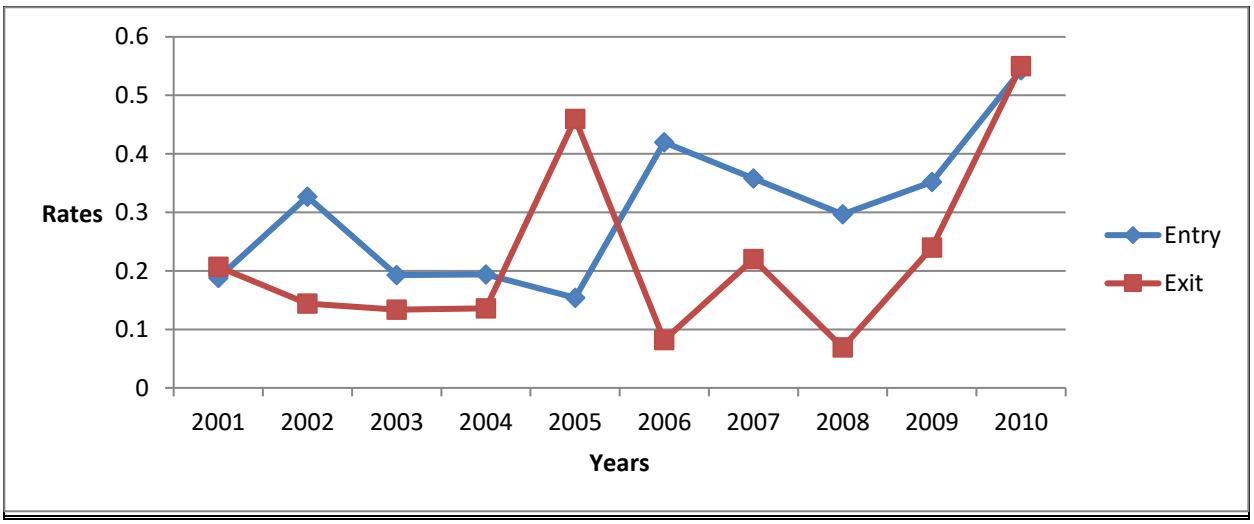
Table 2.1 also shows the pattern of entry and exit rates in the Ethiopian manufacturing sector during the sample period. A firm is considered as an entrant if it is observed for the first time in the census even if it does not distinguish between firms that crossed the 10-person employment threshold from those firms new to the market. Furthermore, the entry also includes firms that exit at some point because of its employment was reduced below 10 workers and reappear in the data. Exiters are those firms which do not reappear in the census once they exit. However, since the definition of entry and exit includes switchers, the churning rates might be overestimated and thus the results should be interpreted with these limitations in mind. Entry and exit rate is defined

[16]Employment is the sum of permanent and casual employees and the latter adjusted to year equivalent labor

[17]Note: The low number of firms and thus employment too in 2005 resulted from the statistics office decision to take samples in specific sectors, such as bakery products, furniture, and manufacture of articles of concrete, cement, and plaster. The total population of formal manufacturing establishments in 2005 is above 1100.

respectively as the ratio of the number of new firms and exiters to the total number of incumbents. Thus, Figure 2.1 presents the firm entry and exit dynamics in Ethiopian manufacturing by showing that there is a huge variation in entry and exit over time for the period 2001-2010. The average annual entry rate ranges from 15% in 2005 to 54% in 2010, whereas exit rates vary even more taking the lowest value of 7% in 2008 and the highest value of 55% in 2010. Together the average firm entry and exit account for 30% to 19% of the total number of firms and the former largely outpaced the latter making net entry positive. The average turnover is a simple average of entry and exit rates during this period is about 25 percent.

Figure 2. 1: Entry and exit rates in Ethiopian manufacturing, 2001-2010[18]



The original data and/or the 12-years unbalanced panel comprise 15111 firms'/year observations, of which the four two-digit sectors accounting for 38 percent. We define a firm as failed (dead) in a given year if the firm status is that of liquidation or dissolved. Firms that did not have complete records of production, capital stock, material input, energy expense, the number of employees, and other inconsistencies, which we included in our regressions, were also dropped. Moreover, since the CSA census was conducted only for establishments which employ ten persons or more, observations of micro-firm establishments with fewer than 10 persons also deleted but lost only 3 firms and left with 5011 firms/year observations comprises 85 and 33 percent of the four-group 2-digit industries and the whole Ethiopian manufacturing firms respectively over the sample period. We grouped the four two-digit sector firms into three broad sectors for analysis purpose: food and beverage, textile and apparel and leather and tanning and the first group accounts for 70%, while the other two sectors take the remaining share equally (15% each) in our sample.

[18]Entry and exit rates are not defined for the years 2000 and 2011 since entry and exit cannot be accurately identified for these years.

In order to avoid confusion between firm exit and firm censorship (still alive but we do not see it beyond the last period), we reduced the last period from the analysis time. Hence, although the dataset contained data up to 2011, we only used data up to 2010 to ensure that the firms present both in 2010 and 2011 are labeled as censored in 2010, whereas firms present in the dataset 2010, but not in 2011, are labeled as exits. Following the removal of the missing observation points, we were left with an unbalanced panel of 1264 firms for the period 2000–2010, giving a total of 4512 observations for the final survival analysis. We define a firm as failed (dead) in a given year if the firm status is that of liquidation or dissolved.

A potential problem with time-variant data is that it is often expressed in current prices. Therefore, our data on current variables are deflated to 2000 prices using the various deflators to avoid biases that might arise because of inflation. More specifically about the dataset and measurements of variables in the regression analysis are presented in Appendix B.2.

2.4. Methodology

To evaluate the differential effects of financial status and exporting activity on the likelihood of survival, we used two modes of analysis with time-varying covariates. The first is a proportional Cox hazard specification for computing the hazard of exit while the other is a panel probit specification for estimating the incidence of failure. The former complements the latter as it models both the event of failure and the time it takes a firm to fail. Besides, a Cox model does not require any assumptions regarding the shape of the baseline hazard function over time. However, both the Cox model and the parametric hazard estimation model do not really allow us to properly control for unobserved heterogeneity, and employing these models requires us to impose the restrictive assumption of proportional hazards. Given these drawbacks, we also employ panel probit estimation as an alternative to check the robustness of our results obtained from the Cox model.

2.4.1. Probit specifications

By following Zingales (1998), Bunn and Redwood (2003), Álvarez Espinoza and Görg (2005), and A. B. Bernard and Jensen (2007), Görg and Spaliara (2014), we initially estimate the following Probit model for the probability of firm failure on the pooled data set:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 FN_{it} + \beta_3 EX_{it} + F_{\text{sec}} + F_{year} + F_{loc} + \mu_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where the subscript *i* indexes firms; and *t* is time. Y_{it} is a binominal dependent variable (survived/exited) or a dummy variable for firm survival taking the value 1 if firms failed in year t, and 0 otherwise. Among the independent variables, X_{it} is a vector of the firm and other

characteristics that have in part been identified by previous studies. Firstly, firm size and firm age, which is measured by the number of employees and plant age as years of operations respectively, are included in the model because they represent the differences in efficiency among firms (Jovanovic, 1982) and are important determinants of firm survival. Firms with large size are assumed to be positively associated with survival. But, the survival-size relationship remains inconclusive, both in the theoretical and empirical bodies of literature. Some studies on Africa firms suggest that the risk of exit declines in firm size (Bigsten & Söderbom, 2006; Frazer, 2005)) and these findings are consistent with the predictions of market selection models as well as some of the evidence for industrialized countries (Van Biesebroeck, 2005). Some other studies for developing country manufacturing firms, however, did not find any significant size effect on firm survival (Biggs, Shah, Srivastava, & Mundial, 1995; McPherson, 1995; NKURUNZIZA, 2005). Similarly, the firm age is often found to be positively correlated with the conditional probability of survival even if its effect seems to diminish with the age. The finding of age-survival relation is consistent with the theories describing entry and exit dynamics as part of learning process. These theories suggest that over time firms learn about their profitability and decide whether to expand, contract, or exit. Those firms that survive accumulate experience and assets making them stronger and lowering their probability of failure.

Ownership type is found to be an important factor influencing firm survival (e.g., (Shiferaw, 2006; H. Vu & Lim, 2013)) even if there is no consensus regarding its effect on firm dynamics literature. On the one hand, it is suggested that foreign firms are "footloose", as they can easily shift their resources to other countries if there are any adverse changes in the host country and inclined to leave the market whenever they sense trouble in the domestic economy or find better business opportunities elsewhere (Gibson & Harris, 1996). To put it differently, foreign firms may have lower exit cost that makes exit probability higher especially for multinationals firms (Görg & Strobl, 2003). Besides, foreign firms on average may have superior technological and managerial skills from the multinational enterprise that enable them to develop successful entry strategies and this would suggest that such firms will have higher productivity and thus a higher probability of survival. On the other hand, Kimura and Fujii (2003), using Japanese data, did not find any statistically significant evidence that firms owned by foreigners is more likely to exit. To account for this, we include a dummy variable of foreign capital (owned 50% and more of the firm's total initial paid up capital) taking the value 1 and 0 if not.

Besides, as argued by Vartia (2004), different sectors have differences in production technology, investment, and productivity, and hence the characteristics of sectors may affect the survival of firms differently. We account for these characteristics by adding the following variables. First, we include capital[19] intensity measured as real capital stock per person employed whose effect on survival probabilities is not clear. On the other hand, more capital per person could enhance labour productivity and reduce the risk of exit as it is shown in A. B. Bernard and Jensen (2007) for U.S.

[19]Capital is deflated by the implicit capital formation obtained from WB'S ADI

manufacturing. On the other hand, standard trade theory predicts that capital intensive industries would going out of business/disappear in economies abundantly endowed with labour unless protected from international competition. Second, the total investment on fixed assets is reported in the dataset and we take as dummy by assigning the value 1 for firms with non-zero investment amounts and 0 otherwise; industry growth measured in terms of output growth and productivity, which is measured by Stochastic Frontier Analysis (SFA), are also included in the model. Third, the mode of operation and the structure of ownership represented by dummy variables are also incorporated in our regression. The mode of operation (1= firm operates more than one shift and 0 otherwise) is a proxy variable for production capacity. Arguably, more shifts can be taken as an indication of more capacity and hence more able to survive. Finally, establishments which belong to a multi-unit firm are also identified by a dummy variable that takes the value one for such firms and zero for single-unit establishments. The style of the organization often seems to enhance performance because of the pool of resources at the firm level such as knowledge, experience, and finance that can be shared by individual plants and thus it has a better survival probability as compared to single-unit establishments (Disney, Haskel, & Heden, 2003).

The first variable of interest is to deal with the effect of financial constraints on firm survival and different proxies can be taken. For example, following Fotopoulos and Louri (2000) and Görg and Spaliara (2014), we employ the following two financial variables alternatively in Equation (1). The first one is the firm's total liability of the firm to total assets ratio, which proxy for its leverage (firm's solvency) but bank loan is found to be the only explicit total liability from the data set used. The greater the ratio the more likely it is that the firm has a solvency problem. The findings on its effects on exit and survival are ambiguous. On the one hand, a high leverage ratio may be obstructive for entry and for the operation of existing firms leading to the potential exit. That is, it is associated with a worse balance sheet situation, which would increase moral hazard and adverse selection problems, and lead to the inability of firms to obtain external finance at a reasonable cost, and consequently, may increase failure probabilities (Bridges & Guariglia, 2008; Farinha & Santos, 2006; Zingales, 1998). On the other hand, some authors argue that a high rate of leverage can be seen as an indicator of a good credit standing and higher borrowing capacity of firms and thus may increase the probability of survival (Denis & Mihov, 2003; Nickell, Nicolitsas, & Dryden, 1997). As an alternative to the above financial variable, we also re-estimated our model to check the results' don't significantly change by using access to external finance (the credit financing for working capital) like in Görg and Spaliara (2014) and NKURUNZIZA (2005) as a qualitative dummy variable which is set to 1 if bank credit is listed as a source of new working capital. We expect to find a negative impact of bank credit availabilities on the probability of firm failure, controlling for other firm- and industry-specific characteristics.

In addition to financial indicators, we are also concerned in dealing with the impact of exporting activity on the probability of survival. The paper follows two approaches to testing the effect of exporting on survival. The first is to use the firm-level export participation (EX_{it}) directly in the

model which is used as a dummy variable to capture the role of export activities on firm survival. The other approach is considering export participation at different stages which enable to investigate further the role of export behavior in relation to firm survival. According to Görg and Spaliara (2014), we define continuous exporters as firms that export throughout the sample period but there are a few exceptional cases with a one-year export break. Likewise, starting exporters are enterprises that do not export in the year $t-1,\ t-2\ etc$ but export in the year t and includes a one year missing export data as an exception. The Switcher Exporters are firms that enter and exit the export market several times. The export exiters are those that stop exporting but still operate in domestic markets. The continuous non-exporters are those firms that never export in our data. We would expect that continuous and export starters have the lowest probabilities of exiting, as these are the most financially healthy group of firms (Greenaway, Guariglia, & Kneller, 2007). On the same way, export switchers are more flexible firms which are capable of changing their export status frequently and, hence, their likelihood of failure should also be low. Non-exporters may be the firms with the highest failure probabilities. All in all, the direct effect of exporting groups is judged from the sign and significance of the coefficient β_3. Further, imports, which reflect the international trade activities of firms, are considered as a dummy equal to 1 if firms have imported inputs or machinery, and 0 otherwise. This index is incorporated as an independent variable in the model based on the argument that using inputs from domestic markets may be less advanced in technology than imported inputs (Wagner, 2013). However, there is an argument that supports dependence on imported inputs may be a source of instability and a higher risk of failure. Thus, it is difficult to make prior expectation its effect on survival.

Furthermore, we augment equation 1 to contain the interaction between the financial indicators and export and its different export status to deal with whether each category exhibit different effects of financial variables on their survival prospects. The rationale for using interaction terms is that financial availability may improve exporting firms' performance, especially during periods of crises, by shielding firms from liquidity constraints and thus their survival. When we consider each export status relative to the need to external finance, export starters and exiters may be more responsive to financial constraints for survival due to the sunk cost of export entry and exit. In contrary, we would expect the opposite for firms that always export or those that switch status frequently since these firms are financially healthy and, thus, have little need for external finance. This is due to the former firms are successful in the export markets and the latter firms are associated with high levels of flexibility and adaptability (see (Greenaway et al., 2007; R. I. Harris & Li, 2010). The main aim of our paper is to provide empirical evidence for this.

Finally, the location of firms is also included in the model to capture its region-specific effect that may be due to 'differences in demand conditions, the degree of competition, or ability to procure inputs' (McPherson, 1995). Thus, we model location (F_{loc}) using a dummy variable with a value of 1 for the Addis Ababa province and 0 for others. Other industry-specific sectoral difference in

productivity is captured via industry dummies (F_{sec}). The effects of time-specific factors such as macroeconomic conditions (like the possible influence of the business cycle) that affect all the firms are captured by using time dummies (F_{time}) for panel data as suggested by J. Wooldridge (2009).

2.4.2. Cox proportional hazard specifications

To evaluate the effects of financial and foreign market participation variables on firm survival further, we estimated the determinants of the hazard of firm failure, $\lambda_i(t)$, which represents the instantaneous rate at which firm i fails at time t given that it was 'alive' at a time $t-1$. A functional form has to be assumed for the hazard function in the empirical implementation of the model. A convenient specification for $\lambda_i(t)$ being the proportional hazard model, of which the most frequently used in empirical studies and the popular one is the one provided by Cox (1972):

$$\lambda_i(t) = \lambda_0(t)\exp(X'_{it}\beta).....2$$

Where $\lambda_0(t)$ is the baseline hazard function at time t which is common to all sub-samples and not affected by any covariate, and *X's* is a vector of explanatory variables with the corresponding vector of regression coefficients. The explanatory variables included in the vector X_i' are those contained in Equation (1). Our interest is to deal with the role of financial and global engagement variables on the firms' exit hazard but not the underlying shape of the baseline hazard. To put it differently, our interest is just in how the covariates shift the hazard function without having to determine the baseline hazard. Thus, the most convenient way of estimating the parameters without having to make arbitrary and possibly incorrect assumptions about the functional form of the baseline hazard is provided by Cox's (1972) partial likelihood approach. In other words, in comparison with the parametric models[20] (e.g. the exponential, Gompertz and Weibull models), the semi-parametric models, such as the Cox (1972) proportional hazards model, are preferred. First, it assumes time dependence without having to specify time's functional form. Second, CPH has the advantage of accommodating stratified models without needing to specify the interaction of the variables with time. As its name indicates, the CPH model assumes that the hazard rate changes proportionately with respect to time. Third, no assumptions about the shape of the hazard over time are required. This estimation method has been widely used in empirical studies (e.g. (A. B. Bernard & Sjoholm, 2003; Bridges & Guariglia, 2008; Disney et al., 2003; Fotopoulos & Louri, 2000; Kimura & Fujii, 2003; Shiferaw, 2006; Vartia, 2004) etc).

[20] It is used if one wants to know the shape of the baseline hazard and must be estimated by assigning the three different distribution to the baseline hazard

Besides, failure to capture unobserved heterogeneity, including omitted variables into proper account may lead to the underestimation of the results. That is, even if our Cox proportional hazard models include firm-specific covariates, it is likely that it cannot account for all the observation-specific effects. Thus, discrete proportional hazard model with a gamma mixture distribution, estimation of Prentice and Gloeckler (1978) method[21], are employed to test for the presence of unobserved individual heterogeneity and for robustness checking in addition to the probit model. The latter model is a discrete time model which is similar to the Cox method and enables the baseline hazard to be modelled flexibly and thus avoids any restrictive parametric assumptions being made about its shape which makes it contrary to the Cox proportional hazard model.

The survival model is estimated over two different samples. The first sample includes the entire firms while ignoring left censoring and assumed the analysis period to be concurrent with the firm's life. For these firms the 2000 data is regarded as their initial values for the analysis since the initial conditions are not reported in the data. While ignoring the left censoring allowed us to utilize all the data in the analysis and estimate a model that includes a wide array of explanatory variables, it could introduce bias in our estimates because the risk of failure starts to accumulate soon after incorporation. As a robustness check, we also deal with left censoring by deleting all firms that were incorporated before 2000 like in A. B. Bernard and Sjoholm (2003), Bridges and Guariglia (2008) and Fotopoulos and Louri (2000) etc. In other words, our second sample focuses only on new firms, i.e. on those cohorts of firms established between 2000 and 2011 and whose entry/initial conditions are observed. Restricting the sample to newly established firms aimed at avoiding problems of left-censoring and to ensure comparability with other studies in the literature. In this reduced sample the variable entry size correctly reflects the firm size in the year of incorporation. Besides, after removing the left-censored firms, age could not be entered in the model directly as it is corresponding to the analysis time and also as it is collinear with the baseline hazard.

2.5. Overview of foreign trade and financial market in Ethiopia

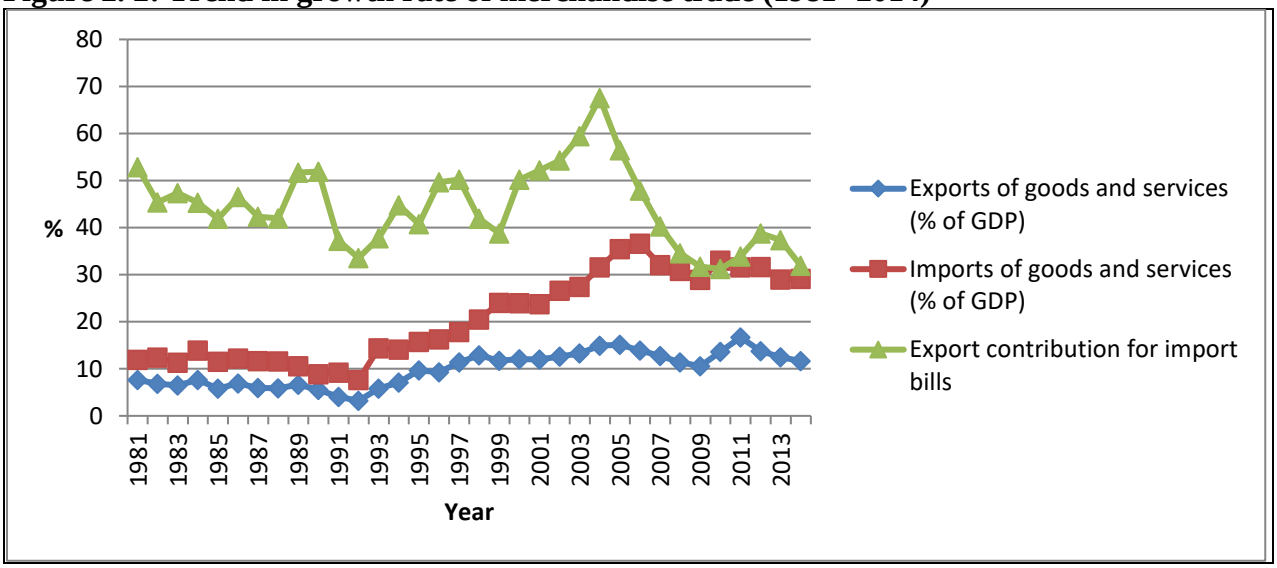
Our interest in this paper is to examine the interplay between internationalization and financial situation in determining firms' survival. This section provides background information about the foreign trade evolution and financial sector development of Ethiopia followed by the description of the financial constraints faced by Ethiopian firm.

2.5.1. Foreign Trade reforms and its trend

[21] This model was estimated using the "*pgmhaz8*" Stata command implemented by Stephen Jenkins.

Ethiopia's economy followed an import-substitution strategy under both the Imperial and Derg government during the 1950's up till the 1980s with the aim of boosting industrialization. After the downfall of the military regime, Ethiopia began to gradually move away from the communist-inspired controlled economy to a more market-oriented economy. The current Government of Ethiopia coming to power in 1991 and undertook policy reform steps including privatization, trade opening, and market deregulation. Besides, they launched a structural adjustment program (SAP) with the support of the World Bank (WB) and the International Monetary Fund (IMF). The new trade reform declared in 1993 was comprehensive and aimed at dismantling quantitative restrictions and gradually reducing the levels of import tariffs and export taxes, as well as non-tariff barriers and import licensing requirements. Further, export promotion schemes and customs tariffs reduction through a six-stage reform were introduced between 1993 and 2003. Firstly, the maximum tariff was reduced from 230% to 80% and also to 35% in 2003. Then, Export Trade Duty Incentive Scheme was established in 2001. It included duty drawbacks, vouchers, and bonded manufacturing warehouses, where exporters are refunded 100% of any duty paid on raw materials. Last but not least, the government also issued directives in 2004 to reduce taxes and other costs on salaries paid to foreign experts to further encourage exporters to acquire foreign technology and expertise (Bigsten & Gebreeyesus, 2009).

Figure 2. 2: Trend in growth rate of merchandise trade (1981- 2014)



Source: WDI, 2016

Export-led growth is a trade and economic policy aiming to speed up the industrialization process of a country by exporting goods for which the nation has a comparative advantage. Ethiopia's total exports and GDP have been growing at an average rate of 5.4% while imports with 8.1% during the year 1981 to 2014. Figure 2.2 above shows the export contribution of import bills and the evolution of both exports and imports as a percentage of GDP during 1981-2014, which increased as a result of these changes in the country's trade policy. Exports increased from 7.6% of GDP in 1981 to 11.6% in 2014, an increase of around 9.9% on average during the last three decades. In

other words, Exports of goods in Ethiopia are only about 9.9 percent of GDP which is still falls short compared to an average of near 27.2 and 29.8 percent of GDP in Sub-Saharan Africa and World respectively between the year 1981 to 2014 (World Bank, 2016). Imports increased from 11.9% in 1981 to 29.1% in 2014, a much a larger increase of 20.8%, hence the gap between exports and imports is increasing. Ethiopia's export sector is still small; evidenced by the lower export/GDP ratio and the declining share of exports in import financing. Thus, the share of export in import financing (Export/Import ratio) has contracted over time from the level of 52.8 percent in 1981 to31.9 percent in 2014, averaged 27.7% over the period 1981-2014. This share peaked at 67.5% in 2004 but declined steadily afterward. The lower export/GDP ratio compared to imports, do highlight the closed nature of the Ethiopian economy on the export side and the limited ability of the export sector in financing the country's import demand. In fact, for the last 25 years, export was able to finance only about 28 percent of the country's import demand with the remaining 72 percent being financed by the net FOREX inflows from services, unrequited transfers, and loan disbursements. This widened merchandise trade deficit is used to be the result of increased import expenditure mainly on capital goods and other consumer goods following the growth of the national economy. On the one hand, relatively less diversified export receipt could not be able to adequately respond in covering the growing import demand. Particularly the huge public investment being carried in the country has contributed a lot for the divergence of the import payments and export receipts. This caused the importance of expanding exports to reduce the serious foreign exchange constraint which is a bottleneck for the growth of the whole economy. Hence, the government should figure out the problem to increase the country's foreign exchange earnings by pursuing concrete policy measures and incentive schemes to improve the unsatisfactory performance and overall economic growth.

2.5.2. Ethiopian financial market overview

The financial sector in Ethiopia consists of formal, semiformal and informal institutions. The formal financial system comprises of financial institutions which are composed of 18 banks (2 public (i.e. the DBE and the Commercial Bank of Ethiopia (CBE)) and 16 domestic privates); 17 insurance companies (16 private and 1 public); 35 microfinance institutions, and five capital goods finance companies that operate in both rural and urban areas (National Bank of Ethiopia, 2015/16). The semiformal financial sector is composed of three types of over 8200 saving and credit cooperatives, namely Institution based SACCOs; Community-based SACCOS; and SACCOs sponsored by NGOs. The informal sector is the traditional community associations such as *iddirs, iqqubs, and mehabers* and highly varies from social, religious and financial concerns, but are all aimed to address the needs of the people throughout the country.

Ethiopia's financial system is small and largely dominated by the domestic banking sector which represents more than 92.6 percent of total assets of the financial sector, excluding the assets of the DBE and NBE. Microfinance institutions (MFIs) constitute 5.2 percent and insurance companies 2.2 percent of the total financial sector assets. Further, the banking sector is dominated by state-

owned banks, which control the credit market share of lending, constitute 70 percent of total assets of the banking sector. Within this group, the CBE holds 60 percent of total assets of banks as of June 30, 2015, while the private banks' total asset share is only 30% in the third quarter of 2015 which declined from 36% in 2008/09 (World Bank, 2016). Development Bank of Ethiopia (DBE) is a large holder of treasury bills, as of June 2014, (see WB, 2015). The National Bank of Ethiopia (NBE) has a monopoly on all foreign exchange transactions and supervises all foreign exchange payments and remittances. CBE is relatively well run and profitable because of lack of competition in the financial sector in Ethiopia which is highly regulated and completely closed from foreign companies.

Despite access to financial services has been improving and the total bank branches reached to 3187 as of 2015/16, the population per bank branch was still hanged up 28,932 and 34.4% of bank branches were located in the capital (Addis Ababa) indicating very limited access to financial services and its severity in the rural parts of the country. In other words, the country has a trend with only 2.9 bank branches per 100,000 adults and only 0.33 ATMs per 100,000 adults which makes to lag behind compared to the SSA average of 4.5 and 3.4, respectively (World Bank, 2016). The share of public banks, in total branches, declined to 39.5 percent from 41.9 percent last year signifying the growing role of private banks. The total capital of the banking system is reached ETB 43.0 billion, of which private banks account for 51.1%, while that of CBE remained at 31.5% by the end of June 2016 (National Bank of Ethiopia, 2015/16). By June 2014 the private credit to GDP ratio for Ethiopia was around 10.9% compared with the average of 30% for sub-Saharan Africa. Moreover, credit as the share of GDP is on a downward trend and below the SSA average since 2008. This finding confirms the overall development of the financial sector of Ethiopia is below the average of sub-Saharan African countries (WB, 2015).

However, the financial market remains shallow with a limited range of services and also characterized by a lack of more sophisticated financing mechanisms such as leasing, equity funds, etc (O. AfDB & Undp, 2012). The financial service is dominated by a cash based system. Moreover, capital markets mainly comprise treasury bills and Government bonds, and foreign exchange markets are in their early stages of development and stock markets are non-existent. The interbank money market remained dormant; no intermediaries operating in either the primary or secondary market; no foreign investment in government securities; and highly regulated financial institutions which make difficult to penetrate. According to the 2015/16 Global Competitiveness Report, Ethiopia scored 3.75 out of 7 and ranked 109th out of 140 countries in financial market development, lower than the average of "factor-driven economies".

The non-banking sector remains largely undeveloped, except for 17 insurance companies with about 426 branches across the country. Besides, about 53.5% of insurance branches were located in Addis Ababa and 83.6% of the total branches were private which slightly increased from 82.5% a year ago. The total capital of insurance companies grew 25.3 percent to Birr 3.6 billion from 2.8 billion last year while the private insurance companies accounted for 76.7 percent of the total

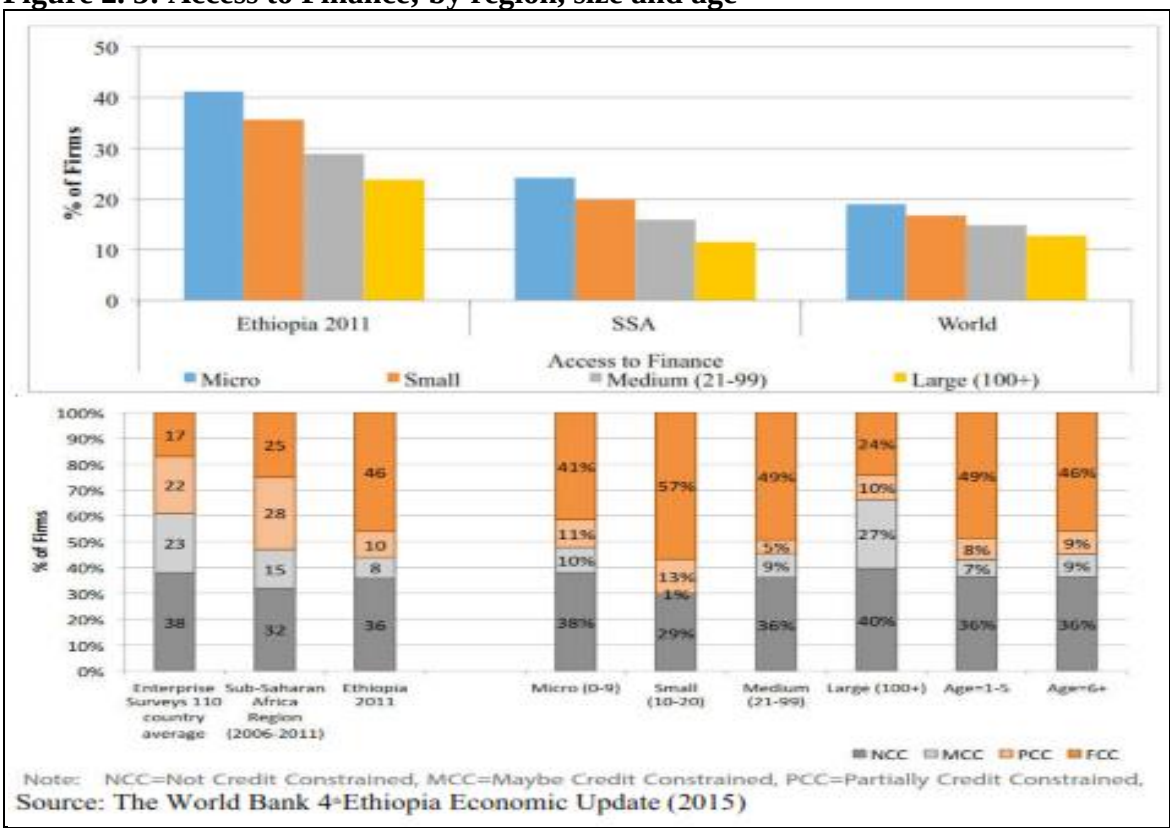
capital. The microfinance sector is relatively well developed but not strictly supervised. By end 2015/16, the number of microfinance institutions (MFIs) reached 35 from 31 a year ago. Their total capital and total asset also increased significantly by 23.5 and 20.0 percent and reached Birr 8.9 billion and Birr 36.7 billion, respectively. Their mobilized deposits grew by 24.3 percent to Birr 18.4 billion and their outstanding credit rose by 15.5 percent to Birr 25.2 billion as they increased their outreach (National Bank of Ethiopia, 2015/16).

2.5.3. Access to Finance for Ethiopian Firms

Firms in Ethiopia suffer largely from a shortage of finance than SSA and other countries. This lack of external sources of finance is a major constraint for investment and exporter's capability (Harhoff & Körting, 1998). As illustrated in Figure 2.3, nearly half of firms in Ethiopia are fully credit constrained compared with 25 % in sub-Saharan Africa and 17 % in other countries. This implies that firms in Ethiopia either do not have access to external finance at all, or their application for the loan is rejected or did not apply even though they suffered from lack of extra working capital.

When we grouped access to finance constraint by size, all categories of Ethiopian firms are facing a lower degree of access to bank credit. This is given as 36%, 29%, and 23% for small, medium and large Ethiopian firms compared to an SSA average of 20%, 16%, and 11% respectively (Figure 2.3). This may due to the fact that banks in Ethiopia have limited capacity to extend a large amount of credit in general and thus they can only finance a small fraction of the working capital requirements of larger firms. When we looking at the relationship between firm age and credit constraint, it seems weaker or there is no perceivable difference between them. In other words, 49% of young firms (1 to 5 ages) are fully credit constrained compared to the 46% of old firms. This seems contrary to the observation of Zingales (1998) that firms rely on external sources of finance early in their life-cycle, while later on, they are more likely to generate enough resources on their own. In sum, the data show that Ethiopian enterprises have very limited access to external finance and the problem of financial constraints is more pervasive for young and small firms relative to those that are larger and more established. This low external finance dependence of firms is a mirror image of the overall low development of banking sector in the country.

Figure 2. 3: Access to Finance; by region, size and age



2.6. Results

2.6.1. Descriptive statistics

Tables 2.2A and 2.2B present descriptive statistics for the entire and entrant firms respectively. Accordingly, the means and standard deviations of the main variables of interest are reported for the entire sample (column 1), failed firms and surviving firms (columns 2 and 3, respectively) for both groups of data. Besides, the p-values of a test for the equality of means of surviving and failed firms are presented in column 4. For the entire sample, 482 out of 4,512 firm-years were recorded as failed whereas for the entrant sub-sample 529 out of 2698. In other words, we observe that the percentage of firm failure is higher for entrant firms (19.6%) compared to their entire counterparts (10.6%). The definitions of the key variables are provided in Appendix B.2.

We can see that, without holding other factors constant, surviving firm-years have generally larger than failed firm-years with size (entry and current) for both groups of data as well as appear to be statistically significant differences between them for the entire sample. We also observe that surviving firms are in general more productive and efficient; have higher capital intensity; operate in industries experiencing high investment (almost half of Ethiopian firms have non-zero investment). To put it differently, investment is slightly above the both sample average for

surviving establishments while for exiting establishments it is below the industry average. Besides, they are also slightly older for the entire and younger for the entrant sample and higher proportion of imported machinery in capital stock than their failed counterpart. Surprisingly, they are experiencing lower growth in output for both sets of data. Furthermore, they are more multi-unit and produce in more than one shifts than the failed ones and the difference is statistically significant for both samples. In sum, in most cases these differences between surviving and failed firm-years are similar for both sets of data.

Yet, surviving firm-years are also export-oriented, and slightly more likely to be foreign-owned than their failed counterparts, the difference between them is not statistically significant for the latter from entire sample. That is, only 4.3% of the establishments have a 50% and above FDI with no significant change over the sample period. According to Table 2.2A, about 4% of surviving establishments have some FDI as compared to 3% among those that closed down. In terms of each category of exports, we find that there is a higher share of continuous exporters and export starters and switchers among surviving firms for both samples, although the difference is not statistically significant for the entrant sample. Yet, exiting exporters have the same share for both datasets. Regarding, the financial variables, we can see that failed firm-years display lower credit access, and higher leverage (indebted) ratios than the surviving ones and this difference are statistically significant as we can see from the p-values from tests of equality of means for the entire sample. This confirms that a highly-leveraged firm, ceteris paribus, will be at a higher risk of exit compared to a low leveraged firm during a market downturn. Moreover, a firm exhibiting a high debt-asset ratio will face significantly more difficulty in borrowing cash to avoid potential exit during adverse market conditions. This preliminary descriptive analysis of our data seems to suggest that both global engagement and financial variables affect firms' survival probabilities. In sum, the patterns described on the new sample (Table 2.2B) are generally similar to the wider sample. In the following sections, we formally test with econometric evidence to account for the confounding effects of financial and other factors that may influence the incidence of firm survival.

Table 2. 2A: Summary statistics: Entire sample

Variables	Total Sample	Failed Firms	Surviving Firms	Diff
Firm's Failure	0.10(0.31)	1.00(0.00)	0.00(0.00)	
Entry size	3.94(1.41)	3.62(1.23)	4.00(1.42)	0.00
Firm size	4.02(1.39)	3.69(1.21)	4.07(1.40)	0.00
Firm Age	15.7(17.5)	14.1(14.6)	15.8(17.8)	0.04
Capital intensity	9.56(1.94)	9.1(2.19)	9.61(1.91)	0.00
Efficiency	0.64(0.22)	0.62(0.23)	0.64(0.22)	0.00
Multi-unit	0.11(0.31)	0.07(0.29)	0.11(0.31)	0.00
No. of shift	0.38(0.48)	0.31(0.46)	0.39(0.48)	0.00
Import	0.638(0.48)	0.59(0.49)	0.64(0.47)	0.01
Industry growth	1.38(10.7)	3.11(17.2)	1.08(9.25)	0.00

Exporter	0.11(0.32)	0.06(0.25)	0.12(0.32)	0.00
Never Exporters	0.79(0.41)	0.86(0.35)	0.78(0.41)	0.00
Exiting Exporters	0.03(0.18)	0.03(0.18)	0.03(0.18)	0.99
Switching Exporters	0.07(0.25)	0.04(0.20)	0.07(0.25)	0.02
Starting Exporters	0.08(0.27)	0.06(0.24)	0.08(0.27)	0.10
Continuous Exporters	0.03(0.18)	0.01(0.08)	0.04(0.18)	0.00
Leverage	0.86(6.58)	1.50(10.3)	0.78(5.98)	0.01
Access to credit	0.22(0.41)	0.13(0.33)	0.23(0.41)	0.00
Foreign Ownership	0.043(0.20)	0.03(0.18)	0.04(0.21)	0.25
Investment	0.49(0.50)	0.35(0.48)	0.52(0.49)	0.00
Observations	4512	482	4030	

Notes: Standard error is within parenthesis

Table 2.2B: Summary statistics: Entrant sample

Variables	Total Sample	Failed Firms	Surviving Firms	Diff
Firm‘s Failure	0.19(0.39)	1.00(0.00)	0.00(0.00)	
Entry size	3.68(1.06)	3.51(1.03)	3.58(1.07)	0.21
Firm size	5.02(3.16)	3.71(1.17)	3.67(1.11)	0.47
Firm Age	5.02(2.66)	6.57(3.25)	4.64(3.03)	0.00
Capital intensity	9.86(1.82)	9.45(1.96)	9.95(1.77)	0.00
Efficiency	0.64(0.22)	0.64(0.23)	0.64(0.22)	0.00
Multi-unit	0.10(0.30)	0.07(0.25)	0.11(0.31)	0.00
No. of shift	0.36(0.48)	0.33(0.47)	0.38(0.48)	0.01
Import	0.59(0.49)	0.58(0.49)	0.60(0.49)	0.32
Industry growth	1.94(20.1)	2.58(14.5)	1.65(22.2)	0.38
Exporter	0.07(0.26)	0.06(0.23)	0.07(0.27)	0.05
Never Exporters	0.87(0.32)	0.89(0.31)	0.87(0.33)	0.40
Exiting Exporters	0.04(0.19)	0.04(0.19)	0.04(0.18)	0.64
Switching Exporters	0.03(0.16)	0.02(0.14)	0.03(0.16)	0.34
Starting Exporters	0.04(0.21)	0.04(0.20)	0.05(0 .21)	0.86
Continuous Exporters	0.01(0.11)	0.01(0.08)	0.02(0.12)	0.12
Leverage	0.53(4.44)	0.70(4.38)	0.48(4.46)	0.30
Access to credit	0.22(0.41)	0.14(0.34)	0.24(0.43)	0.00
Foreign Ownership	0.04(0.20)	0.03(0.16)	0.04(0.21)	0.04
Investment	0.46(0.49)	0.40(0.49)	0.48(0.50)	0.000
Observations	2698	529	2169	

Notes: Standard error is within parenthesis

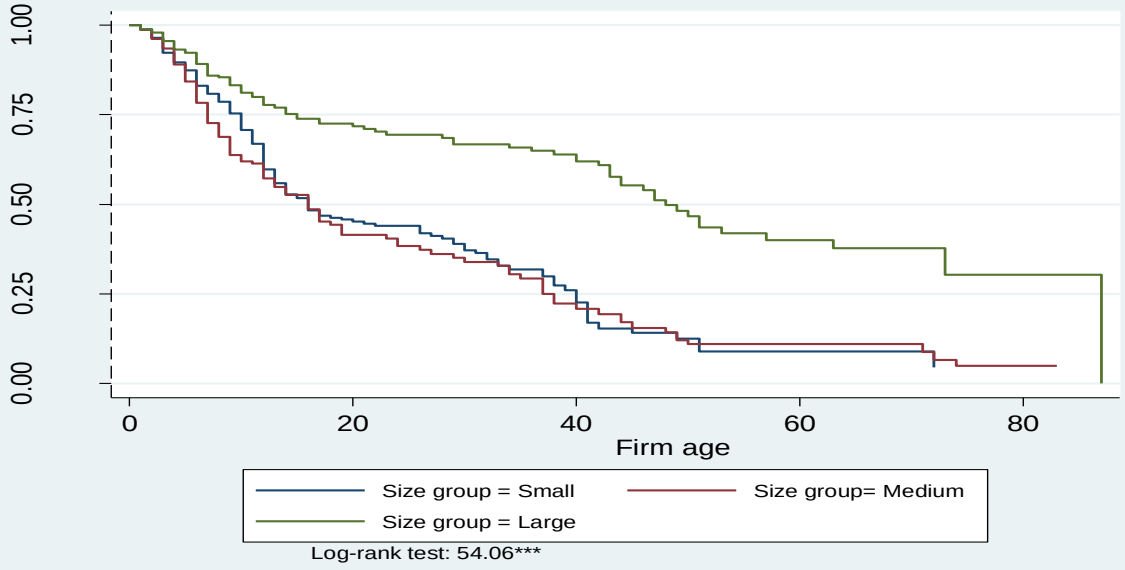
2.6.2. Modeling and estimation results

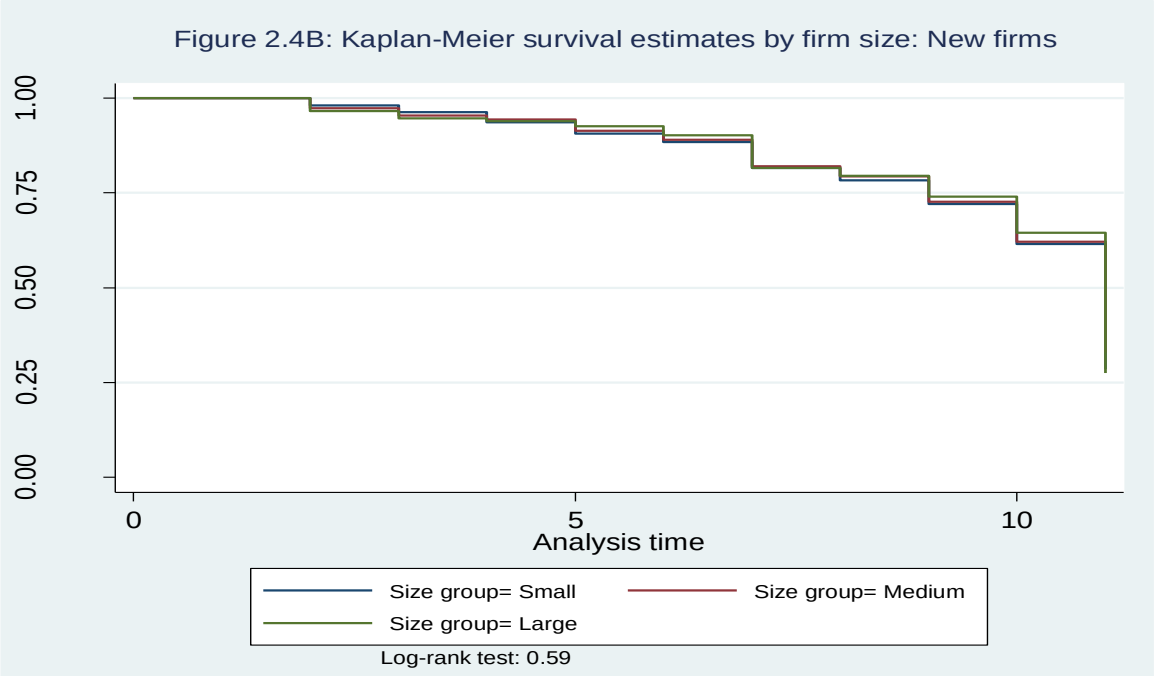
2.6.2.1. Non-parametric estimates of the survivor functions

This section provides a preliminary insight whether firm size, exporting groups and access to credit affect firms' probability of survival. We first provide a Kaplan-Meier non-parametric estimate of survival patterns for the whole sample for all variables and entrant firms for the first variable and then distinguishing between different types of firms in terms of the above factors. Figure 2.4A - 2.6 presents this preliminary evidence.

First, we may have a look at the survivor function for small (with less than 30 employees), medium (30 to 100 employees) and large (more than 100 employees) establishments for all. The rate of survival up to age 10 is 61%, 62%, and 64% while only 8%, 12%, and 43% of firms in our sample survive up to 50 years for the three-size group consecutively. Figure 2.4A plots present the Kaplan-Meier estimates of the survivor function of the entire firms for large, medium and small establishments which corresponds to the upper, middle and lower lines, respectively, showing a positive association between size and survival. For large establishments, the slope of the survivor function is essentially flat at any point in time while it declines with establishment age particularly for small producers. This indicates that the risk of exit for the entire sample is conditional on survival time for small and medium-size establishments but not so for large establishments. The observed pattern is consistent with theoretical expectations and empirical findings for other countries. On the other hand, there is no significant effect of size variation on survival for entrant firms (Figure 2.4B). In order to check for the significance of the differences in survival functions we also run the log-rank non-parametric tests of homogeneity across the three groups of firms. This allows us to reject the hypothesis that the survival functions across the different firms are equal. Accordingly, we reject for the entire and fail to reject for entrant samples.

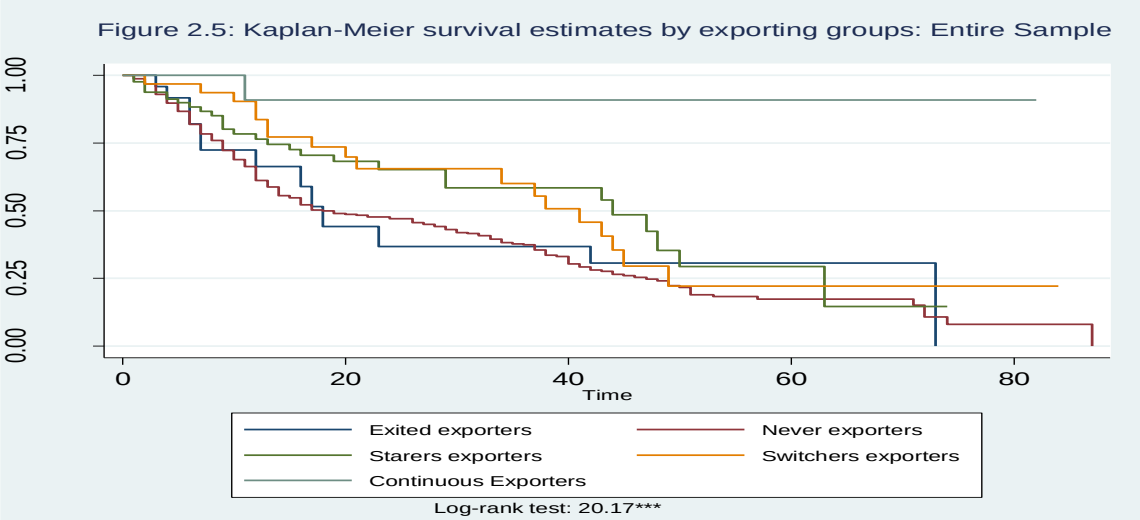
Figure 2.4A: Kaplan-Meier survival estimates by firm size: Entire firms

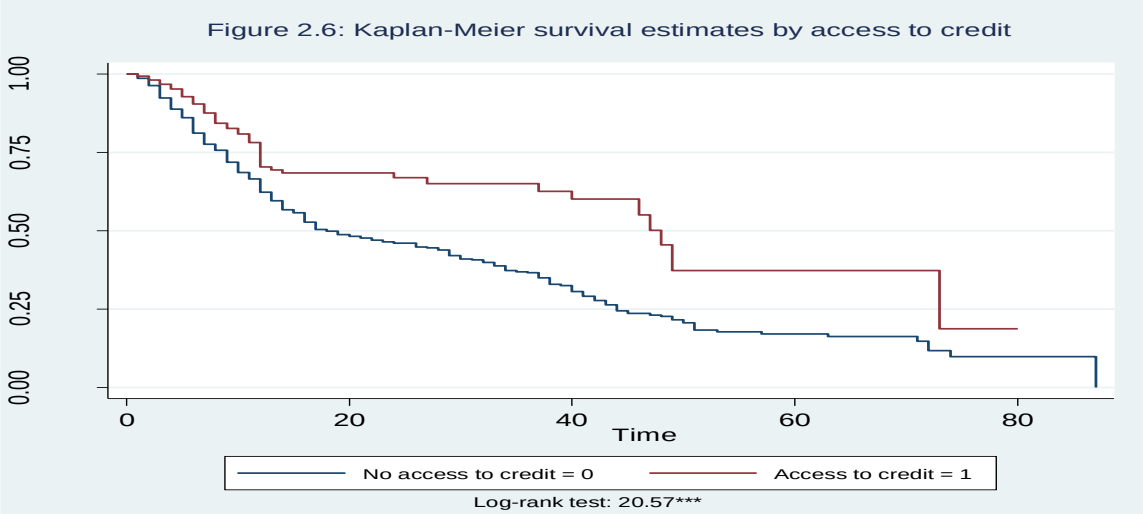




As for exporting effects (shown in Figure 2.5), it is apparent continuers has the best survival prospect in the market, which is followed by starters and switchers firms, though highly variable. The non-exporters and exiters have faced the highest risk of exit. The rate of survival up to age 10 is 62%, 18%, 19%, 89% and 100% while only 19%, 22%, 30%, 30% and 90% of firms in our sample survive more than 50 years for non-exporters, switchers, exiters, starters and continuers groups of firms respectively. Finally, we carry out a log-rank test of equality of survival functions across exporting groups of firms. The results obviously indicate the rejection of the null hypothesis and thus the existence of significant differences in survival across each of the groups considered. Finally, we compare survival rates of firms in terms of access to credit. We observe that firms with an access to bank credit endure better survival prospects than its counterpart as it also confirmed by log-rank test. In particular, less than 20% of firms with no access to credit survive up to 50 years, whereas the probability of survival up to that age is more than 35% of firms with access to credit (see Figure 2.4).

In the following sections, we dig deeper into this relationship by presenting econometric evidence that allows us to control for other relevant factors.





2.6.2.2. Empirical results

In this section, we estimate both the entire sample by ignoring the left censorship and the new entrant (firms that are established by the year 2000 to 2011) by using two specifications: Cox hazard model and probit specification. The results are presented in Table 2.3 and 2.4 respectively. Hazard ratios presented in the table indicate the effect of the variable on hazard probability. A coefficient larger than 1 indicates that the variable increases (decreases) the hazard (survival) probability, whereas a coefficient smaller than 1 has the opposite effect. Besides, the estimates by a probit specification are presented for robustness in even the columns of Table 2.3 & 2.4, whereas the Cox proportional hazard specifications are reported in the odd columns.

We start by testing whether or not the proportionate hazard assumption is valid (how the assumption fits empirical data) in a specific application with r-test at covariate level and global test to the equation as a whole. The tests confirm a strong evidence of proportional hazard for each covariate and for the global test accommodating proportional hazard for both datasets, given the

P-values are equal to 0.788 and 0.348, respectively. When we come to the main results[22], column 1 of Table 2.3 suggest that there is a negative and significant association between firm size and their probability of business failure as it is obtained from all regressions even if its magnitude is different across various specifications. That is, small firms are found to suffer a significantly higher risk of exit than larger firms. Furthermore, firm age seems to have a reducing effect on firm failure. That is, as to our expectation, young firms are more unlikely to survive. This confirms the prediction of the 'learning-by-doing' models and agrees with many previous empirical studies (e.g., (Bridges & Guariglia, 2008; Hansen, Rand, & Tarp, 2009; Nafziger & Terrell, 1996) who have generally found that younger firms are more likely to fail. Most importantly, the results in Table 2.3 indicate that efficiency, which is measured from SFA, reduces the probability of exit. The results reveal the existence of competitive markets that eliminate less efficient producers from the manufacturing sector and also consistent with theories of market selection (markets do select efficient firms) and with the findings of Frazer (2005), Shiferaw (2006) and Söderbom, Teal, and Harding (2006) for different African countries.

Secondly, firms that undertake investment during the study period were able to prolong their survival time compared to non-investing firms regardless of the magnitude of investment as it confirmed from both specifications. The results of the Cox regression suggest that the risk of exit for investing firms is about 45% lower than that of firms that do not invest. This result is consistent with investment behavior of African manufacturing firms like Shiferaw (2006) who found that investing firms enjoy better survival prospects. In other words, entrepreneurs are using a strategy of opening new businesses rather than ploughing back their profits to enlarge an existing establishment to minimize uncertainty. The choice of technology is captured by capital intensity which does not have significant impact on the risk of failure as it is confirmed from the Cox model. It seems that firms can freely choose their factor intensities without any implication on chances of survival and it is consistent with Söderbom et al. (2006) for African firms.

The presence of multi-unit firms tends to reduce the risk of exit by about 40% of the hazard facing single-unit establishments and the coefficients vary little across specifications. It could mean that branching out grow which seems to be a response to an uncertain business environment enables to use available business skills, financial resources, and other relevant knowledge on to the new establishments and thus the cost of learning is expected to be much lower than that for single-unit entrants. It agrees with the results in A. B. Bernard and Jensen (2007) and Disney et al. (2003). Similarly, the coefficient on the number of shift dummy, measuring the production capacity, is less than one and statistically significant from Cox hazard estimation. This means as the firm operates more than one shift, the probability for survival rises. Finally, we don't find any significant effect of imported inputs on the risk of exit and thus, its dependence does not seem to expose domestic firms to any higher risk of failure. The improved access to foreign reserves since

[22] We have also run with regressors lagged by one period in order to reduce endogeneity concerns but results are essentially unchanged.

the reform program could explain why importing does not increase the risk of failure. Another industry-specific variable considered in this study is output growth which has a poorly significant effect on the probability of exit in the probit specification This might be the fact that growing industries attract more small entrants which will soon exit the market and hence increasing the exit rate.

Regarding the effect of foreign ownership, there are only a few firms with non-zero levels of foreign capital, i.e. about 4.3%, and also its presence does not matter for survival as it confirmed in all regressions. That is, foreign establishments make the life for others neither more difficult (through stiff competition), nor easier (through spillovers). This finding is similar with Kimura and Fujii (2003) study results while in contrast with (Álvarez Espinoza & Görg, 2005; Andrew Bernard & Jensen, 2005; A. B. Bernard & Jensen, 1999a; A. B. Bernard & Sjoholm, 2003; Görg & Strobl, 2003; Vartia, 2004) who all found that being foreign-owned significantly affects firms' survival probabilities. On the other hand, exporting noticeably (ceteris paribus) improve the survival performance of the Ethiopian manufacturing firms. It endures about 39% lower probability of exit than non-exporting firms as confirmed from the Cox hazard model. Yet, while this result is in line with the findings of (A. B. Bernard & Jensen, 1999b; Kimura & Fujii, 2003; Pérez et al., 2004), it is in contradict with the finding of Shiferaw (2006) who found the insignificant effect of exporting on exit. When we consider the impact of exporting status on survival, we found that continuous, starters and switcher exporters attract strong and significant coefficients. That is, being in one of these groups of firms is associated with significantly lower hazard rates. Export exiters, however, suffer from a lower probability of survival than non-exporters even if it is not confirmed from probit estimation. The coefficients suggest that starters and continuous exporters endure a significant lower exit risk (about 30% and 60% lower, ceteris paribus, respectively) than the risk suffered by the continuous non-exporters (the base category). These results are in line with the majority of empirical results from other studies who found that continuous exporting firms enjoy better survival prospects (e.g., (Görg & Spaliara, 2014; R. I. Harris & Li, 2010; H. Vu & Lim, 2013)). In other words, export starters and continuous exporters might be more productive and have a better financial health compared to others while stoppers may be firms that suffer from financial shortage to continue exporting activities in highly competitive foreign markets as claimed by Greenaway et al. (2007). Thus, our results confirm the importance of distinguishing between different exporting groups and also show variations in the probability of survival of different exporting statuses in dealing with their survival prospects.

Coming to the financial variables, we can see that access to external finance that implies a better liquidity situation and can be associated with lower financial constraints and thus negatively affects the firm's failure probabilities, whereas the leverage ratio as an alternative financial variable has the opposite effect. That is, high values of this ratio seem to increase the hazard rates of firms. These results are in line with previous studies that high levels of debt would increase moral hazard and asymmetric information problems, and would lead to a higher probability of failure (see

(Bridges & Guariglia, 2008; Farinha & Santos, 2006; Fotopoulos & Louri, 2000; Görg & Spaliara, 2009; Zingales, 1998). In addition to the potentially time-varying firm level covariates, this version of the hazard model includes region, time and industry dummies (coefficients not reported here) to control for location, time and industry fixed effects and a likelihood ratio test rejects the exclusion of the above dummies.

Table 2. 3: Results of Cox proportional hazard and probit specifications: Entire firms

Variables	Cox (1)	Probit (2)	Cox (3)	Probit (4)	Cox (5)	Probit (6)	Cox (7)	Probit (8)
Firm Age	0.869***	-0.073**	0.871***	-0.071**	0.881***	-0.067**	0.885***	-0.06**
	(0.043)	(0.029)	(0.043)	(0.029)	(0.044)	(0.029)	(0.045)	(0.029)
Firm Size	0.863***	-0.093***	0.863***	-0.094***	0.887***	-0.072***	0.891***	-0.07**
	(0.037)	(0.026)	(0.038)	(0.026)	(0.039)	(0.026)	(0.040)	(0.026)
Capital	1.022	0.033**	1.021	0.035**	1.023	0.031**	1.022	0.04***
Intensity	(0.023)	(0.015)	(0.024)	(0.015)	(0.024)	(0.015)	(0.024)	(0.015)
Efficiency	0.683**	-0.332**	0.685**	-0.328***	0.67**	-0.338***	0.672**	-0.33**
	(0.149)	(0.126)	(0.149)	(0.127)	(0.146)	(0.127)	(0.147)	(0.127)
Industry growth	1.000	0.006**	1.000	0.007**	1.000	0.006**	1.000	0.01**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Multi-unit	0.593***	-0.293***	0.603***	-0.281***	0.595***	-0.304***	0.604**	-0.28***
	(0.113)	(0.102)	(0.115)	(0.102)	(0.114)	(0.103)	(0.115)	(0.13)
No. of shift	0.759***	-0.118*	0.763***	-0.118*	0.766***	-0.121*	0.769***	-0.13*
	(0.079)	(0.061)	(0.081)	(0.061)	(0.080)	(0.062)	(0.081)	(0.061)
Import	1.012	0.082	1.008	0.081	1.028	0.069	1.023	0.07
	(0.097)	(0.058)	(0.097)	(0.058)	(0.099)	(0.058)	(0.098)	(0.058)
Exporter	0.613**	-0.097*	0.603***	-0.108*				
	(0.190)	(0.111)	(0.191)	(0.111)				
Continuous					0.179**	-0.858**	0.164**	-0.908**
Exporters					(0.129)	(0.303)	(0.118)	(0.303)
Starting					0.680***	-0.160*	0.653***	-0.173
Exporters					(0.141)	(0.116)	(0.135)	(0.116)
Switching					0.887*	-0.189	0.859	-0.207
Exporters					(0.226)	(0.135)	(0.218)	(0.135)
Exiting					1.107*	0.041	1.042	0.093
Exporters					(0.301)	(0.156)	(0.287)	(0.157)
Access to	0.712**	-0.236***			0.716***	-0.230***		
Credit	(0.105)	(0.076)			(0.107)	(0.077)		
Leverage			1.021***	0.03**			1.023**	0.028**
			(0.008)	(0.012)			(0.009)	(0.013)
Foreign capital	1.285	0.029	1.267	0.00	1.382	0.080	1.376	0.052
	(0.335)	(0.150)	(0.331)	(0.149)	(0.364)	(0.152)	(0.362)	(0.152)
Investment	0.542***	-0.243***	0.546***	-0.23***	0.549***	-0.247***	0.556***	-0.220***

	(0.056)	(0.062)	(0.057)	(0.062)	(0.057)	(0.062)	(0.058)	(0.061)
Industry, time and location dummies				Included in all models				
Observations				4512				
Log-likelihood	-1234.8	-1296.0	- 1232.4	-1296.5	-1228.2	-1290.0	-1225	-1289.8

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

The interaction between exporting and finance

In this section, we deal with whether firms with exporting and its various exporting status exhibit different effects of financial variables on their survival probabilities. To test this hypothesis, we use interaction terms between variables proxying for exports and its export status dummies (starters, continuous, exiters, switchers) and financial indicators (access to credit and leverage alternatively). The interaction gauges the change in the response to financial characteristics varies with the exporting status of firms relative to the base category, never exporters. The empirical results for both models are reported in Table 2.4 in odd columns for Cox proportional hazard specifications and even columns for probit specification. In both specifications, the signs and significance of the other explanatory variables other than the interacted ones are almost similar to those obtained in baseline model result (Table 2.3).

We found that access to credit has a weaker effect on the exporting firms' probabilities of failure. This might due to the fact that exporting firms are less tied to the domestic cycle, and less subject to those financial constraints induced by tight credit policy and economic problems in their home country. This leads to a more stable cash flow for exporters compared to non-exporters, which in turn leads to a relaxation of the liquidity constraints for the former that they might face (Campa & Shaver, 2002). In other words, it confirms our hypothesis that credit availability does not directly affect exporting firms' survival probabilities. That is, we contend that the results may be motivated by the fact that access to bank credit may rather affect survival prospect indirectly through their effect on the drivers of exporting. On the other hand, indebtedness has an increasing and marginally significant effect, from Cox regression result, indicates that exporters are more responsive to increases in debt in terms of their probability to exit. In other words, compared to non-exporters, changes in debt have stronger declining effects on the survival probabilities of exporters.

Besides, the sign and significance of the interacted terms reveal whether the impact of access to finance or leverage on firm survival differs for starters, exiters, switchers and continuous exporters. In terms of financial variables, it appears that there is no statistically significant difference in the link between access to credit and survival for continuous non-exporters (base category) and other export status dummies. Similarly, no significant difference occurs regarding the relation between leverage and exit probability for never exporters and export exiters or switchers. Yet, while the coefficients on leverage on exporter starters are greater than one and statistically significant, the

coefficients on leverage for continuous exporters are less than one and statistically significant. This points to the idea that export starters are more responsive to increases in debt in terms of their probability to exit. To put it differently, compared to non-exporters, changes in debt have stronger decline effects on the survival probabilities of exporter starters. This is in line with the idea that start-up sunk costs have increased the debt obligations of export starters and thus a further increase in their debt level strongly weaken their survival prospects. On the other hand, continuous exporters are less negatively affected by leverage as the Cox regression result confirms. This is not surprising given previous evidence that continuous exporters have a better financial status compared to other firms (Greenaway et al., 2007). Some of our findings are consistent with the work by Görg and Spaliara (2014), who find no significant effect of financial constraints on the export decision. In sum, our findings indicate that there are no notable differences in the differential effects of financial variables on survival probabilities for export exiters and switchers apart from starters and continuous exporters.

Table 2. 4: Exporting and Finance- Entire sample

	Cox (1)	Probit (2)	Cox (3)	Probit (4)	Cox (5)	Probit (6)	Cox (7)	Probit (8)
Firm Age	0.870***	-0.073**	0.872***	-0.071**	0.882**	-0.067**	0.830***	-0.062*
	(0.044)	(0.029)	(0.043)	(0.029)	(0.004)	(0.029)	(0.047)	(0.030)
Firm Size	0.862***	-0.092***	0.864***	-0.093**	0.887***	-0.071***	0.882**	-0.073***
	(0.037)	(0.026)	(0.037)	(0.025)	(0.040)	(0.026)	(0.044)	(0.026)
Capital intensity	1.023	0.032**	1.021	0.035**	1.023	0.031**	1.033	0.034***
	(0.023)	(0.015)	(0.023)	(0.015)	(0.023)	(0.015)	(0.026)	(0.015)
Efficiency	0.682*	-0.332***	0.685*	-0.325**	0.671*	-0.342***	0.596**	-0.336***
	(0.148)	(0.127)	(0.149)	(0.126)	(0.147)	(0.127)	(0.147)	(0.127)
Industry growth	1.001	0.006***	1.001	0.006***	1.000	0.006***	1.001	0.007***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Multi-unit	0.594***	-0.293***	0.604***	-0.280**	0.595***	-0.304***	0.581**	-0.289***
	(0.114)	(0.103)	(0.115)	(0.102)	(0.114)	(0.103)	(0.125)	(0.103)
No. of shift	0.761***	-0.117*	0.763**	-0.118*	0.765**	-0.122**	0.688***	-0.123**
	(0.079)	(0.061)	(0.080)	(0.061)	(0.079)	(0.062)	(0.083)	(0.062)
Import	1.011	0.082	1.008	0.081	1.030	0.068	0.956	0.070
	(0.098)	(0.058)	(0.097)	(0.058)	(0.099)	(0.058)	(0.104)	(0.058)
Exporter	0.917**	-0.133*	0.919**	-0.106*				
	(0.205)	(0.124)	(0.198)	(0.116)				
Credit*Exporters	1.217	0.154						
	(0.531)	(0.232)						
Leverage*Exporters			1.052*	0.010				
			(0.327)	(0.012)				
Continuous Exporters					0.346*	-0.967**	0.252*	-0.828**
					(0.140)	(0.389)	(0.191)	(0.330)
Starting Exporters					0.673*	-0.224*	0.709**	-0.192
					(0.153)	(0.128)	(0.141)	(0.119)

Switching Exporters					0.901	-0.232	1.089	0.188
					(0.257)	(0.152)	(0.305)	(0.144)
Exiting Exporters					1.261	0.036	1.187	0.096
					(0.366)	(0.173)	(0.386)	(0.158)
Access to credit	0.881**	-0.255***			0.850**	-0.263***		
	(0.130)	(0.082)			(0.148)	(0.087)		
Credit*Continuers					1.813	0.340		
					(0.148)	(0.598)		
Credit*Starters					1.064	0.348		
					(0.518)	(0.273)		
Credit*Switchers					0.930	-0.201		
					(0.512)	(0.287)		
Credit*Exiters					0.472	-0.354		
					(0.365)	(0.395)		
Leverage			1.021**	0.026**			1.070*	0.023*
			(0.008)	(0.012)			(0.037)	(0.015)
Leverage*Continuers							0.565*	-0.508
							(1.223)	(1.384)
Leverage*Starters							1.063**	0.058*
							(0.059)	(0.083)
Leverage*Switchers							0.480	-0.111
							(0.272)	(0.308)
Leverage*Exiters							1.013	0.006
							(0.036)	(0.034)
Foreign Capital	1.281	0.022	1.267	0.003	1.369	0.064	1.282	0.068
	(0.335)	(0.151)	(0.331)	(0.149)	(0.366)	(0.152)	(0.412)	(0.152)
Investment	0.541***	-0.243***	0.546***	-0.236**	0.54***	-0.238***	0.629***	-0.228***
	(0.056)	(0.062)	(0.057)	(0.061)	(0.057)	(0.062)	(0.072)	(0.062)
Industry, time and Location dummies			Included in all model					
Observations	4512							
Log-Likelihood	-1234.7	-1295.8	-1232.4	-1296.5	-1227.6	-1288.4	-979.5	-1288.9

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

Robustness Checks

We now check whether our main results are robust to taking into account unobserved heterogeneity by using the discrete proportional hazard model with gamma heterogeneity. A test of significance of the unobserved heterogeneity for the entire sample with discrete proportional hazard model shows that the null hypothesis cannot be rejected. We carry out this test by means of a chibar2(01) statistic and obtain that chibar2(01) = 3.6e-07 with a p-value of 0.5. This means there is no unobserved heterogeneity for the firms. The signs and significance of the main variables included

in our regressions do not change once unobserved heterogeneity is taken into account. Our main results are, therefore, robust to taking unobserved heterogeneity into account.

Besides, our main results are also robust to changes in the model specification except for capital intensity which is positively affects the exit probability in the probit specification. In this section, we provide an additional robustness check by deleting all firms that were incorporated before 2000. This addresses the problem of left censoring; however, it also reduces the sample size and removes some of the big firms from the sample. Accordingly, Table 2.5 presents both the Cox and Probit estimates of the baseline model based on the short period sample of data. Apart from our size, efficiency and export switcher variables, which now attract a poorly determined coefficient and output growth which is found weakly positive significant effect on failure probability, the other variables display similar sign and significance coefficients to those obtained for the entire firms except value deviation of some coefficients.

Table 2. 5: Results of Cox proportional hazard and probit specifications: New firms

Variables	Cox (1)	Probit (2)	Cox (3)	Probit (4)	Cox (5)	Probit (6)	Cox (7)	Probit (8)
Firm Age		-0.273**		-0.280***		-0.302***		-0.287***
		(0.055)		(0.055)		(0.085)		(0.055)
Firm Size	0.961	-0.002	0.963	-0.004	0.957	-0.028	0.958	-0.019
	(0.048)	(0.032)	(0.048)	(0.031)	(0.049)	(0.042)	(0.049)	(0.033)
Capital	1.029*	0.093***	1.030*	0.098***	1.023*	0.138***	1.024**	0.098***
Intensity	(0.031)	(0.019)	(0.031)	(0.019)	(0.031)	(0.026)	(0.031)	(0.019)
Efficiency	0.970	-0.113	0.964	-0.113	0.959	-0.417**	0.953	-0.119
	(0.236)	(0.149)	(0.235)	(0.149)	(0.234)	(0.187)	(0.233)	(0.149)
Industry	0.992*	-0.001	0.993*	-0.002	0.993*	-0.004	0.993*	-0.001
Growth	(0.004)	(0.001)	(0.004)	(0.001)	(0.004)	(0.007)	(0.004)	(0.001)
Multi-unit	0.597***	-0.366***	0.600**	-0.341***	0.585**	-0.207***	0.587***	-0.343***
	(0.118)	(0.115)	(0.118)	(0.114)	(0.116)	(0.144)	(0.180)	(0.115)
No. of shifts	0.820*	-0.108*	0.823*	-0.109*	0.821*	-0.040*	0.823*	-0.114*
	(0.093)	(0.071)	(0.093)	(0.071)	(0.093)	(0.091)	(0.094)	(0.071)
Import	0.973	-0.072	0.973	-0.073	0.985	-0.113	0.984	-0.065
	(0.104)	(0.068)	(0.104)	(0.068)	(0.105)	(0.088)	(0.105)	(0.068)
Exporter	0.704*	-0.196*	0.632**	-0.218*				
	(0.251)	(0.147)	(0.250)	(0.146)				
Continuous					0.518*	-0.931**	0.517*	-0.80***
Exporters					(0.278)	(0.088)	(0.277)	(0.305)
Starting					0.696***	-0.056**	0.683***	-0.063***
Exporters					(0.169)	(0.185)	(0.167)	(0.145)
Switching					1.552	0.511	1.538	0.285
Exporters					(0.465)	(0.251)	(0.461)	(0.188)
Exiting					1.981***	0.533*	1.977***	0.139
Exporters					(0.623)	(0.311)	(0.619)	(0.230)

Access to	0.573*	-0.262***			0.562*	-0.246***		
Credit	(0.152)	(0.088)			(0.147)	(0.116)		
Leverage			1.012*	0.030*			1.012*	0.031*
			(0.011)	(0.021)			(0.011)	(0.021)
Foreign	0.855	-0.123	0.855	-0.162	0.967	-0.108	0.966	-0.093
Capital	(0.271)	(0.184)	(0.271)	(0.183)	(0.305)	(0.242)	(0.305)	(0.188)
Investment	0.711***	-0.041	0.712***	-0.041	0.719***	-0.037	0.721***	-0.039
	(0.085)	(0.071)	(0.085)	(0.071)	(0.086)	(0.092)	(0.086)	(0.071)
Industry, time and location dummies			Included in all models					
Observations			2698					
Log-Likelihood	-824.2	-1012.3	-819.9	-1014.7	-818.7	-612.2	-818.1	-1011.0

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

Similarly, we also re-estimate the equation that involves the interaction between financial variables and different export status with the new sample. We can see the result on the Appendix B.1 and overall our findings do not change compared to Table 2.4 except some variables. In particular, size and efficiency variables no longer attract a statistically significant coefficient. In the opposite, export exiters variable resulted in a positive and a statistically significant on the risk of business failure which was poorly determined for the entire sample. All in all, the results suggest that left censoring is not biasing our estimates and thus the result is robust by relying on the new sample and to alternative model specifications in both contexts.

2.7. Conclusions

In this paper, we have used a panel of Ethiopian firm-level data over the period 2000-11 to investigate empirically the link between a firm's financial health, its export activity, and survival probabilities by using survival analysis and panel probit estimation. The study provides some key findings as follows.

Firstly, we found that the probability of exiting declines for large establishments and more productive firms. Age is found to increase firm survival, which confirms that firms learn survival skills by staying in the market, as other studies have suggested. Besides, improving investment, working in multi-unit establishments and produce in more than one shift prolong survival time significantly.

Secondly, we found that exporting, lower leverage ratios and higher credit availability result in a lower hazard while importing or being foreign-owned does not significantly affect survival probabilities. Besides, different export status matters for survival in which we found that continuous, starters and switcher exporters are associated with significantly lower hazard rates while export exiters suffer from a lower probability of survival than non-exporters.

Thirdly, our empirical results show that the impact of financial variables on firm survival indeed differs at different stages of export status (starters, continuers, exiters, switchers). In particular, while access to credit has a weaker effect on the exporting firms' probabilities of exit, indebtedness has a positive and marginally significant effect on them. The former implies that exporting plays a significant indirect effect on survival probabilities, by shielding firms from financial constraints. The latter, while, indicates that changes in debt have stronger adverse effects on the survival probabilities of exporters. Besides, increases in domestic credit availability are associated with lower exit probabilities, irrespective of the export status but not anyone of them being statistically significant. That is, the result confirms as there is no difference in the link between access to credit and survival for continuous non-exporters (base category) and other export dummies. On the other hand, changes in debt have stronger negative effects on the survival probabilities of exporter starters due to the start-up sunk costs while continuous exporters are less negatively affected by leverage due to their good financial health and established a reputation in the exporting market (Greenaway et al., 2007). The results are robust to alternative model specification, dataset and to taking into account unobserved heterogeneity.

Policy implications of our findings can be summarized as follows:

First, the foreign market plays significant effects on survival probabilities. Thus, the government should design further export promotion policies and incentive scheme in a way to effectively exploit the global market access opportunities (such as EPAs, AGOA, and other preferences) and strengthen their capacity to compete in international markets. This measures likely to reduce the level of financial constraints faced by firms, and consequently to enhance their survival probabilities, which is likely to foster the industrialization process and aggregate growth of developing countries.

Second, investment and access to credit have a significant positive effect on firms' survival prospects. Thus, improving the investment climate to increase the proportion of investing firms and improving financial conditions and access to bank credit would help firms to improve their survival probability.

Third, the presence of foreign firms in the market does not have any impact on the survival of domestic (and foreign) firms and thus there is no need to fear that foreign firms impose an unduly pressure on domestic firms. To put it differently, the enterprise policy should be relaxed by giving attention for foreign investors too.

Lastly, given the evidence that indebtedness has stronger negative effects on the survival probabilities of exporter starters due to the start-up sunk costs, measures to reduce the costs of export should be taken through reducing the regulatory obstacles, shortening custom processes, providing foreign market information, including standards of a specific market, and increasing transport infrastructures and thereby improve survival probability.

Appendix B

Appendix B.1: Exporting and Finance- Entrant sample

	Cox (1)	Probit (2)	Cox (3)	Probit (4)	Cox (5)	Probit (6)	Cox (7)	Probit (8)
Firm Age		-0.273***		-0.248**		-0.285***		-0.292***
		(0.054)		(0.054)		(0.055)		(0.055)
Firm Size	0.943	-0.001	0.622	-0.004	0.955	-0.015	0.956	-0.014
	(0.046)	(0.032)	(0.048)	(0.032)	(0.049)	(0.033)	(0.049	(0.033)
Capital intensity	1.020	0.094***	1.030	0.967***	1.021*	0.094***	1.028*	0.098***
	(0.022)	(0.019)	(0.031)	(0.019)	(0.031)	(0.019)	(0.031	(0.019)
Efficiency	0.981	-0.113	0.964	-0.116	0.970	-0.115	0.971	-0.113
	(0.185)	(0.149)	(0.235)	(0.149)	(0.238)	(0.149)	(0.238	(0.149)
Industry growth	0.992*	-0.001	0.993	-0.002	0.993	-0.002	0.993	-0.002
	(0.004)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)	(0.004	(0.001)
Multi-unit	0.633***	-0.368***	0.600**	-0.34***	0.592**	-0.369**	0.589**	-0.347***
	(0.111)	(0.115)	(0.118)	(0.114)	(0.118)	(0.115)	(0.117	(0.115)
No. of shift	0.757*	-0.109*	0.823*	-0.108*	0.815*	-0.120*	0.823*	-0.121*
	(0.071)	(0.071)	(0.093)	(0.071)	(0.093)	(0.071)	(0.094	(0.071)
Import	1.065	0.072	0.973	0.074	0.984	-0.058	0.982	-0.065
	(0.096)	(0.068)	(0.104)	(0.068)	(0.105)	(0.068)	(0.105	(0.068)
Exporter	0.603*	-0.100*	0.613*	-0.243**				
	(0.142)	(0.165)	(0.155)	(0.148)				
Credit*Exporters	0.430	-0.392						
	(0.245)	(0.314)						
Leverage*Exporters			1.001*	0.005				
			(0.001)	(0.008)				
Continuous					0.659*	-0.698*	0.677**	-0.585*
Exporters					(0.398)	(0.364)	(0.393	(0.346)
Starting Exporters					0.716**	-0.172**	0.712*	-0.150*
					(0.190)	(0.160)	(0.176	(0.153)
Switching Exporters					1.860	0.218	1.681**	0.214
					(0.580)	(0.201)	(0.516)	(0.196)
Exiting Exporters					2.393**	0.395	2.339**	0.317
					(0.874)	(0.291)	(0.815)	(0.274)
Access to credit	0.602*	-0.226**			0.565**	-0.271**		
	(0.161)	(0.092)			(0.176)	(0.096)		
Credit*Continuers					0.371	-0.179		
					(0.458)	(0.629)		
Credit*Starters					0.854	-0.665		
					(0.508)	(0.351)		
Credit*Switchers					0.245	-0.596		
					(0.259)	(0.558)		
Credit*Exiters					0.535	-0.529		

					(0.377)	(0.492)		
Leverage			1.011*	0.028*			1.016*	0.014
			(0.011)	(0.021)			(0.013)	(0.015)
Leverage*Continuers							0.027	-1.871
							(0.126)	(2.028)
Leverage*Starters							1.064**	0.318*
							(0.034)	(0.212)
Leverage*Switchers							0.351	-0.717
							(0.442)	(0.684)
Leverage*Exiters							0.591	-0.574
							(0.363)	(0.493)
Foreign Capital	0.903	-0.106	0.855	-0.157	0.989	-0.074	0.981	-0.073
	(0.285)	(0.186)	(0.271)	(0.183)	(0.312)	(0.192)	(0.309)	(0.191)
Investment	0.707***	-0.041*	0.712**	-0.039*	0.725***	-0.029	0.721**	-0.028*
	(0.084)	(0.071)	(0.085)	(0.071)	(0.087)	(0.072)	(0.086)	(0.071)
Industry, time and Location dummies			Included in all models					
Observations			2698					
Log-Likelihood	-822.9	-1011.5	-823.6	-1013.6	-816.7	1005.2	-816.2	-1006.3

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

Appendix B.2: Variable description

All variables in monetary terms adjusted to the constant price of the year 2000

Variables	Description
Dependent variable	
Firm's failure	1 if firms failed in year t, and 0 otherwise
Explanatory variables	
Firm size	Total number of permanent and adjusted casual employees
Firm age	Number of years since established
Capital intensity	Ratio of capital to total employment
Efficiency	Productivity predicted from SFA
Multi-unit	1= Multi-unit firms and 0= single unit firms
No. of shift	1= firm operates more than one shift and 0 otherwise
Import	1 if firms have imported inputs or machinery, and 0 otherwise
Industry growth	Output growth
Exporter	1 if firms participate in exporting market, 0 otherwise
Continuing exporters	1 if firms export continuously through the sample, 0 otherwise
Starting exporters	1 if firms do not export in year t-1 but export in year t
Switcher exporters	1 if firms that enter and exit the export market several times, 0 otherwise
Continuous non-exporters	1 if firms that never export over the sample period, 0 otherwise
Leverage	Ratio of firm's total liability of the firm to total assets
Access to credit	1 if bank credit is listed as a source of working capital, 0 otherwise.
Foreign ownership	1 for firms involve >50% foreign capital, 0 otherwise
Investment	1 for firms with non-zero investment amounts, 0 otherwise
Fixed-Effect Dummies	
Sector dummies:	There are three sector dummies, including Food and Beverage, Textiles and Apparel, Leather and Tanning products in which the last as the reference group
Region dummies:	1 if situated in Addis Ababa, 0 otherwise

Chapter 3

Global engagement and labor market effects: Evidence from Ethiopian Manufacturing Firms

Abstract

This paper analyses the effect of exposure to international trade and foreign ownership on the employment quality (workforce composition) and wages in manufacturing industries. This study used the unbalanced long panel dataset of Ethiopian manufacturing firms over the period 2000–2011 and deploying alternative econometric estimation technique (OLS, FE, and GMM-SYS) by estimating dynamic models of employment and wages. The results show that firms' international exposure has a positive contribution to employment creation and wage growth in Ethiopian manufacturing. This affirms the fact that Ethiopian's exports are more labor-intensive and this has mitigated the country's labor surplus. Besides, trade and foreign ownership are found to have an absolute quality-bias which affirms the presence of learning by exporting on the Ethiopian manufacturing sector. We also found that Foreign Direct Investment (FDI) magnifies the wage gap between casual and permanent workers. Whereas export participation has a positive, but no significant effect on the wage of permanent workers, while it has a weakly positive significant effect on casual workers' wage.

Keywords: International trade, employment, wage, foreign ownership, panel data

3.1. Introduction

The purpose of this paper is to examine whether the higher productivity advantages of global engagement may be converted into benefits for workers in the form of higher wages and better employment quality[23]. We just look at two dimensions of global engagement. The first is based on whether the firms export, and the second on whether they are foreign owned. Foreign trade, through a positive business climate, flexible labor markets, high-quality education and skill training systems, is one of the main driving forces to spurring economic growth and development. It brings up enhanced opportunities for firms and industries in the world to be transmitted to the domestic markets through technological upgrading and thus to be more profitable. The successful exploitation of this opportunity albeit depending on whether they own the required attributes and become efficient firms/industries. That is, those economies and firms that are unable to adjust themselves to the new situation and fail to secure the required attributes may suffer from the globalization process. In turn, this process has its own implications for employment and its quality

[23]Employment quality is defined as worker contract status and its improvement measured by a decrease in the use of casual worker (an increase in the share of workers with formal labor contracts) (Rand & Torm, 2012).

and wages in the local economy and this argument builds on two possible empirical observations. The first notions are exporting firms pay higher wages and hire more workers than non-exporters and the second one is the existence of a direct link between exports, wages and labor quality utilization in the industry and firm levels. Yet, there is also a considerable skepticism about employment creation and improvement in wages as a result of trade openness (Brambilla, Depetris-Chauvin, & Porto, 2014; Were, 2011).

Similarly, the attraction of foreign investors is a fundamental goal for all policy makers over the globe, and even more so in developing countries, where lack of capital is one of the key constraints to economic prosperity. The first reason why the government of developing countries of particular interest to inward FDI, which makes the workers to receive higher wages than those paid by domestically- owned firms, is the degree of creating new and qualifies jobs in the industrial sector, especially when it is concentrated in the labor-intensive sector. The second one is due to the fact that FDI is seen as a driver for economic development as it may bring foreign capital, foreign technology, management know-how, jobs and access to new markets (Boly, Coniglio, Prota, & Seric, 2014). In general, however, trade liberalization has also implied important challenges for developing countries' labor markets (Stiglitz, 2002). On the one hand, new technologies were often characterized by a labor-saving naturalistic and may involve increasing unemployment, at least in some traditional manufacturing sectors. On the other hand, globalization and technological upgrading may bring the productivity gains which were often coupled with a growing gap between the employment and the wages of various types of workers.

Ethiopia, like many developing countries, implemented a comprehensive program including trade liberalization and deregulation reforms to attract foreign capital into the growth endeavor of the country and thereby increasing employment and improving wages in the domestic economy. This was initially due to the growing pressure from Bretton Woods's institutions (WB & IMF) as preconditions for donor funding, following the fall of the Derg government in 1991. A major component of trade reforms was a policy shift from import-substitution to export-promotion strategy, and a gradual removal of tariff and nontariff barriers to trade. Trade liberalization was undertaken as a measure of increasing trade openness, which would enhance enterprise efficiency and export growth, subsequently leading to growth in employment and economic growth. Trade—through the export-led growth strategy—is now envisaged in the Growth and Transformation Plan II (GTP II), which is a continuity of GTP I, as the strategy and serve as a springboard towards the attainment of the lower middle-income country' status by the year 2025 (National Planning Commission, 2016). Besides, the government establishes industrial zones which allow export oriented manufacturing activities can freely operate without state interference and also gives preferential treatment with respect to taxation, infrastructure, and less industrial regulations for foreign investors. In the same way, Ethiopian government amended its investment laws several times to remove restrictions on foreign investments and to establish an enabling environment for foreign investors since the late 1990s. And a variety of special incentives have been put in place

in order to attract FDI, under the rationale that FDI can generate positive spillover effects within the local economy. The result has been a dramatic increase in FDI flows to Ethiopia's manufacturing sector and making it one of the top five host economies in LDCs in FDI flows during 2015. The net FDI inflows to Ethiopia have increased from 135 million USD in 2000 to 2.2 billion USD in 2015 especially because of its privileged exports under the African Growth and Opportunity Act (AGOA) and economic partnership agreements (EPAs) (UNCTAD, 2016). Thus, manufacturing FDI accounting for 72 percent of foreign capital invested in 2015 (EIC, 2016). Yet, the employment effect of FDI only shows a marginal increment from 27,462 in 2000 to 44,118 in 2014.

The existing empirical literature on trade and labor market outcomes mostly confined to developed countries, and recently some attention has also been devoted to middle-income and low-income developing countries. Empirical evidence on the African continent is severely limited. Besides, the studies do not differentiate between the casual and permanent workers rather they focused on overall or aggregate level of employment and wages. The effect of exposure to international openness on the employment quality (workforce composition) and their wages in developing countries' economies in general, and in their manufacturing industries, in particular, is barely observed. There have been a few empirical works in this regard. Among the few studies on this topic, Were (2011) for Kenya and V. H. Vu, Lim, Holmes, and Doan (2012) for Vietnam are considered as the pioneering studies of the impact of export participation on casual[24] workers. A positive impact is observed when using a panel data fixed effects approach for Kenya in 1994-5, but this is not the case for 2003 using cross-sectional data. While, in the Vietnamese context, it is obtained that there is a negative relationship between export activities and employment quality even if its impact including on wages vary greatly with respect to levels of technology. They only focus on the effect of trade variables on the share of casual workers and don't depict the full picture of international openness effect.

Promoting international trade policies via various strategies have received due attention in Ethiopia, however, its implications for workforce composition and earnings structure is a paucity in the firm-level literature. That is, investigation of the relationship between export participation and employment quality and their wages in the Ethiopian context at the firm-level is nonexistent. To the best of our knowledge, this research is the first study in this respect. The only related study in this view in Ethiopian context has been done by Getinet Haile, Srour, and Vivarelli (2016) on the impact of technological change on permanent employment of skilled and unskilled workers over the period 1996 – 2004. Their empirical results suggest weak evidence of the overall skill enhancing effect of trade liberalization and globalization. On the other hand, the present study

[24]Often have no formal labor contracts with the employer and their services can be terminated any time at short notice or without notice. Besides, they usually employed on temporary basis and operate without non-wage employment benefits such as medical cover, transport allowance and severance pay. In the empirical literature, the words precarious, non-standard, flexible forms of employment are used interchangeably in reference to irregular, part-time, casual, seasonal workers (Were, 2011).

expands the scope of previous research and adds to the existing works on the subject in several ways. First, this study uses the most recent firm dataset which derives from census data collected by the Ethiopian Central Statistics Authority (CSA) available from 2000 to 2011. Second, the present study rather focuses on the other side of employment aspects such as workforce composition in terms of quality which is never done in the Ethiopian context. Finally, this paper separately analyzing the firms' involvement in international markets via the effect of exposure to trade (export-orientation) and technology transfer via FDI on employment and wages in terms of use of different categories of workers (casual versus permanent) at the firm level within a dynamic framework. This, in turn, enables to distinguish between quantity and price effect and allow evaluating the absolute and relative quality bias. In other words, having two equations for both employment and wages can provide a more thorough understanding of the nature of the possible labor-saving and employees' quality-biased nature of the impact of global engagement.

All these things, in fact, have their own implications for poverty, especially in the urban areas where such casual forms of employment are becoming prevalent and this category of informal workers operates without security and non-wage employment benefits. Besides, the fastest growing part of the labor force in many countries, including Ethiopia has been in casual work and part-time employment. In sum, a better understanding of the links between trade integration and the performance of labor markets is crucial for the implementation of sound policy responses to the generalized trend towards different types of labor and their earnings.

The rest of the paper is structured as follows. Section 2 and 3 presents the related literature and data used in the empirical analysis respectively. Section 4 sheds light on the process of trade liberalization, employment and wage outcomes in Ethiopia and presents some descriptive evidence on the manufacturing sector. Section 5 specifies the empirical model and estimation techniques in the regression analysis. The empirical results and discussion follow in section 6. The last section provides a summary with some final remarks.

3.2. Related literature

There are many empirical studies that examining the effect of international trade on employment even if they are mostly confined to the experience of the developed countries. Some of them are the USA (Artuç, Chaudhuri, & McLaren, 2010; Slaughter, 2001), the UK (Greenaway, Hine, & Wright, 1999), and France & Britain (Biscourp & Kramarz, 2007; Chetwin & Bairam, 2001). More recently, some studies have started to explore the labor market effects of international trade from a developing country's perspective, such as India (Hasan, Mitra, Ranjan, & Ahsan, 2012; Raj & Sen, 2012; Sen, 2009), China (Fu & Balasubramanyam, 2005), Brazil (Moreira & Najberg, 2000), Vietnam (Kien & Heo, 2009; Ko, Rangkakulnuwat, & Paweenawat, 2015)), Turkey (Meschi, Taymaz, & Vivarelli, 2016) and Mexico (Revenga, 1997). Further, there are some cross country studies on this issue, such as research on developing countries (Harrison, 1996), the EU (Abraham

& Brock, 2003), the OECD Countries (R. E. Baldwin, 1995) and in 97 different countries (Carrere, Fugazza, Olarreaga, & Robert-Nicoud, 2014). However, no clear directions have emerged from the literature so far. Some researchers conclude that international trade considerably and positively affects employment (Fu & Balasubramanyam, 2005; Kien & Heo, 2009; Sen, 2009). On the contrary, Greenaway et al. (1999); Revenga (1997) find that trade openness leads to a reduction in the level of derived labor demand. Likewise, other studies have found no significant evidence of the impacts of trade on employment (Lang, 1998; Raj & Sen, 2012; Sasidharan, 2015).

Similarly, several papers analyze the impact of foreign acquisitions on employment in developed countries: most of the existing evidence suggests that firm-level employment levels remain unchanged or increase following foreign acquisition (see, for example, (Bandick & Karpaty, 2007; Brännlund, Nordström, Stage, & Svedin, 2016) for Sweden; (Girma, 2005) for the UK; (Balsvik & Haller, 2010) for Norway). The study of Lipsey, Sjöholm, and Sun (2010) for Indonesia and Boly et al. (2014) for 19 sub-Saharan African countries are among the very few which explore the contribution of FDI to employment growth in less developed countries. The authors find that foreign-owned manufacturing plants contribute positively to employment growth. Further, Barthel, Busse, and Osei (2011) shows that foreign firms in Ghana are larger, on average, in terms of workers employed (and provide for more formal training programs for workers) than domestic firms. However, empirical evidence on Sub-Saharan Africa is severely limited.

The empirical evidence of the wage premium effect of foreign trade and FDI is still limited. Its results are also inconclusive and often vary greatly across different contexts, making it hard to make generalized inferences. Some studies found positive impacts of the presence of firms in exporting markets on wages. For example, studies in developed countries like the USA (A. B. Bernard & Jensen, 1999a; A. B. Bernard et al., 1995), Germany (A. B. Bernard & Wagner, 1997b) and England (Greenaway & Yu, 2004) have confirmed that export wage premiums vary in range from 2% to 15%. Likewise, others have also found a positive correlation between export activity and wage differentials in the context of developing countries, e.g., Taiwan (Liu, Tsou, & Hammitt, 1999a) and African countries (Van Biesebroeck, 2005). In contrast, Munch and Skaksen (2008) for Danish manufacturing firms found a negative impacts of the presence of firms in exporting markets on wages while Hiep and Ohta (2009) for Vietnam show that export activities do not have an impact on wage differentials. Similarly, the export destination matters for the impact of exporting on wage premium as it is indicated by some researchers. That is, a positive linkage between export participation and wages prevails when exporting to the less competitive African market is made whereas exports to competitive markets outside Africa generate a disciplining effect on wage premium (Milner & Tandrayen, 2007). Likewise, there was a consensus that foreign firms pay higher wages than their domestic counterparts, mainly in developing countries ((Te Velde & Morrissey, 2003) for Sub-Saharan Africa; (Lipsey & Sjöholm, 2004; Strobl & Thornton, 2002) for Indonesia). However, with the increasing availability of linked employer-employee data, this consensus has been challenged at least in developed countries. For example, Heyman,

Sjöholm, and Tingvall (2007) show that foreign takeovers in Sweden reduced individual wages relative to their counterparts in domestic firms, while Andrews, Bellmann, Schank, and Upward (2007) for Germany, Malchow-Møller, Markusen, and Schjerning (2013) for Denmark and Huttunen (2007) for Finland find small positive effects. While some other researchers obtained no significant impact of foreign ownership on wages ((P. S. Martins & Esteves, 2015) for Brazil and (Brännlund et al., 2016) for Sweden).

In sum, there is considerable disagreement among analysts on the impact of global engagement on labour demand and their earnings. Our contribution to these debates in this paper is essentially an empirical issue. Besides, unlike previous studies, this study also considers the relationship between export participation and employment quality (contract status). Accordingly, we disaggregate labor into casual and permanent categories to analyze the effects of global engagement on employment quality and their corresponding wages by using firm-level data covering the period 2000-2011.

3.3. Data Source

The study relies on the annual census data collected for manufacturing establishments with 10 and above employees by the Ethiopian Central Statistic Authority (CSA) between 2000 and 2011. The data give information concerning the number of proprietors/enterprises involved in manufacturing, income obtained, volume and value of production, inputs (local and imported), sales (local and exported), paid-up capital, costs of production, type of ownership (domestic and foreign), value added, employment and investment, and others in the sector. Total employment is the sum of permanent and casual employees and the latter adjusted for year equivalent labor. The casual workers include those workers who are employed for a whole or a part of the year. These workers are not regularly on the payroll of the establishment. The ownership of the firm as foreign or domestic by the share of the initial paid-up capital is also one of the main variables in our estimation. If the share of non-Ethiopian in the initial paid-up capital is greater than 50% of the firm's total initial paid-up capital, we can categorize the firm as foreign-owned firm. Besides, the census also involves a data on wages and salaries which include all payments in cash or in kind made to employees during the reference year in connection with the work done for the establishments but it excludes commissions, bonuses, professional and hardship, allowances. The census covers all major manufacturing sectors in all regions of the country based on 4-digits international standard industrial classification (ISIC) - Revision 3.1. The industrial sectors involve manufacturers of food and beverage, textile, apparel, leather and footwear, wood, paper and printing, chemicals, rubber and plastic, nonmetal, fabricated metal, and furniture.

Of the 12-year unbalanced panel comprises 15111 firms/year observations; we used the four two-digit sectors accounting for 38 percent for the empirical one. In other words, we grouped the four two-digit sector firms into three broad sectors for analysis purpose: food and beverage, textile and apparel and leather and tanning and the first group accounts for 70%, while the other two sectors

take the remaining share equally (15% each) in our sample. Observations with missing output and/or input variables and also those who observed only for one year was deleted since the empirical part relies on lagged values of the regressor for identification purposes like other studies that have used this dataset, namely (Getinet Haile et al., 2016; Siba & Gebreeyesus, 2017). Moreover, since the CSA census was conducted only for establishments which employ ten persons or more, observations of micro firm establishments with fewer than 10 persons also dropped and left with 4388 firms/year observations comprises 70 and 30 percent of the three group industry and the whole Ethiopian manufacturing firms respectively over the sample period.

Throughout the analysis, all financial variables are deflated to 2000 prices generated from the various deflators to avoid biases that might arise because of inflation. Further details on deflators and variable construction can be found in the Appendix C.1.

3.4. Overview of trade and employment in Ethiopia

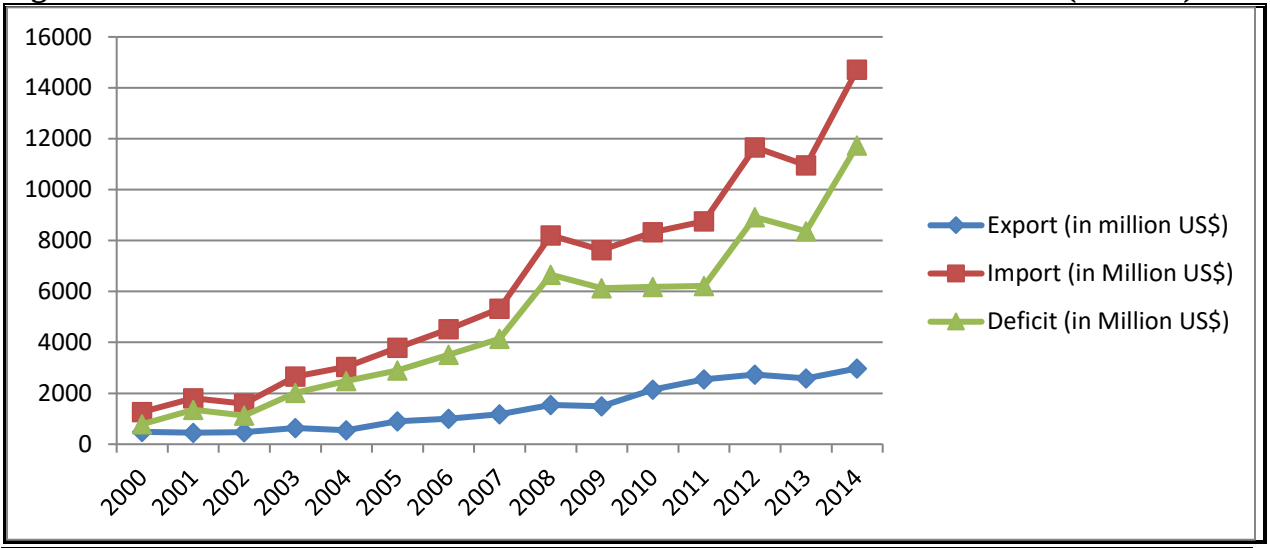
3.4.1. Trade reforms and Merchandise trade in Ethiopia

Ethiopian external trade policy has undergone substantial reform starting the mid-1990s in line with the policy based lending program of the WB and IMF. The heart of the reform process has been reduction and harmonization of tariffs, exchange rate devaluation, and relaxation of quantitative trade barriers. The tariff reform process has resulted in a decline in the maximum tariff rate from 230 to 80 percent in the first round. This tariff revision continued for seven times. Currently, a six-band international harmonized system (HS) tariff schedule is used with a minimum rate of 5 percent on capital goods and a maximum rate of 35 percent on most finished products, whereas intermediate inputs and raw material inputs face lower tariff rates. The above measures accompanied by a progressive reduction in non-tariff barriers with the implementation of trade facilitation programs (i.e., adoption of the Harmonized Commodity Description and Coding System of the World Customs Organization for classification of internationally traded goods, introduction of the Automated System for Customs Data Management of UNCTAD, application of the GATT/WTO valuation system) (Ferede & Kebede, 2015).

Ethiopia also continues to participate actively in multilateral and regional economic groupings. These negotiations are accession to the World Trade Organization (WTO), the New Economic Partnership Agreement (EPA) with the European Union, Common Market for Southern and Eastern Africa (COMESA), Free Trade Agreement (FTA), Tripartite free trade area (TFTA) consisting of COMESA, the East African Community (EAC) and Southern African Development Community (SADC) member countries, Intergovernmental Authority for Development (IGAD) and the Sana'a Forum for Co-operation (SFC). It should be noted that although all of the above agreements demand increased liberalization of the country's trade regime and eventual total elimination of tariff and non-tariff barriers, a coherent trade policy is lacking in Ethiopia.

The total value of exports revealed a slight progress relative to the preceding years since 2009. Accordingly, export receipt reached to $2,978 million in 2014 from $2,591 million in 2013 with 15% higher than the previous year. Similarly, import expenditure has grown up continuously since 2009 with the exception of a slight decrease in 2013. Import payment has been reached to the highest point in 2014 accounting $14,718 million. The 2014 import payment was about 34.3 percent higher compared to the previous year's import expenditure. In the past decade, export and import growth had averaged 15 and 21 percent per year, respectively (see figure 3.1).

Figure 3. 1: Trend in Merchandise Statistics in Million US$ and Growth Rate (2000-14)



Time	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Export GR	-5.9	4.5	35.6	-13.8	62.0	11.5	18.4	30.4	-3.2	43.8	18.4	7.8	-5.5	14.9
Import GR	42.7	-11.8	67.1	13.9	25.0	19.1	17.8	54.0	-7.1	9.2	5.2	33.1	-6.0	34.3
Deficit GR	72.5	-17.3	80.3	22.7	16.8	21.5	17.7	60.7	-8.0	0.8	0.6	43.5	-6.2	40.4

Source: Own computation from WDI, 2016

The merchandise trade deficit has continued to widen since 2003 as shown the figure above. The deficit in 2014 increased to 40.4 percent relative to that of 2013 (it increased from $8,364 million to $11,740 million). The deficit has exerted an upward pressure since 2006. The growing pressure of the deficit has reached its peak and became more recognizable in 2014 after falling in 2013. The trade balance has been deteriorating due to the faster growth in goods imports. That is, the trade deficit was driven by poor export performance and a large external debt-financed imports of capital goods for public investment programs following the growth of the national economy. Currently, the country has implemented GTP II (Growth and Transformation Plan) which requires huge public investments to achieve the sets goals and has contributed a lot to the divergence of the import payments. This caused the importance of expanding exports to reduce the serious foreign exchange constraint that acts as a bottleneck for the growth of the economy. Hence, the government should figure out the problem to increase the country's foreign exchange earnings by pursuing concrete policy measures and incentive schemes to improve the unsatisfactory

performance and overall economic growth. Besides, the export receipt has been highly dependent on agricultural raw materials whose price grows much lower than that of finished industrial goods and thus this worsened the vulnerability of receipt instability from merchandise export and could not be able to adequately respond in covering the growing import demand. This caused import expenditure to grow by about 34.3 percent in 2014 while the export receipt grew only by about 14.9 percent in the same year.

3.4.2. Performance of FDI in Ethiopia

FDI is considered as one path for economic growth of a country as it could bring different advantages, particularly to host nations that are job creation and the enhancement of capital, technology, and know-how. That is why FDI as a component of capital formation has got importance in the Ethiopian economy notable after 1992. The current Ethiopian government took several policy reforms especially that of the privatization and pro-investment strategies and through the use of Industrial Parks (IP) to attract Foreign Direct Investment (FDI) (GA Haile & Assefa, 2006). However, out of the total investment projects licensed between 1992- 2012, FDI's share is about 15.71 percent, which is one of the meager flows in Africa (EIA, 2012a).

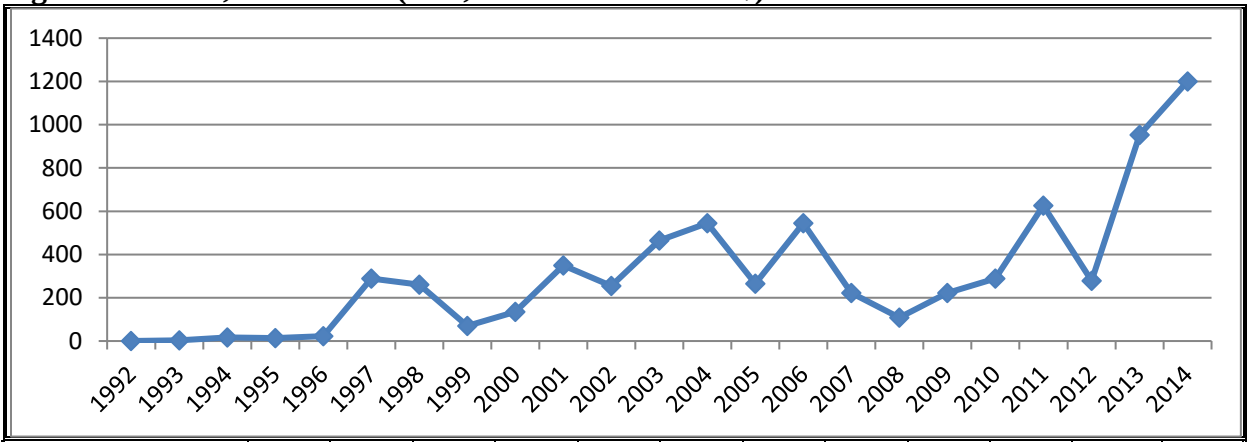
FDI inflows to Ethiopia overall is increasing from the period 1992 to 2014 with an annual average of 310 million US$ but the annual financial inflows have been fluctuating over the years due to the political instability in those periods (World Bank, 2016). Figure 3.2 indicates the highest FDI inflows before 2000 was registered in 1997 with a value of 288 million dollars. During the Ethio-Eritrea border conflict (1998-2000) the inflow of FDI had fallen to a large extent. Besides, during the 2005 country's election crisis time, however, the FDI flows declined to $265 million from $545 million in the preceding year of 2004. The decline in 2007/08 reflects the global financial crisis worldwide as well as economic instability in Ethiopia. On the other side, there is a foreign capital boom in 2004 and 2006, which is directly related to massive petroleum exploration in the country particularly in Ogaden region (UNCTAD, 2007). In sum, after 2000 FDI inflows to Ethiopia have been fluctuating until it rises to 953 million dollars in 2013 and then reached 1200 million US$ in 2014 (see Figure 3.2).

Moreover, despite the improvements in the overall economic contexts, Ethiopia's share of FDI inflows to Africa remains below 2 percent (UNCTAD, 2011). Inauspiciously the share of FDI in the Ethiopian GDP has increased steadily from an annual average of 1.6 percent over 1992 to 2002 to a 2.2 percent from 2003 to 2014 as we see from Figure 2 below. It also shows that the percentage share of FDI to GDP remains the least, as it was recorded 5.43 in 2003 and 2004, which was the highest over the past two decades.

When we see the sectoral distribution of FDI flow, manufacturing sector becomes increasingly important to attract more FDI than the other sectors. It accounted for about 68.27%, while the agriculture and service sectors share only 9.36% and 22.37% of the total FDI inflows to Ethiopia

from 1992 to 2015 respectively. It's also remains limited by country of origin and accordingly, the majority of FDI inflows to Ethiopia are from developing countries such as China, India, Turkey, and Saudi Arabia.

Figure 3. 2: FDI, net inflows (BoP, current Million US$): 1992-2014



Time	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014
FDI, net inflows (% of GDP)	0.00	0.2	0.3	3.3	1.6	3.2	5.4	3.6	0.4	1.0	0.6	2.2

Source: Own computation from WDI, 2016

3.4.3. Employment situation in Ethiopia

Ethiopia is a predominantly agricultural country, where over 80% of the population resides in rural areas and are actively involved in agricultural production. The country's employment structure has not changed considerably over the past decade. The agricultural sector share of total employment still significant and employs more than three-quarters of all workers. Employment increased by 15 million between 1999 and 2013, with agriculture absorbing 72 percent of this increase, followed by trade (7 percent), manufacturing (5 percent) other services (4 percent), and public services (3 percent) as we can see from Table 3.1. Employment growth varied across sectors. The commerce sector experienced the smallest average growth rate, only 1.4%, between 1999 and 2013 followed by agriculture and manufacturing, which is 3.2% and 3.9% respectively. Employment in the manufacturing sector increased marginally from 4.4% to 4.7% of total employment between 1999 and 2013. In particular, the trade sector has played a pivotal role in absorbing a substantial number of workers in the country next to agriculture. Over 2.8 million laborers work in the trade sector, which accounts for 7.7% of total new jobs (P. Martins, 2014).

Table 3. 1: Total Employment by sector, 1999-13

	Employment by Sector (Thousands)			Employment by Sector (% Total Employment)			Employment by Sector (Annual Growth, %)		
	1999	2005	2013	1999	2005	2013	1999-05	2005-13	1999-13
Agriculture	19,869.0	25,208.0	30,821.0	79.8	80.2	77.3	4.0	2.5	3.2
Mining	16.0	82.0	195.0	0.1	0.3	0.5	31.8	11.5	19.8
Manufacturing	1,107	1,529	1,882	4.4	4.9	4.7	5.5	2.6	3.9
Utilities	28	33	90	0.1	0.1	0.2	2.7	13.4	8.7
Construction	229	446	825	0.9	1.4	2.1	11.8	8.0	9.6
Commerce	2,342	2,406	2,845	9.4	7.7	7.1	0.5	2.1	1.4
Transport	123	146	378	0.5	0.5	0.9	3.0	12.6	8.4
Finance	20	38	134	0.1	0.1	0.3	11.6	17.1	14.7
Public services	578	729	1,212	2.3	2.3	3.0	3.9	6.6	5.4
Other services	585	818	1,492	2.4	2.6	3.7	5.7	7.8	6.9
TOTAL	24,897	31,435	39,874	100	100	100	4.0	3.0	3.4

Source: P. Martins (2014) cited on the World Bank 4th Ethiopia Economic Update (2015)

3.4.4. Employee status and wages by varies category of the firm

Table 3.2 compares the average of certain indicators such as employment (casual and permanent) and their share, average wages of casual and permanent workers, capital per worker and output per worker of exporters and non-exporters by industry. Generally, exporting firms employed more workers, regardless of employee category and industry in absolute numbers while the proportion of total casual and skilled workers among the total workforce is almost the same. That is, exporting firms employed an average of 4.6, 4.4 and 5.2 times bigger total, permanent and casual workers compared to non-exporting firms, respectively. Besides, paid higher wages for both casual and permanent workers, had more capital per worker, and produced more output per worker. On average exporters paid 1.6 times higher wages to permanent and casual workers, produced 1.8 times more output per worker, and 1.4 times more capital intensive. These differences are similar to those reported from Kenya in Were (2011).

Regarding the employee characteristics by sector, the textile and apparel industry employed the highest average number of workers irrespective of their type followed by food and beverage sector for total employees and casual workers. Textile& apparel and the food & beverage sector had paid the highest average wage for casual and permanent workers respectively. On the other hand, leather and tanning, which also had the highest proportion of exporting, had the highest capital-labor ratio, followed by food and beverage industry. While food and beverage sector ranked first in terms of productivity measured by output labor ratio and skilled labor employment, it had the least proportion of permanent workers.

Table 3. 2: Characteristics of exporting and non-exporting firms, by industry (2000–2011)

	Export status	Share of firms	Total workers	Permanent Workers	Casual workers	Mean wage of Permanent workers	Mean wage of casual workers	Share of casual workers	Share of Skilled[25] workers	O/L	K/L
Food & beverage	Non-exporting	94.9	101.2	79.3	22.7	5125.1	2916.5	15.6	42.0	97695.7	52046.8
	Exporting	5.1	826.4	548.3	278.0	10873.4	5049.6	23.9	48.1	206453.9	139713.3
	All	100.0	138.5	103.7	35.8	5423.5	3087.4	16.1	42.4	103287.4	56554.1
Textile & apparel	Non-exporting	77.6	342.4	311.8	34.3	4239.5	2967.7	13.5	36.9	41958.3	26829.5
	Exporting	22.4	771.5	696.3	75.1	5776.4	5064.7	13.7	27.6	91167.0	31178.1
	All	100.0	438.5	398.8	43.5	4587.3	3497.9	13.5	34.8	52987.8	27804.2
Leather & footwear	Non-exporting	68.9	75.3	67.2	9.1	4121.2	2827.6	12.0	25.7	59774.0	103327.2
	Exporting	31.1	269.3	248.0	21.3	6861.1	3933.3	8.1	33.9	161938.2	60110.5
	All	100.0	135.6	124.1	12.9	4982.4	3250.9	10.8	28.3	91544.6	89887.8
All sectors	Non-exporting	88.5	128.8	107.4	22.6	4897.039	2916.1	14.9	39.5	86223.4	54790.1
	Exporting	11.5	586.7	469.2	117.5	7821.3	4701.0	14.7	36.6	156025.5	77071.3
	Proportion exporter /non-exporter		4.6	4.4	5.2	1.6	1.6	1.0	0.9	1.8	1.4
N	Non-exporting	3,899	3,899	3,857	3,899	3,857	1,833	3,899	3,848	3,899	3,899
	Exporting	507	507	507	507	507	310	507	507	507	507

Source: Own computation of CSA data

[25] They are "administrative and technical employees" which include the salaried directors and managers, technicians, superintendents, research workers, draftsmen and designers, engineers, chemists, architects, accountants, book-keepers, office machine operators, receptionists, sales men, delivery personnel, guards and other office staff while the "production workers" are those workers directly engaged in production i.e., persons engaged in fabricating, processing, assembling, maintenance, repair, janitorial, record keeping and other associated activities. This data is based on full time permanent workers only.

Table 3.3 shows employee status by firm size (based on the level of employment) as small (10-29), medium (30-99) and large (=>100). It shows that exporting is positively related to firm size, that is, the proportion of exporting firms increased as one moves from small to larger firms even if it declines over time. This could be due to scale economies associated with large firms. It also shows that casualization is positively related to size i.e. the proportion of casual workers is relatively high among large firms compared to medium to small firms. In other words, the number of full-time, long-term salaried employees seems to be decreasing, as the system evolves towards the employment of a diverse pool of workers who are non-standard forms of employment to cut on costs as the latter usually do not enjoy fringe benefits and other employment benefits. Likewise, the share of skilled workers and foreign-owned firms are characterized by increased with firm size but decline over time. That is why the proportion of women's employment is now rising with time as they are relatively unskilled and a cheap source of labor so that they are likely to be most affected by adverse changes in the labor market. In terms of gender, formal sector employment is male-dominated, and women currently constitute only about 29% in 2000 and 35% in 2010 of total labor force. The average wage and productivity have been a consistent rise in with the firm size and the time. Finally, even if the share of exporting firms increases with size, it declines with time.

Table 3. 3: Employees status by firm size and time

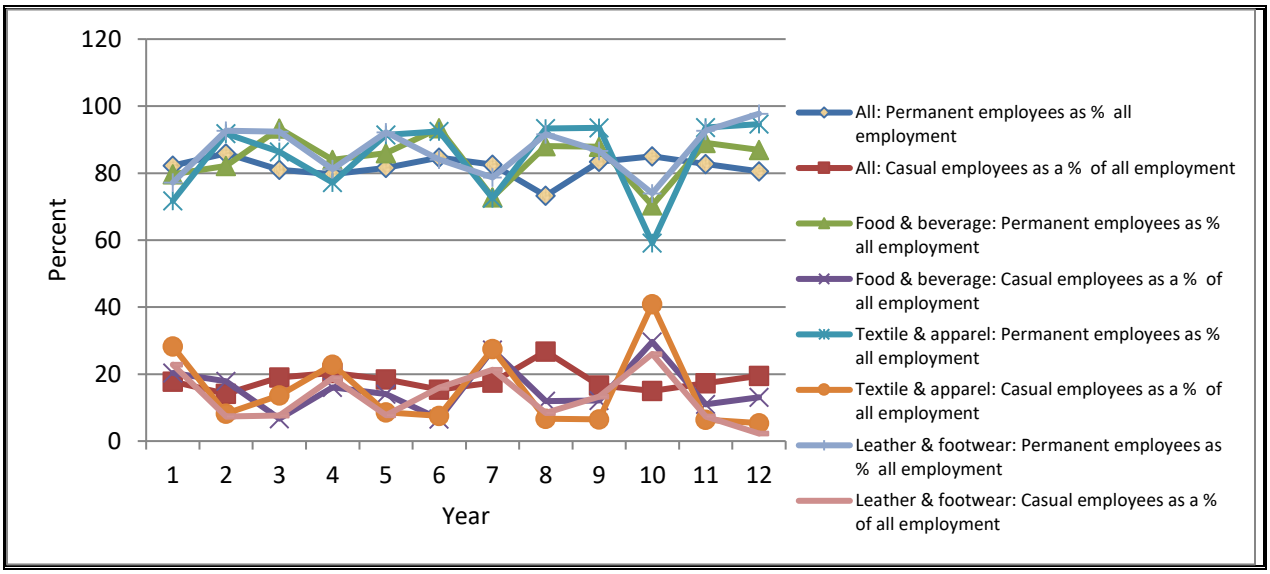
Year	Category	Total firms	Total workers	Share of casual workers	Average wage	Mean O/L	Share of female	Share of exporters	Share of skilled workers	Share of foreign owned
2000	Small	96	1644.9	9.4	2623.7	46532	28.3	0.0	35.1	2.0
	Medium	57	3162.8	12.7	4110.3	84029	28.4	17.5	37.5	3.5
	Large	94	56173.6	18.3	5538.2	104561	30.9	23.4	44.9	6.4
	All	247	60981.4	17.8	4075.9	77269	29.3	13.0	39.4	4.1
2004	Small	147	2484.8	18.7	2396.0	36092	33.2	0.0	33.4	2.7
	Medium	107	5844.0	19.0	3877.9	82655	31.9	8.4	39.2	4.7
	Large	106	57356.3	18.7	5930.1	93085	30.3	33.0	43.0	8.4
	All	360	65685.1	18.7	4567.9	66742	30.1	12.2	38.0	5.0
2010	Small	174	3101.3	8.8	3084.6	297223	34.9	4.6	36.7	1.7
	Medium	169	9278.5	15.0	4388.9	135442	33.7	7.1	32.6	4.1
	Large	146	70163.4	18.0	6562.7	113680	38.3	17.8	35.3	5.5
	All	489	82543.2	17.3	8132.1	186511	35.6	9.4	34.1	3.7

Source: Own computation of CSA data

The available data shows that during the sample period, overall employment has been increasing, and permanent workers are about four times as numerous compared to casual workers. In other words, casual employment as a proportion of total employment has been shown a constant trend which is an average of 18%, relative to regular or permanent employment for all sectors (see Figure

3.3). More importantly, the distribution of casual workers varied marginally by sector. Leather and tanning, take the lead by employing the highest proportion of permanent workers, which is about 87% during the sample period while the other two sectors, food & beverage and textile & apparel, have the same share of permanent workers which is about 84% on average in the same period.

Figure 3. 3: Casual and permanent employment as % of total employment



Source: Own computation of CSA data

3.5. Methods and Estimation Technique

Using the Cobb–Douglas production function and GMM estimation, this section investigates the impacts of Ethiopian's global engagement on workforce composition and earnings using firm-level data. The section starts with the model's specification and then presents the estimation method.

3.5.1. Model Specification

3.5.1.1. The impact of globalization on employment quality

The Cobb–Douglas production function is used to derive the employment equation and thus to deal with the impact of international trade on employment. This approach has been used by a few studies (Greenaway et al., 1999; Milner & Wright, 1998; Revenga, 1997) by using industry rather than firm-level data.

Accordingly, a Cobb-Douglas production function for a representative firm is assumed:

$$Q_{it} = A^{\lambda} K_{it}^{\alpha} L_{it}^{\beta} \quad \text{.....(1)}$$

Where i denotes firm, t denotes time, Q represents real output, A represents total factor productivity, K represents capital stock, L represents units of labor utilized, $\alpha \text{ and } \beta$ denote factor share coefficients, and λ allows for growth in efficiency in the production process.

A firm pursuing a profit maximizing strategy will choose the level of labor and capital, where the marginal revenue of labor equals the wage (*w*) and the marginal revenue of capital equal its user cost (*c*). Solving this system simultaneously to eliminate capital from the expression for firms' output yields the following equation:

$$Q_{it} = A^{\lambda} \left(\frac{\alpha L_{it}}{\beta} * \frac{w_i}{c} \right)^{\alpha} L_{it}^{\beta} \quad \text{.....(2)}$$

By taking logarithms to linearize and rearranging the above equation, we derive the firm's derived demand for labor as:

$$\ln L_{it} = \phi_0 + \phi_1 \ln\left(\frac{w}{c}\right) + \phi_2 \ln Q_{it} \quad \text{.....(3)}$$

$$where: \phi_0 = -(\lambda \ln A + \alpha \ln \alpha - \alpha \ln \beta)/(\alpha + \beta)$$

$$\phi_1 = -\alpha/(\alpha + \beta), \ \phi_2 = 1/(\alpha + \beta)$$

Following the previous studies at industry level as done by Greenaway et al. (1999) and Manda and Sen (2004) and at firm level (see Were (2011)), increased openness through export participation and technology transfer via FDI may promote technical efficiency of the production process. This is due to the pressures of competition in the international markets and knowledge spillovers from FDI-funded imports and other foreign contacts. Therefore, parameter A in the production function may be hypothesized to evolve over time in the following manner:

$$A_{it} = e^{\delta_0 T_i} EX_{it}^{\delta_1} FO_{it}^{\delta_2}, \quad \delta_0, \delta_1, \delta_2 > 0$$

Where T is time trend, EX is export ratio and FO is the inflows of FDI at the firm level to capture the degree of openness. Thus, Equation (3) rewrites as follows:

$$\ln L_{it} = \phi_0 + \phi_1 \ln w_{it} + \phi_2 \ln Q_{it} + \phi_3 EX_{it} + \phi_4 FO_{it} + \phi_5 Z_{it} + F_{location} + F_{time} + F_{\text{sector}} + (\mu_{it} + \varepsilon_i) \quad \text{.....(4)}$$

All variables – apart from dummies – are expressed in natural logarithms. L_{it} is total employment in firm i at time t, w_{it} is real average wage (computed as firm's total real wage bill divided by total employment) in firm i at time t and Q_{it} is real output in firm i at time t. We would expect the coefficient of wages to be negative $(\phi_1 < 0)$ and the coefficient of output to be positive $(\phi_2 < 0)$. Besides, EX_{it} and FO_{it} are the variable of interest to measure the degree of global engagement of firm i in time t and captured by a dummy covariates. The signs of ϕ_3 *and* ϕ_4 are uncertain as greater export orientation and FDI can lead to more employment intensity of production as firms substitute away from capital to labor (which usually would be the cheaper factor in a labor surplus economy like Ethiopia) to compete more effectively in world markets, but can also lead to productivity gains and labor shedding (Sasidharan, 2015).

Attention is also given to other explanatory variables (Z_{it}) such as the firm age, which expects to have positively related to their size and mode of operation (1= firm operates more than one shift and 0 otherwise) which is a proxy variable for production capacity. Arguably, more shifts can be taken as an indication of more capacity and hence more able to employ more workers. Location dummy, $F_{location}$, is included to capture its region-specific effect. It takes the value of one if the firm is situated in Addis Ababa (capital city) where larger and more technologically advanced firms and financial center are located, and zero otherwise. It is expected to have an employment enhancing effect through higher competitiveness. F_{time} *and* F_{sector} represent time and sector fixed effects, that might impact differently on the relationship between globalization and employment, are also controlled in the model to account for unobserved shocks that may affect the variables. Finally, the error term is composed of the idiosyncratic disturbance term (μ_{it}) and the time invariant firm fixed effect to account for unobservable firm-specific characteristics (ε_i).

One of the advantages of panel data is that it allows researchers to understand the dynamics of adjustment as many economic relationships are dynamic (Baltagi, 2008). In addition, the costs of labor adjustment and persistence in the employment evolution call for transforming the model from a static to a dynamic one, in order to take into account firm's attrition and delays in hiring/firing workers (see (Arellano & Bond, 1991; Greenaway et al., 1999; Getinet Haile et al., 2016; Lachenmaier & Rottmann, 2011). These dynamic relationships are characterized by the presence of lagged total employment (L_{it-1}), and it takes the following final extended form:

$$\ln L_{it} = \phi_0 + \gamma \ln L_{it-1} + \phi_1 \ln w_{it} + \phi_2 \ln Q_{it} + \phi_3 EX_{it} + \phi_4 FO_{it} + \phi_5 Z_{it} + F_{location} + F_{time} + F_{sector} + (\mu_{it} + \varepsilon_i) \quad .....(5)$$

Practically, labors are not a homogeneous factor of production since firms' employ workers on different terms and different skills. Thus, our study also uses the composition of the workforce (the number of casual and permanent workers) based on labor contract status that a worker holds, represents the 'empowerment' of employees to define labor (Rand & Torm, 2012; Were, 2011). This permits us to analyze the effect of trade variables on demand for different categories of labor.

The above empirical model is extended to capture this effect through defining a separate labor demand equation for each work group of casual and permanent workers. Equation (6) and (7) are therefore expressed for studying the effect on employment trends (*quantity effect*) for both types of labor within a dynamic specification of the following form:

$$\ln L_{it}^{c} = \phi_0 + \gamma \ln L_{it-1}^{c} + \phi_1 \ln w_{it}^{c} + \phi_2 \ln Q_{it} + \phi_3 EX_{it} + \phi_4 FO_{it} + \phi_5 Z_{it} + F_{location} + F_{time} + F_{sector} + (\mu_{it} + \varepsilon_i) \quad \text{.....(6)}$$

$$\ln L_{it}^{p} = \phi_0 + \gamma \ln L_{it-1}^{p} + \phi_1 \ln w_{it}^{p} + \phi_2 \ln Q_{it} + \phi_3 EX_{it} + \phi_4 FO_{it} + \phi_5 Z_{it} + F_{location} + F_{time} + F_{sector} + (\mu_{it} + \varepsilon_i) \quad \text{.....(7)}$$

Where L_{it}^{c} *and* L_{it}^{p} are respectively the numbers of casual and permanent workers of firm i at time t; whereas w_{it}^{c} *and* w_{it}^{p} are the real average wages of casual and permanent labor respectively. The other variables are defined in the same way as in Equation (5). The effect of trade liberalization on equation (6) is hypothesized to be indeterminate. On the one hand, it may be positive based on the argument that increased competitive pressures associated with exporting exacerbate the demand for casual workers, whereby firms seek low-cost. On the other hand, exporting firms may possibly employ a less proportion of casual workers if the technologies transferred through trade are biased in favor of skilled permanent labor.

Besides, the estimation of two-equation setting (as opposed to the alternative strategy for estimating a standard cost share single equation) allows for exploring the autoregressive employment dynamics of casual and permanent workers separately. Therefore, estimating equations (6) and (7) and testing the differences in coefficient magnitudes allow to assess the impact of technology and trade variables on relative employment quality, and permit to investigate the *relative* versus *absolute* quality bias (see Section 1). Absolute quality bias would appear when openness related variables have a positive and significant coefficient for permanent workers and negative or not significant coefficients for casual workers, while relative quality bias implies a faster increase of demand for permanent workers with respect to casual labors. In other words, absolute quality bias implies a diverging pattern between permanent and casual labor demand, while relative quality bias does not.

3.5.1.2. The Impact of globalization on Wages

In order to investigate the impact of global engagement on the wage differential, a basic dynamic specification controlling firm characteristics, following among the substantial number of studies (for example (Holtz-Eakin, Newey, & Rosen, 1988; Revenga, 1997)), is specified as follows:

$$\ln w_{it} = \phi_0 + \gamma \ln w_{it-1} + \phi_1 \ln L_{it} + \phi_2 \ln Q_{it-1} + \phi_3 EX_{it} + \phi_4 FO_{it} + \phi_5 Z_{it} + F_{location} + F_{time} + F_{\text{sector}} + (\mu_{it} + \varepsilon_i) \text{.....(8)}$$

To test their impacts on wage differential, thus studying the *price effect*, we also estimate two wage equations of each type of workers by following Meschi et al. (2016) and is presented as follows (where the variables are defined as in (6) and (7)).

$$\ln w_{it}^{c} = \phi_0 + \gamma \ln w_{it-1}^{c} + \phi_1 \ln L_{it}^{c} + \phi_2 \ln Q_{it-1} + \phi_3 EX_{it} + \phi_4 FO_{it} + \phi_5 Z_{it} + F_{location} + F_{time} + F_{\text{sector}} + (\mu_{it} + \varepsilon_i) \text{.....(9)}$$

$$\ln w_{it}^{p} = \phi_0 + \gamma \ln w_{it-1}^{p} + \phi_1 \ln L_{it}^{p} + \phi_2 \ln Q_{it-1} + \phi_3 EX_{it} + \phi_4 FO_{it} + \phi_5 Z_{it} + F_{location} + F_{time} + F_{\text{sector}} + (\mu_{it} + \varepsilon_i) \text{.....(10)}$$

Where w_{it}^{c} & w_{it}^{p} *and* w_{it-1}^{c} & w_{it-1}^{p} are the real average wages of casual and permanent workers and their corresponding lags, respectively. We used lagged real output of each firm, Q_{it-1}, to avoid endogeneity since wage can be seen as a component of firm's output (Meschi et al., 2016). The firm size, L_{it}, which proxies by total employment, is expected to have a positive relationship with the wage premium because workers in larger firms are paid higher wages (Idson & Oi, 1999). It has been shown that foreign engaged firms from tending to pay higher wages than domestic firms, probably due to the formers' greater use of technology (See for instance (Aitken, Harrison, & Lipsey, 1996; Brambilla et al., 2014)). Regarding firm-level factors Z_{it}, this study closely follows the model specification of A. B. Bernard et al. (1995). The location of a firm $(F_{location})$ may be an important determinant of wages, in part due to differences in labor market tightness and differences in the cost of living among regions. The year and industry dummies $(F_{time}$ *and* $F_{\text{sector}})$, which account respectively for the economy-wide demand shocks and industry-specific shocks that may have an impact on our results are also included in the analysis.

Table 3.4: Descriptive statistics of regression variables

Variables	N	Mean	Std. Dev.	Min	Max
Total Employment	4,388	179.57	475.02	10	11,972
Casual Employment	4,388	33.61	207.07	0	7,518
Permanent Employment	4,347	147.34	353.74	1	4,454
Total Average wage	4,389	4,367.23	4,346.33	102	91,070
Wage of Casual workers	2,138	3,015.28	4,439.40	0	44,281
Wage of Permanent workers	4,347	4,956.28	5,379.30	0	144,103
Output	4,388	15,900,000.00	50,800,000.00	1,895	1,240,000,000

Export Dummy	4,388	0.12	0.32	0	1
Foreign Ownership	4,388	0.05	0.21	0	1
No. of Shifts	4,388	0.39	0.49	0	1
Firm Age	4,388	16.23	17.14	0	97
Location Dummy	4,388	0.53	0.50	0	1

3.5.2. Estimation Method

Most of the previous empirical works for estimating dynamic employment and wage equations have used simple OLS and fixed effects regression analysis. However, these methods are confronted by the endogeneity and heterogeneity problem and the estimators are biased. In other words, the presence of firm-specific effects causes a correlation between the lagged dependent variables and the individual fixed effect (ε_i) which implies a violation of the assumption of strict exogeneity of the estimators in dynamic specification. This makes OLS, fixed effects, random effects, and feasible generalized least squares (FGLS) techniques to yield biased and inconsistent estimates (Baltagi, 2008; M. N. Harris & Mátyás, 2004; Hsiao, 1986). In particular, using the pooled OLS methodology would lead to upward bias (Hsiao, 1986) whereas the fixed effect estimator yields a downward bias (Nickell, 1981) for the lagged dependent variable in the presence of firm-specific effects and a dynamic specification. To deal with this problem, the most favored approaches to date that give unbiased and consistent results are IV and GMM. However, the present study has used the GMM estimator for two reasons. First, the GMM estimator is more efficient than the simple IV estimator if heteroscedasticity is present and it is no worse asymptotically than its counterpart if heteroscedasticity is not present (Baum, Schaffer, & Stillman, 2003). Second, since the IV method does not use all available moment conditions and it does not take into account the differences structure on the residual disturbances, its use may lead to consistent, but not necessarily efficient, estimates of the model's parameters (Baltagi, 2008).

Arellano and Bond (1991) have first utilized the first-differenced GMM (DIF-GMM) technique as an alternative to the Anderson and Hsiao (1982) approach which developed a formulation for obtaining consistent FE-IV estimators. In their model, the instrument matrix includes all previous level values of the lagged dependent variable, where they obtain the DIF-GMM estimator which helps to overcome the problem of endogeneity. As pointed out by Blundell and Bond (1998) and Bond, Hoeffler, and Temple (2001), however, the DIF-GMM estimator has been found to have poor finite sample properties, in terms of bias and imprecision, when (1) there is strong persistence in the time, where the lagged levels are weakly correlated with the differences in the explanatory variables and (2) if cross-section variability dominates time variability (Bond et al., 2001).

Later on, an improved panel data GMM called system GMM (SYS-GMM) method has been proposed by Arellano and Bover (1995) and has been fully developed by Blundell and Bond (1998)

by imposing additional moment conditions to perform an efficiency improvement to the DIF-GMM model. In particular, SYS-GMM estimator is deduced from the estimation of a system of two simultaneous equations, one in first differences (with lagged levels as instruments) which is similar to the GMM-DIFF estimator and the other in levels (with lagged first differences as instruments). This estimator is defined under extra moment restrictions that are available under quite reasonable conditions relating to the properties of the initial condition process. Exploiting these extra moment restrictions offers efficiency gains and permits the identification of the effects of time-invariant variables. Besides, this specification allows us to control for potential endogeneity problems, sectoral unobserved time-invariant heterogeneity and time effects (Blundell and Bond, 1998). Therefore, the SYS-GMM estimator is more appropriate than the DIF-GMM for our empirical model and is used as the main method for estimating the employment and wage equations.

In order to have a benchmark on the coefficients estimated using system-GMM and for proper robustness checking, we also estimate the employment and wage functions using pooled OLS and fixed effects. To take into account the biases of estimated input coefficients due to the heterogeneity of production technology across sectors, we also estimated the two functions at 2-ISIC digits level. The estimated coefficients of inputs are reported in Appendix 3.A**.** The validity of instruments is tested using a Sargan test of over identifying restrictions and Arellano-Bond test for autocorrelation.

3.6. Results

The results of our empirical analysis are reported in Tables 3.5, 3.6 and 3.7 below which presents the OLS, FE and SYS-GMM estimators for the total employment and wages and their corresponding decomposition equations. Despite the biases and inconsistency in the OLS and fixed effects estimations, their results are still useful for verifying the estimation results of SYS-GMM. The fixed effects estimator yields a downward bias (Nickell, 1981); whereas the OLS estimator produces upward-biased estimates for the lagged dependent variable in the presence of firm-specific effects and a dynamic specification (Hsiao, 1986).

As one can see in employment and wage equations (Table 3.5), the coefficients behave exactly as expected. The SYS-GMM shows a positive and significant value of the lagged total employment coefficient, further asserting the persistence in the time series and the presence in adjustment costs to changing employment level. The implication of this is that employers usually based their current employment decisions on the previous level of employment. The same holds true for the lagged real average wage coefficient on wage equation. That is, the value of the lagged dependent variables is large and statistically significant for both equations and lay between the upper bound of the OLS model and the lower bound of the fixed effects and this confirms the importance of the dynamic of the models and the chosen SYS-GMM methodology.

The other regressors also show positive coefficients reflecting employment and wage-enhancing effects of varying levels of significance. The coefficient of real output for employment equation and its lag for wage equation has the expected sign and is statistically significant at the 1 percent level in all specifications for both equations. On the contrary, the average wage coefficient shows a negative and significant value, which is consistent with the expected sign indicating a negative relationship between labor demand and wages. In other words, increases in output cause a rise of wages as firms take on more labor to meet their production needs, while expansions in employment independent of increased output generally cause a fall of wages. This result is also consistent with a study in Tunisia by Haouas, Yagoubi, and Heshmati (2005), and in India by Sasidharan (2015). Similarly, the positive sign of the capacity variable indicates that as the firm operates more than one shift, the demand for labor rises. On the contrary, the firm's location doesn't matter on labor demand and wage wherever the firm located. Finally, firms with age are also found to have an employment and wage-enhancing effect.

The results show that the estimated coefficient of exports is positive and statistically significant at conventional levels and indicating that being exporter additionally contributes to job creation for Ethiopian's abundant labor force, thus reducing its unemployment level. Besides, export participation may help firms to expand their markets (Van Biesebroeck, 2005), and then firms need more laborers to meet the expansion in market demand. Similarly, a positive effect of exports on wage structure is compatible with the hypothesis that the increase in profits generated by achieving a competitive position in export markets does generate higher wages. The estimated coefficient of the foreign ownership variable is positive and significant, albeit being weakly significant, indicating its contribution to employment and wage growth in the manufacturing sector. Its magnitude and significance level are; however, lower than that for the exports variable which could be due to the employment and wage multiplier for FDI are not as big as that for exports.

Table 3. 5: Regression results from the total employment and wage equations

	Employment equations			Wage equations		
	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM
Lagged Employment	0.614***	0.218***	0.250***			
	(0.012)	(0.014)	(0.063)			
Real Average Wage	-0.165***	-0.186***	-0.311***			
	(0.017)	(0.018)	(0.057)			
Real Output	0.221***	0.268***	0.248***			
	(0.008)	(0.009)	(0.034)			
Employment				-0.099***	-0.024*	-0.094***
				(0.012)	(0.013)	(0.043)
Lagged Real Average				0.605***	0.092***	0.131***
Wage				(0.014)	(0.016)	(0.044)
Lagged Real output				0.207***	0.130***	0.093***

				(0.008)	(0.009)	(0.024)
Export Dummy	0.172***	0.195***	0.671***	-0.038	0.156***	0.489**
	(0.036)	(0.042)	(0.256)	(0.035)	(0.039)	(0.140)
Foreign Dummy	0.091*	0.090*	0.513*	0.107**	0.173***	0.132*
	(0.047)	(0.054)	(0.376)	(0.049)	(0.050)	(0.097)
No. of Shifts Dummy	0.086***	0.065**	0.157***	0.001	-0.034	0.020
	(0.022)	(0.023)	(0.036)	(0.022)	(0.022)	(0.031)
Firm Age	0.073***	0.105***	0.210***	0.030***	0.032**	0.066***
	(0.011)	(0.014)	(0.036)	(0.011)	(0.014)	(0.024)
Location Dummy	0.076***	0.091**	0.021	0.156***	-0.013	-0.020
	(0.022)	(0.033)	(0.069)	(0.023)	(0.032)	(0.048)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	No	Yes	Yes	No	Yes
Observations	4,388	4,388	4,388	4,388	4,388	4,388
No. of firms	818	818	818	818	818	818
No. of instruments			94			99
AR(2)			0.275			0.304
Hansen test			0.173			0.224

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

As mentioned above, we carry out the same exercise by classifying the industries into three sub-groupings. Results reported in Appendix C2.1. In all of the separate regression the lagged employment, real output, firm age, and export participation have a positive and statistically significant effect on employment level which is similar to the combined sector as a whole. A rise in the average wage rate has a decline while the foreign ownership has a raising effect on the employment demand but not in the leather & tanning sector. Finally, the diagnostic statistics, which are reported in the tables, are satisfactory in all cases. The Sargan test does not reject the null hypothesis implies the over-identifying restrictions or instruments used in the SYS-GMM are valid. The null hypothesis of no second-order autocorrelation not rejected. Thus, specification tests support the overall validity of the model.

The second focus of this paper is to address whether differential labor demand and wage-enhancing effect exist in the employment and wage of casual and permanent workers with separate regressions as reported in Table 3.6 and 3.7. It shows both types of workers exhibit persistence as the change of employment and wage depends significantly on its lagged values. This suggests that the dynamic of the models is important. Also, the magnitude of this two coefficient value of the two groups of equations obtained from SYS-GMM estimation lies within the upper and lower bounds set by the OLS and FE estimators, respectively.

Table 3. 6: Employment equations for casual and permanent workers

	Casual workers equation			Permanent workers equation		
	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM
Lagged casual workers	0.492***	0.079**	0.202***			
	(0.024)	(0.033)	(0.055)			
Casual workers Wage	-0.341***	-0.318***	-0.221**			
	(0.034)	(0.040)	(0.107)			
Lagged permanent				0.603***	-0.001	0.201***
Workers				(0.012)	(0.020)	(0.045)
Permanent workers wage				-0.240***	-0.217***	-0.241***
				(0.014)	(0.022)	(0.051)
Real Output	0.278***	0.197***	0.188***	0.219***	0.249***	0.300***
	(0.023)	(0.045)	(0.074)	(0.008)	(0.013)	(0.029)
Export Dummy	0.278**	0.206	0.112	0.239***	0.086	0.582**
	(0.102)	(0.150)	(0.220)	(0.039)	(0.052)	(0.155)
Foreign Dummy	-0.157	-0.528***	-0.110	0.132**	0.064	0.121*
	(0.132)	(0.195)	(0.348)	(0.052)	(0.066)	(0.191)
No. of Shifts Dummy	0.045	-0.043	0.295**	0.060**	0.041	0.108***
	(0.076)	(0.098)	(0.124)	(0.024)	(0.027)	(0.036)
Firm Age	0.060*	0.144	0.166***	0.080***	0.091***	0.191***
	(0.001)	(0.098)	(0.068)	(0.012)	(0.025)	(0.031)
Location Dummy	-0.017	0.584*	-0.221	0.098***	-0.020	0.112*
	(0.078)	(0.312)	(0.152)	(0.023)	(0.085)	(0.066)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	No	Yes	Yes	No	Yes
Observations	2,138	2,138	2,138	4,347	4,347	4,347
No. of firms	608	608	608			818
No. of instruments			123			134
AR(2)			0.735			0.971
Hansen test			0.978			0.165

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

The SYS-GMM coefficient values of the employment equations reveal that the output and wages have the expected signs and are statistically significant for both groups of workers. That is, the expansion of production raises the demand for both types of labor; whereas increases in average wage rates lower the employment level of both types. The coefficient value with permanent workers has a slightly higher magnitude albeit there is no significant difference between these two values of output as we can see from t-test result (refer to Table 3.8) and thus output does not entail a relative quality bias in terms of employment. The average wage for casual workers has higher coefficient, which probably implied that the demand for casual workers is more elastic given the ease with which such workers can be substituted vis-a-vis their permanent counterparts. The

capacity (number of shifts) variable shows similar results, positive and significant for both casual and permanent labors, but this increase seems to be higher for casual workers. However, in this case also, no conclusion can be made regarding the presence of a relative quality bias as the t-test for the significance of the difference between the two values is insignificant (see Table 3.8). Firm age also shows a positive and significant result for both groups of workers, but no statistical significant difference between the two coefficients. This doesn't assert the existence of relative quality bias effect. Firms situated at the capital city are obtained to have an employment enhancing effect for permanent workers but not for casual workers. This effect has also absolute quality bias effect which explained by the statistically significant difference in the two coefficients and hence firms located in the capital region hire more permanent and less casual workers' vis-a-vis their counterparts in other regions. Hence, full-time or long-term contracts with employees may be the preferred choice for firms in the capital city.

The exporting firms[26] and those with a share of foreign ownership have significant effects only for permanent workers and witnessed an absolute quality bias effect. This indicates that export activities of firms and presence of foreign ownership increase the employment of long-term salaried employees, while do not significantly affect the employment of casual workers. This, in turn, improves the empowerment of workers through allowing them to enjoy the associated benefits of being legal. Besides, since employees with permanent employment contracts are likely to be more skilled, technology transfer via international market involvement appears in Ethiopia which supports the learning by exporting hypothesis[27]. In other words, this is likely to imply that technology transfers embodied in trade flows bring productivity improvements through obtaining efficiency gains, and acquiring knowledge of international best practices (Vivarelli, 2014), which may, in turn, affect the employment's level and composition. Positive and significant results for this variable would indicate that exporters within the Ethiopian manufacturing sector are indeed benefitting from this channel of technology transfer. Therefore, the employment enhancing effect of export variable and foreign ownership observed in the total employment equation stems largely from the effect on the higher demand for permanent labors.

Looking at Table 3.7 also reports the findings for the two types of workers' wage equations. The estimated coefficients of the real output and employment have the expected signs and also in line with theoretical priors. Increases in firm output raise the wage for both types of workers, with a slightly higher magnitude for permanent workers with a statistical significant difference between the two coefficients, and implies relative quality bias (see Table 3.8). Whereas increases in labor demand for a specific category of workers turn out to be negatively correlated with the wage rate of the corresponding category. Coming to other characteristics, shift variable has a positive, but

[26] The t-test for the difference between the two coefficients of this variable is not found to be statistically significant due to the coefficient for casual workers being not significant (see table 3.8).

[27] It is related with the revealed quality biased impact of exporting which encourages hiring more permanent which are relatively more skilled than casual workers as a response to a more sophisticated foreign demand and a tougher international competition.

weakly significant effect on the wage of casual workers. Firm age has a widening wage differential effect in favor of permanent worker's wage and also has an absolute quality bias effect (see table 3.8). Location doesn't matter for both groups of worker wage. We also see that foreign ownership magnify the wage gap between casual and permanent workers. In particular, it has a positive significant effect on permanent works, while does not affect the casual worker's wage, and thus widening wage inequality. Looking at the export participation, we obtain a positive significant effect on the wage of both groups of workers. In particular, when the EX dummy turns to 1, wages of permanent workers increase by almost 40%, and those of casual workers by almost 34% but the gap isn't statistically significant (see table 3.8). In sum, the resulting technological transfer and thus possibly productivity gains from opening up to international trade have a worrying effect on workers' quality dispersion and wage differentials

To further investigate the impact of global engagement on the employment quality across sectors, we also estimated the two employment quality equations at 2-ISIC digits level. The estimated coefficients for casual and permanent workers are reported respectively in Appendix C2.2 and C2.3. In all of the separate regression the lagged employment and real output have a positive and the statistical significance effect of each type of employment regardless of model choices as it observed in the combined sector result. The labor demand regardless of its quality declines with a rise in wage rate but not for permanent workers in the leather & tanning sector in which it has insignificant effect. Lastly, a positive effect of export participation is observed in food & beverages and leather & tanning industries for permanent workers, but there is no significant association with the employment of casual workers in all sectors. Likewise, a positive association is witnessed between foreign ownership and permanent workers in food & beverages sector, but not for casual workers in all sectors. This is almost corroborated our findings obtained from the combined sector. Again, the Sargan test for instrumental validity is satisfied and the Arellano–Bond test for the existence of second-order autocorrelation cannot reject the null hypothesis that the residuals have no second-order correlation.

Table 3. 7: Wage equations for casual and permanent workers

	Casual Workers wage equation			Permanent Workers wage equation		
Variable	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM
Lagged casual workers wage	0.408***	0.217***	0.153***			
	(0.027)	(0.029)	(0.074)			
Casual workers	-0.199***	-0.167***	-0.197***			
	(0.019)	(0.019)	(0.057)			
Permanent workers				-0.080***	-0.014	-0.090*
				(0.012)	(0.013)	(0.050)
Lagged Permanent workers				0.640***	0.147***	0.241***
Wage				(0.014)	(0.017)	(0.113)
Lagged Real Output	0.301***	0.186***	0.140***	0.188***	0.130***	0.158**
	(0.015)	(0.019)	(0.058)	(0.008)	(0.009)	(0.028)

Export Dummy	-0.036	0.178**	0.345**	-0.049	0.157***	0.405**
	(0.080)	(0.084)	(0.277)	(0.038)	(0.040)	(0.179)
Foreign Dummy	-0.089	0.018	-0.045	0.111**	0.165***	0.496**
	(0.108)	(0.108)	(0.522)	(0.049)	(0.051)	(0.247)
No. of Shifts Dummy	0.073	0.115*	0.164*	-0.003	-0.035	0.020
	(0.061)	(0.060)	(0.086)	(0.023)	(0.022)	(0.034)
Firm Age	-0.057**	-0.063**	-0.033	0.025***	0.032***	0.065***
	(0.028)	(0.029)	(0.088)	(0.011)	(0.014)	(0.026)
Location Dummy	0.209***	-0.139**	0.046	0.141***	0.033	-0.069
	(0.064)	(0.0.65)	(0.166)	(0.023)	(0.031)	(0.053)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	No	Yes	Yes	No	Yes
Observations	2,138	2,138	2,138	4,347	4,347	4,347
No. of firms	608	608	608	818	818	818
No. of instruments			127			94
AR(2)			0.250			0.682
Hansen test			0.160			0.111

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

Table 3.8: t-statistic for comparing coefficients of the two equations of employment and wage

Variables	Labor demand equation	Wage equation
Real output	2.05	15.85***
Export Dummy	0.13	0.03
Foreign ownership	5.07**	4.12**
No. of shifts	0.08	1.00
Firm age	0.39	5.42**
Location Dummy	3.2*	0.65

***, **, and * indicate the statistical significance at the 1, 5, and 10 %, respectively

3.7. Concluding Remarks

This study aimed to investigate empirically how labor demand and wages in manufacturing industries is affected by international trade involvement within the Ethiopian manufacturing sector over the period 2000–2011. In order to determine these differential responses to trade liberalization, we estimate dynamic models of employment and wages using a panel data estimation technique by using alternative econometric estimators. The study provides some key findings as follows.

Firstly, firms' international exposure has a positive contribution to employment creation and wage growth in Ethiopian manufacturing. This affirms the fact that Ethiopian's exports are more labor intensive and this has mitigated the country's labor surplus or reduces the unemployment level. In other words, integration into the international market has generated new jobs for workers with a

higher wage and may play in shaping the demand for labor in a developing country like Ethiopia. Thus, the government should give due attention to attract investors and to increase exports through designing different incentives and enhancement of infrastructure quality, opening industry parks, creating a favorable investment climate with the requisite credit and financial infrastructure, among others, to be more beneficiary.

Secondly, trade and foreign ownership are found to have an absolute quality-bias effect on employment which affirms the presence of learning by exporting on the Ethiopian manufacturing sector. This is explained by the employment of long-term salaried employees, which improves the empowerment of workers. This in turn helps the low skilled and/or casual workers who are vulnerable to income shocks if they lose their jobs due to unsecure employment contracts. Besides, this suggests that the effect of exporting activity and foreign ownership on total firm-level employment is largely the result of its effect on permanent labor. Thus, this also needs to bring more quality workers via designing appropriate economic policies which able to couple trade openness with training and education policies targeted to produce a qualified labor supply in line with the demand of employers. These measures would allow the country to deepen its participation in global networks and strengthen its competitive position to take advantage of the opportunities arising from increasing globalization, openness and liberalized markets. Besides, proximity to the capital city is found to lead to an absolute quality bias for derived labor demand in favor of permanent workers. Similarly, a positive and significant relationship was found between level of employment and output in the sector. This underscores the fact that efforts to improve the level of production in the sector via infrastructural development, especially power supply will boost productivity, which will, in turn, enhance the level of employment generation in the sector.

Finally, employees in foreign-owned firms are paid higher wages for permanent workers and worsen income distribution by increasing wage differentials between the two types of workers which in turn assures the presence of quality differences. Exporters, on the other hand, have a positive significant effect on the wage of both groups of workers but no significant difference.

Appendix C

Appendix C.1: Result of employment and its categories for the three 2-digit subsectors

Appendix C.1.1: Employment equations for the three 2-digit subsectors

Total Employment	Food and Beverages			Textile and Apparel			Leather and Tanning		
	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM
Lagged Employment	0.597***	0.015	0.298***	0.690***	0.127**	0.470***	0.395***	-0.017	0.084
	(0.015)	(0.023)	(0.076)	(0.028)	(0.053)	(0.099)	(0.037)	(0.054)	(0.125)
Real Average Wage	-0.174***	-0.251***	-0.345***	-0.167**	-0.196***	-0.249*	0.246	-0.042	-0.090
	(0.017)	(0.018)	(0.081)	(0.053)	(0.058)	(0.137)	(0.052)	(0.066)	(0.144)
Real Output	0.222***	0.184***	0.235***	0.218***	0.332***	0.309***	0.246***	0.259***	0.270***
	(0.009)	(0.013)	(0.037)	(0.022)	(0.029)	(0.087)	(0.024)	(0.034)	(0.071)
Export Dummy	0.237***	0.182**	0.523**	0.086	0.222***	0.692**	0.234***	0.130	0.308
	(0.055)	(0.078)	(0.234)	(0.074)	(0.081)	(0.311)	(0.078)	(0.103)	(0.323)
Foreign Dummy	0.131**	0.115	0.385*	0.031*	0.157	0.038*	-0.063	-0.029	0.075
	(0.061)	(0.079)	(0.326)	(0.123)	(0.133)	(0.598)	(0.089)	(0.151)	(0.182)
No. of Shifts Dummy	0.086***	0.086***	0.138***	-0.048	-0.099	-0.130	0.113*	-0.001	0.096
	(0.025)	(0.028)	(0.038)	(0.080)	(0.075)	(0.204)	(0.064)	(0.074)	(0.082)
Firm Age	0.005***	0.003*	0.012***	0.005**	-0.003	0.012**	0.010***	0.002	0.022***
	(0.001)	(0.002)	(0.003)	(0.002)	(0.004)	(0.005)	(0.002)	(0.007)	(0.005)
Location Dummy	0.073**	-0.049	-0.040	0.031	0.468*	0.070	0.098	-0.365*	-0.021
	(0.025)	(0.089)	(0.074)	(0.064)	(0.282)	(0.131)	(0.062)	(0.213)	(0.138)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Observations	3098	3098	3098	638	638	638	656	656	656
No. of firms	599	599	599	107	107	107	112	112	112
No. of instruments			91			90			92
AR (2)			0.402			0.853			0.395
Hansen test			0.168			0.797			0.862

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

Appendix C.1.2: Casual workers equations for the three 2-digit subsectors

Casual workers	Food and Beverages			Textile and Apparel			Leather and Tanning		
	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM
Lagged casual workers	0.514***	0.080**	0.301***	0.460***	0.160*	0.387***	0.238***	-0.028	0.188*
	(0.028)	(0.040)	(0.078)	(0.057)	(0.072)	(0.105)	(0.098)	(0.106)	(0.206)
Casual workers Wage	-0.320***	-0.256***	-0.255**	-0.434***	-0.546***	-0.352**	-0.489***	-0.917***	-0.340*
	(0.039)	(0.046)	(0.122)	(0.074)	(0.086)	(0.238)	(0.143)	(0.185)	(0.598)
Real Output	0.281***	0.193***	0.306***	0.325***	0.193	0.345**	0.153**	0.614***	0.136*
	(0.026)	(0.053)	(0.075)	(0.055)	(0.091)	(0.148)	(0.096)	(0.174)	(0.226)
Export Dummy	0.394***	0.590**	0.627*	0.401	-0.002	0.009	-0.067	-0.085	0.408
	(0.140)	(0.207)	(0.338)	(0.187)	(0.249)	(0.403)	(0.347)	(0.473)	(0.486)
Foreign Dummy	-0.109	-0.474**	-0.169	-0.704**	-1.455***	-0.510	-0.051)	-0.356	-0.768
	(0.162)	(0.230)	(0.247)	(0.321)	(0.421)	(0.884)	(0.388)	(0.896)	(1.298)
No. of Shifts Dummy	0.102	0.053	0.188	-0.242*	-0.252	-0.306	0.340	0.261	-0.895
	(0.085)	(0.123)	(0.112)	(0.187)	(0.204)	(0.371)	(0.366)	(0.572)	(0.986)
Firm Age	-0.000	0.001	0.002	0.013***	0.005	0.014**	0.027***	0.049*	0.032***
	(0.002)	(0.009)	(0.004)	(0.005)	(0.017)	(0.006)	(0.007)	(0.028)	(0.010)
Location Dummy	-0.042	0.541	-0.071	-0.062	2.927***	-0.090	0.019	0.297	-0.392
	(0.094)	(0.381)	(0.151)	(0.171)	(0.901)	(0.190)	(0.281)	(0.853)	(0.517)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Observations	3098	3098	3098	638	638	638	656	656	656
No. of firms	599	599	599	107	107	107	112	112	112
No. of instruments			210			131			111
AR(2)			0.547			0.969			0.693
Hansen test			1.000			1.000			1.000

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

Appendix C.1.3: Permanent workers equations for the three 2-digit subsectors

Permanent workers	Food and Beverages			Textile and Apparel			Leather and Tanning		
	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM
Lagged Permanent workers	0.539***	-0.019	0.245***	0.704***	0.068	0.644***	0.345***	0.011	0.147*
	(0.015)	(0.023)	(0.048)	(0.026)	(0.059)	(0.077)	(0.038)	(0.052)	(0.086)
Permanent workers Wage	-0.137***	-0.218***	-0.100	-0.313***	-0.143**	-0.299*	-0.013	-0.160**	-0.088
	(0.019)	(0.020)	(0.069)	(0.066)	(0.072)	(0.153)	(0.060)	(0.077)	(0.124)
Real Output	0.235***	0.224***	0.310***	0.229***	0.350***	0.338***	0.263***	0.271***	0.319***
	(0.010)	(0.014)	(0.030)	(0.025)	(0.031)	(0.079)	(0.028)	(0.041)	(0.057)
Export Dummy	0.254***	0.238***	0.480**	0.057	-0.248***	0.147	0.319***	0.335**	0.373*
	(0.061)	(0.083)	(0.173)	(0.081)	(0.089)	(0.173)	(0.090)	(0.124)	(0.206)
Foreign Dummy	0.164***	0.207***	0.084	0.072	-0.147	-0.012	-0.079	-0.085	-0.158
	(0.067)	(0.084)	(0.146)	(0.133)	(0.146)	(0.201)	(0.103)	(0.182)	(0.175)
No. of Shifts Dummy	0.053**	0.062*	0.078*	-0.001	-0.037	-0.183	0.158**	0.010	0.126
	(0.027)	(0.031)	(0.041)	(0.086)	(0.083)	(0.122)	(0.074)	(0.089)	(0.102)
Firm Age	0.006***	0.002	0.009***	0.003*	-0.002	0.004	0.011***	0.002	0.018***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.008)	(0.004)
Location Dummy	0.132***	-0.014	0.177***	0.063	0.426	0.133	0.134*	-0.293	0.087
	(0.028)	(0.097)	(0.066)	(0.071)	(0.310)	(0.120)	(0.072)	(0.255)	(0.108)
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Observations	3098	3098	3098	638	638	638	656	656	656
No. of firms	599	599	599	107	107	107	112	112	112
No. of instruments			226			196			190
AR(2)			0.929			0.750			0.508
Hansen test			0.898			1.000			1.000

Notes: We report *P*-values for all test statistics. Robust standard error in parentheses, ***, **, * indicate statistical significance at 1%, 5% and 10 % level respectively.

Appendix C.2: Variable description

All variables in monetary terms adjusted to the constant price of the year 2000

Variables	Description
Total employment	Total number of permanent and adjusted casual employees
Casual workers	Number of casual workers
Permanent workers	Number of permanent workers
Real average wage	Ratio of total wage of employees to total number of employees
Casual workers wage	Real average wages of the casual workers
Permanent workers wage	Real average wages of the permanent workers
Real output	Total sales deflated by LMMI deflator obtained from MoFED
Exporter	1 if firms participate in exporting market, 0 otherwise
Foreign ownership	1 for firms involve >50% foreign capital, 0 otherwise
Firm age	Number of years since established
Fixed-Effect Dummies	
Sector dummies:	There are three sector dummies, including Food and Beverage, Textiles and Apparel, Leather and Tanning products in which the last as the reference group
Location dummy:	1 if situated in Addis Ababa, 0 otherwise

Reference

Abegaz, B. (1999). Aid and reform in Ethiopia. *background paper for WORLD BANK (2001), available at http://www. worldbank. org/research/aid/africa/intro. htm*.

Abraham, F., & Brock, E. (2003). Sectoral employment effects of trade and productivity in Europe. *Applied Economics, 35*(2), 223-238.

AfDB. (2014). Annual Report.

AfDB, O., & Undp, U. (2012). African Economic Outlook 2012 *Country Note Burundi*.

Aggrey, N., Eliab, L., & Joseph, S. (2010). Export Participation and Technical Efficiency in East African Manufacturing Firms. *Current Research Journal of Economic Theory, 2*(2), 62-68.

Aitken, B., Harrison, A., & Lipsey, R. E. (1996). Wages and foreign ownership A comparative study of Mexico, Venezuela, and the United States. *Journal of international Economics, 40*(3-4), 345-371.

Almeida, R., & Fernandes, A. M. (2008). Openness and technological innovations in developing countries: evidence from firm-level surveys. *The Journal of Development Studies, 44*(5), 701-727.

Altăr, M., & Cazacu, A.-M. (2016). Testing Self-Selection And Learning By Exporting Hypotheses. The Case Of Romania. *ECONOMIC COMPUTATION AND ECONOMIC CYBERNETICS STUDIES AND RESEARCH, 50*(1), 5-22.

Álvarez Espinoza, R., & Görg, H. (2005). Multinationals and plant exit: evidence from Chile: Discussion paper series/Forschungsinstitut zur Zukunft der Arbeit.

Alvarez, R., & Lopez, R. A. (2005). Exporting and performance: evidence from Chilean plants. *Canadian Journal of Economics/Revue canadienne d'économique, 38*(4), 1384-1400.

Alvarez, R., & Vergara, S. (2013). Trade exposure, survival and growth of small and medium-size firms. *International Review of Economics & Finance, 25*, 185-201.

Anderson, T. W., & Hsiao, C. (1982). Formulation and estimation of dynamic models using panel data. *Journal of econometrics, 18*(1), 47-82.

Andersson, L. (2001). Openness and total factor productivity in Swedish manufacturing, 1980–1995. *Review of World Economics, 137*(4), 690-713.
Andrews, M. J., Bellmann, L., Schank, T., & Upward, R. (2007). The takeover and selection effects of foreign ownership in Germany: an analysis using linked worker-firm data.
Arcelus, F. J., & Arocena, P. (2000). Convergence and productive efficiency in fourteen OECD countries: a non-parametric frontier approach. *International Journal of Production Economics, 66*(2), 105-117.
Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277-297.
Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics, 68*(1), 29-51.
Arnold, J. M., & Hussinger, K. (2005). Export behavior and firm productivity in German manufacturing: a firm-level analysis. *Review of World Economics, 141*(2), 219-243.
Artuç, E., Chaudhuri, S., & McLaren, J. (2010). Trade shocks and labor adjustment: A structural empirical approach. *The American Economic Review, 100*(3), 1008-1045.
Aw, B. Y., Chung, S., & Roberts, M. J. (2000). Productivity and turnover in the export market: micro-level evidence from the Republic of Korea and Taiwan (China). *The World Bank Economic Review, 14*(1), 65-90.
Aw, B. Y., Roberts, M. J., & Winston, T. (2007). Export market participation, investments in R&D and worker training, and the evolution of firm productivity. *The world economy, 30*(1), 83-104.
Baldwin, J., & Yan, B. (2011). The death of Canadian manufacturing plants: heterogeneous responses to changes in tariffs and real exchange rates. *Review of World Economics, 147*(1), 131-167.
Baldwin, J. R., & Gu, W. (2003). Export-market participation and productivity performance in Canadian manufacturing. *Canadian Journal of Economics/Revue canadienne d'économique, 36*(3), 634-657.
Baldwin, R. E. (1995). The effects of trade and foreign direct investment on employment and relative wages: National Bureau of Economic Research.
Balsvik, R., & Haller, S. A. (2010). Picking “lemons” or picking “cherries”? Domestic and foreign acquisitions in Norwegian manufacturing. *The Scandinavian Journal of Economics, 112*(2), 361-387.
Baltagi, B. (2008). *Econometric analysis of panel data*: John Wiley & Sons.
Bandick, R., & Karpaty, P. (2007). *Foreign acquisition and employment effects in Swedish manufacturing*: University of Nottingham.
Barthel, F., Busse, M., & Osei, R. (2011). The characteristics and determinants of FDI in Ghana. *The European Journal of Development Research, 23*(3), 389-408.
Basile, R. (2001). Export behaviour of Italian manufacturing firms over the nineties: the role of innovation. *Research policy, 30*(8), 1185-1201.
Baum, C. F., Schaffer, M. E., & Stillman, S. (2003). Instrumental variables and GMM: Estimation and testing. *Stata journal, 3*(1), 1-31.
Bernard, A., & Jansen, J. (1999). Exporting and Productivity,‘National Bureau of Economic Research Working Paper: 7135.
Bernard, A., & Jensen, J. B. (2005). Firm Structure, Multinationals, and Manufacturing Plant Deaths.
Bernard, A. B., Eaton, J., Jensen, J. B., & Kortum, S. (2003). Plants and productivity in international trade. *The American Economic Review, 93*(4), 1268-1290.
Bernard, A. B., & Jensen, J. B. (1999a). Exceptional exporter performance: cause, effect, or both? *Journal of international Economics, 47*(1), 1-25.
Bernard, A. B., & Jensen, J. B. (1999b). Exporting and productivity: National bureau of economic research.

Bernard, A. B., & Jensen, J. B. (1999c). Exporting and productivity.
Bernard, A. B., & Jensen, J. B. (2004). Why some firms export. *Review of Economics and Statistics, 86*(2), 561-569.
Bernard, A. B., & Jensen, J. B. (2007). Firm structure, multinationals, and manufacturing plant deaths. *The Review of Economics and Statistics, 89*(2), 193-204.
Bernard, A. B., Jensen, J. B., & Lawrence, R. Z. (1995). Exporters, jobs, and wages in US manufacturing: 1976-1987. *Brookings papers on economic activity. Microeconomics, 1995*, 67-119.
Bernard, A. B., & Sjoholm, F. (2003). Foreign owners and plant survival: National Bureau of Economic Research.
Bernard, A. B., & Wagner, J. (1997a). Exports and success in German manufacturing. *Weltwirtschaftliches Archiv, 133*(1), 134-157.
Bernard, A. B., & Wagner, J. (1997b). Exports and success in German manufacturing. *Review of World Economics, 133*(1), 134-157.
Bernard, A. B., & Wagner, J. (2001). Export entry and exit by German firms. *Weltwirtschaftliches Archiv, 137*(1), 105-123.
Biggs, T., Shah, M., Srivastava, P., & Mundial, B. (1995). *Technological capabilities and learning in African enterprises*: World Bank Washington^ eD. CDC.
Bigsten, A., Collier, P., Dercon, S., Fafchamps, M., Gauthier, B., Willem Gunning, J., . . . Söderbom, M. (2004). Do African manufacturing firms learn from exporting? *Journal of development studies, 40*(3), 115-141.
Bigsten, A., & Gebreeyesus, M. (2009). Firm productivity and exports: Evidence from Ethiopian manufacturing. *The Journal of Development Studies, 45*(10), 1594-1614.
Bigsten, A., Gebreeyesus, M., Siba, E., & Söderbom, M. (2011). The effects of agglomeration and competition on prices and productivity: Evidence for Ethiopia's manufacturing sector. *Center for the Study of African Economies Working Paper, WPS/2011, Oxford, UK*.
Bigsten, A., & Söderbom, M. (2006). What have we learned from a decade of manufacturing enterprise surveys in Africa? *The World Bank Research Observer, 21*(2), 241-265.
Biscourp, P., & Kramarz, F. (2007). Employment, skill structure and international trade: Firm-level evidence for France. *Journal of international Economics, 72*(1), 22-51.
Blalock, G., & Gertler, P. J. (2004). Learning from exporting revisited in a less developed setting. *Journal of Development Economics, 75*(2), 397-416.
Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics, 87*(1), 115-143.
Boly, A., Coniglio, N. D., Prota, F., & Seric, A. (2014). Diaspora investments and firm export performance in selected sub-Saharan African countries. *World Development, 59*, 422-433.
Bond, S. R., Hoeffler, A., & Temple, J. R. (2001). GMM estimation of empirical growth models.
Bosco Sabuhoro, J., Larue, B., & Gervais, Y. (2006). Factors determining the success or failure of Canadian establishments on foreign markets: A survival analysis approach. *The International Trade Journal, 20*(1), 33-73.
Bover, O., & Arellano, M. (1997). Estimating dynamic limited dependent variable models from panel data. *investigaciones economicas, 21*(2), 141-165.
Brambilla, I., Depetris-Chauvin, N., & Porto, G. G. (2014). Wage and Employment Gains from Exports: Evidence from Developing Countries: Working paper, African Center for Economic Transformation (ACET).
Brännlund, R., Nordström, J., Stage, J., & Svedin, D. (2016). Foreign ownership and its effects on employment and wages: the case of Sweden. *IZA Journal of European Labor Studies, 5*(1), 8.

Bridges, S., & Guariglia, A. (2008). Financial constraints, global engagement, and firm survival in the United Kingdom: evidence from micro data. *Scottish Journal of Political Economy, 55*(4), 444-464.
Bunn, P., & Redwood, V. (2003). Company accounts-based modelling of business failures and the implications for financial stability.
Cameron, A. C., & Trivedi, P. K. (2009). *Microeconometrics using stata* (Vol. 5): Stata press College Station, TX.
Campa, J. M., & Shaver, J. M. (2002). Exporting and capital investment: On the strategic behavior of exporters. *IESE research papers, 469*.
Carrere, C., Fugazza, M., Olarreaga, M., & Robert-Nicoud, F. (2014). Trade in unemployment.
Castellani, D., Serti, F., & Tomasi, C. (2010). Firms in international trade: Importers' and exporters' heterogeneity in Italian manufacturing industry. *The world economy, 33*(3), 424-457.
Chetwin, W., & Bairam, E. I. (2001). The effects of international trade on employment: heterogeneity among 2-digit ISIC manufacturing industries.
Clementi, G. L., & Hopenhayn, H. A. (2006). A theory of financing constraints and firm dynamics. *The quarterly journal of economics, 121*(1), 229-265.
Clerides, S. K., Lach, S., & Tybout, J. R. (1998). Is learning by exporting important? Micro-dynamic evidence from Colombia, Mexico, and Morocco. *The quarterly journal of economics, 113*(3), 903-947.
Coelli, T. (1998). A multi-stage methodology for the solution of orientated DEA models. *Operations Research Letters, 23*(3), 143-149.
Coelli, T. J., Rao, D. S. P., O'Donnell, C. J., & Battese, G. E. (2005). *An introduction to efficiency and productivity analysis*: Springer Science & Business Media.
Collier, P., & Gunning, J. W. (1999). Explaining African economic performance. *Journal of economic literature, 37*(1), 64-111.
Cox, D. (1972). Regression Models and LifeЛTables (with discussion). *JourЛ nal of the Royal Statistical Society, Series B, 34*.
Crespi, G., Criscuolo, C., & Haskel, J. (2008). Productivity, exporting, and the learning-by-exporting hypothesis: direct evidence from UK firms. *Canadian Journal of Economics/Revue canadienne d'économique, 41*(2), 619-638.
Cruz, A., Newman, C., Rand, J., & Tarp, F. (2017). Learning by exporting: The case of Mozambican manufacturing. *Journal of African Economies, 26*(1), 93-118.
Damijan, J. P., Polanec, S., & Prašnikar, J. (2004). Self-selection, export market heterogeneity and productivity improvements: Firm level evidence from Slovenia: LICOS Discussion paper.
De Loecker, J. (2007). Do exports generate higher productivity? Evidence from Slovenia. *Journal of international Economics, 73*(1), 69-98.
Del Gatto, M., Di Liberto, A., & Petraglia, C. (2011). Measuring productivity. *Journal of Economic Surveys, 25*(5), 952-1008.
Delgado, M. A., Farinas, J. C., & Ruano, S. (2002). Firm productivity and export markets: a non-parametric approach. *Journal of international Economics, 57*(2), 397-422.
Denis, D. J., & Mihov, V. T. (2003). The choice among bank debt, non-bank private debt, and public debt: evidence from new corporate borrowings. *Journal of financial Economics, 70*(1), 3-28.
Disney, R., Haskel, J., & Heden, Y. (2003). Entry, exit and establishment survival in UK manufacturing. *The Journal of Industrial Economics, 51*(1), 91-112.
Dzhumashev, R., Mishra, V., & Smyth, R. (2016). Exporting, R&D investment and firm survival in the Indian IT sector. *Journal of Asian Economics, 42*, 1-19.
EIA. (2012a). Ethiopia Investment Agency. Unpublished data. Addis Ababa, Ethiopia.
EIC. (2016). Ethiopian Investment Commission. Unpublished data. Addis Ababa, Ethiopia.

Farinha, M., & Santos, J. (2006). The survival of start-ups: Do their funding choices and bank relationships at birth matter: Citeseer.
Fatou, C., & Choi, J. E. (2013). Working Paper 191-Do Firms Learn by Exporting or Learn to Export: Evidence from Senegalese Manufacturers' Plants.
Ferede, T., & Kebede, S. (2015). Economic growth and employment patterns, dominant sector, and firm profiles in Ethiopia: Opportunities, challenges and Prospects: Bern: Swiss Program for Research on Global Issues of Development. http://www. r4d-employment. com/wp-content/uploads/2014/09/Ethiopia-Country-Paper. pdf.
Fernandes, A. M., & Isgut, A. (2005). Learning-by-doing, learning-by-exporting, and productivity: evidence from Colombia.
Fotopoulos, G., & Louri, H. (2000). Determinants of hazard confronting new entry: does financial structure matter? *Review of Industrial Organization, 17*(3), 285-300.
Frazer, G. (2005). Which firms die? A look at manufacturing firm exit in Ghana. *Economic Development and cultural change, 53*(3), 585-617.
Fryges, H., & Wagner, J. (2010). Exports and profitability: first evidence for German manufacturing firms. *The world economy, 33*(3), 399-423.
Fu, X. (2005). Exports, technical progress and productivity growth in a transition economy: a non-parametric approach for China. *Applied Economics, 37*(7), 725-739.
Fu, X., & Balasubramanyam, V. N. (2005). Exports, foreign direct investment and employment: The case of China. *The world economy, 28*(4), 607-625.
Geroski, P. A., & Gregg, P. (1997). *Coping with recession: UK company performance in adversity* (Vol. 38): Cambridge University Press.
Gibson, J. K., & Harris, R. I. (1996). Trade liberalisation and plant exit in New Zealand manufacturing. *The Review of Economics and Statistics*, 521-529.
Giovannetti, G., Ricchiuti, G., & Velucchi, M. (2011). Size, innovation and internationalization: a survival analysis of Italian firms. *Applied Economics, 43*(12), 1511-1520.
Girma, S. (2005). Safeguarding jobs? Acquisition FDI and employment dynamics in UK manufacturing. *Review of World Economics, 141*(1), 165-178.
Girma, S., Greenaway, A., & Kneller, R. (2004). Does exporting increase productivity? A microeconometric analysis of matched firms. *Review of International Economics, 12*(5), 855-866.
Girma, S., Greenaway, D., & Kneller, R. (2003). Export market exit and performance dynamics: a causality analysis of matched firms. *Economics letters, 80*(2), 181-187.
Görg, H., & Spaliara, M.-E. (2009). Financial health, exports, and firm survival: A comparison of British and French firms.
Görg, H., & Spaliara, M. E. (2014). Financial Health, Exports and Firm Survival: Evidence from UK and French Firms. *Economica, 81*(323), 419-444.
Görg, H., & Strobl, E. (2003). Multinational companies, technology spillovers and plant survival. *The Scandinavian Journal of Economics, 105*(4), 581-595.
Granér, M., & Isaksson, A. (2002). Export performance in the Kenyan manufacturing sector. *Structure and Performance of Manufacturing in Kenya, Hampshire: Palgrave*.
Greenaway, D., Guariglia, A., & Kneller, R. (2007). Financial factors and exporting decisions. *Journal of international Economics, 73*(2), 377-395.
Greenaway, D., Hine, R. C., & Wright, P. (1999). An empirical assessment of the impact of trade on employment in the United Kingdom. *European journal of political economy, 15*(3), 485-500.
Greenaway, D., & Kneller, R. (2004). Exporting and productivity in the United Kingdom. *Oxford Review of Economic Policy, 20*(3), 358-371.
Greenaway, D., & Kneller, R. (2007). Industry differences in the effect of export market entry: learning by exporting? *Review of World Economics, 143*(3), 416-432.

Greenaway, D., & Yu, Z. (2004). Firm-level interactions between exporting and productivity: Industry-specific evidence. *Review of World Economics, 140*(3), 376-392.
Grossman, G., & Helpman, E. (1991). Innovation and growth in the global economyMIT press. *Cambridge, MA*.
Hahn, C. H. (2005). *Exporting and performance of plants: evidence on Korea.* Paper presented at the International Trade in East Asia, NBER-East Asia Seminar on Economics, Volume 14.
Haile, G., & Assefa, H. (2006). Determinants of Foreign Direct Investment in Ethiopia: A time-series analysis.
Haile, G., Srour, I., & Vivarelli, M. (2016). Imported technology and manufacturing employment in Ethiopia. *Eurasian Business Review*, 1-23.
Hailu, K. B., & Tanaka, M. (2015). A "true" random effects stochastic frontier analysis for technical efficiency and heterogeneity: Evidence from manufacturing firms in Ethiopia. *Economic Modelling, 50*, 179-192.
Hansen, H., Rand, J., & Tarp, F. (2009). Enterprise growth and survival in Vietnam: does government support matter? *The Journal of Development Studies, 45*(7), 1048-1069.
Haouas, I., Yagoubi, M., & Heshmati, A. (2005). The impacts of trade liberalization on employment and wages in Tunisian industries. *Journal of International Development, 17*(4), 527-551.
Harhoff, D., & Körting, T. (1998). Lending relationships in Germany–Empirical evidence from survey data. *Journal of Banking & Finance, 22*(10), 1317-1353.
Harris, M. N., & Mátyás, L. (2004). A comparative analysis of different IV and GMM estimators of dynamic panel data models. *International Statistical Review, 72*(3), 397-408.
Harris, R. I., & Li, Q. C. (2010). EXPORT-MARKET DYNAMICS AND THE PROBABILITY OF FIRM CLOSURE: EVIDENCE FOR THE UNITED KINGDOM. *Scottish Journal of Political Economy, 57*(2), 145-168.
Harrison, A. (1996). Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of Development Economics, 48*(2), 419-447.
Hasan, R., Mitra, D., Ranjan, P., & Ahsan, R. N. (2012). Trade liberalization and unemployment: Theory and evidence from India. *Journal of Development Economics, 97*(2), 269-280.
Helpman, E., & Krugman, P. R. (1985). *Market structure and foreign trade: Increasing returns, imperfect competition, and the international economy*: MIT press.
Helpman, E., Melitz, M. J., & Stephen, R. Y. (2004). Exports Versus FDI with Heterogenous Firms, American Economic Review 94.
Heyman, F., Sjöholm, F., & Tingvall, P. G. (2007). Is there really a foreign ownership wage premium? Evidence from matched employer–employee data. *Journal of international Economics, 73*(2), 355-376.
Hiep, N., & Ohta, H. (2009). Superiority of exporters and the causality between exporting and firm characteristics in Vietnam. *RIEB (Research Institute for Economics & Business Administration) Discussion Paper Series, 239*.
Holtz-Eakin, D., Newey, W., & Rosen, H. S. (1988). Estimating vector autoregressions with panel data. *Econometrica: Journal of the Econometric Society*, 1371-1395.
Hölzl, W. (2005). Tangible and intangible sunk costs and the entry and exit of firms in a small open economy: the case of Austria. *Applied Economics, 37*(21), 2429-2443.
Hsiao, C. (1986). Analysis of Panel DataCambridge University Press. *Cambridge, UK*.
Hung, J., Salomon, M., & Sowerby, S. (2004). International trade and US productivity. *Research in International Business and Finance, 18*(1), 1-25.
Huttunen, K. (2007). The effect of foreign acquisition on employment and wages: Evidence from Finnish establishments. *The Review of Economics and Statistics, 89*(3), 497-509.
Idson, T. L., & Oi, W. Y. (1999). Workers are more productive in large firms. *The American Economic Review, 89*(2), 104-108.

Imbruno, M. (2008). International trade and firm productivity within the Italian manufacturing sector: Self-selection or Learning-by-exporting? *Quaderni DSEMS, 21*, 2008.
Isgut, A. (2001). What's different about exporters? Evidence from Colombian manufacturing. *Journal of development studies, 37*(5), 57-82.
Jacobs, R., Smith, P. C., & Street, A. (2006). *Measuring efficiency in health care: analytic techniques and health policy*: Cambridge University Press.
Jovanovic, B. (1982). Selection and the Evolution of Industry. *Econometrica: Journal of the Econometric Society*, 649-670.
Kien, T. N., & Heo, Y. (2009). Impacts of trade liberalization on employment in Vietnam: a system generalized method of moments estimation. *The Developing Economies, 47*(1), 81-103.
Kim, S.-I., Gopinath, M., & Kim, H. (2009). High productivity before or after exports? An empirical analysis of Korean manufacturing firms. *Journal of Asian Economics, 20*(4), 410-418.
Kimura, F., & Fujii, T. (2003). Globalizing activities and the rate of survival:: Panel data analysis on Japanese firms. *Journal of the Japanese and International Economies, 17*(4), 538-560.
Kimura, F., & Kiyota, K. (2006). Exports, FDI, and productivity: Dynamic evidence from Japanese firms. *Review of World Economics, 142*(4), 695-719.
Ko, K., Rangkakulnuwat, P., & Paweenawat, S. (2015). The Effect of International Trade on Labor Demand in ASEAN5. *Economics Bulletin, 35*(2), 1034-1041.
Kraay, A. (1999). Exports and economic performance: Evidence from a panel of Chinese enterprises. *Revue d'Economie du Developpement, 1*(2), 183-207.
Krugman, P., & Obstfeld, M. (2003). Intemational Economics. *Adison\/Vesley, Boston*.
Kumbhakar, S., & Lovell, C. (1998). K (2000) Stochastic Frontier Analysis. *Cambridge University Press, Cambridge UK, 14*, 5-22.
Kumbhakar, S. C., & Lovell, C. K. (2003). *Stochastic frontier analysis*: Cambridge university press.
Kuntchev, V., Ramalho, R., Rodríguez-Meza, J., & Yang, J. S. (2012). What have we learned from the Enterprise Surveys regarding access to finance by SMEs? *Enterprise Analysis Unit of the Finance and Private Sector Development, The World Bank Group*.
Lachenmaier, S., & Rottmann, H. (2011). Effects of innovation on employment: A dynamic panel analysis. *International journal of industrial organization, 29*(2), 210-220.
Lang, K. (1998). The effect of trade liberalization on wages and employment: the case of New Zealand. *Journal of labor Economics, 16*(4), 792-814.
Leuven, E., & Sianesi, B. (2015). PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. *Statistical Software Components*.
Levinsohn, J., & Petrin, A. (2003). Estimating production functions using inputs to control for unobservables. *The Review of Economic Studies, 70*(2), 317-341.
Lipsey, R. E., & Sjöholm, F. (2004). Foreign direct investment, education and wages in Indonesian manufacturing. *Journal of Development Economics, 73*(1), 415-422.
Lipsey, R. E., Sjöholm, F., & Sun, J. (2010). Foreign ownership and employment growth in Indonesian manufacturing: National Bureau of Economic Research.
Liu, J.-T., Tsou, M.-W., & Hammitt, J. K. (1999a). Export activity and productivity: evidence from the Taiwan electronics industry. *Review of World Economics, 135*(4), 675-691.
Liu, J.-T., Tsou, M.-W., & Hammitt, J. K. (1999b). Export activity and productivity: evidence from the Taiwan electronics industry. *Weltwirtschaftliches Archiv, 135*(4), 675-691.
López, R. A. (2006). Imports of intermediate inputs and plant survival. *Economics letters, 92*(1), 58-62.
Lundvall, K., & Battese, G. E. (2000). Firm size, age and efficiency: evidence from Kenyan manufacturing firms. *The Journal of Development Studies, 36*(3), 146-163.

Malchow-Møller, N., Markusen, J. R., & Schjerning, B. (2013). Foreign firms, domestic wages. *The Scandinavian Journal of Economics, 115*(2), 292-325.
Manda, D. K., & Sen, K. (2004). The labour market effects of globalization in Kenya. *Journal of International Development, 16*(1), 29-43.
Martins, P. (2014). Structural change in Ethiopia: an employment perspective. *Browser Download This Paper*.
Martins, P. S., & Esteves, L. A. (2015). Foreign Ownership, Employment and Wages in Brazil: Evidence from Acquisitions, Divestments and Job Movers. *Technology and Investment, 6*(01), 22.
McPherson, M. A. (1995). The hazards of small firms in Southern Africa. *The Journal of Development Studies, 32*(1), 31-54.
Melitz, M. J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica, 71*(6), 1695-1725.
Meschi, E., Taymaz, E., & Vivarelli, M. (2016). Globalisation, technology and the labour market: A microeconometric analysis for Turkey: United Nations University-Maastricht Economic and Social Research Institute on Innovation and Technology (MERIT).
Milner, C., & Tandrayen, V. (2007). The Impact of Exporting and Export Destination on Manufacturing Wages: Evidence for Sub-Saharan Africa. *Review of Development Economics, 11*(1), 13-30.
Milner, C., & Wright, P. (1998). Modelling labour market adjustment to trade liberalisation in an industrialising economy. *The Economic Journal, 108*(447), 509-528.
Moen, Ø. (2002). The born globals: a new generation of small European exporters. *International Marketing Review, 19*(2), 156-175.
Moreira, M. M., & Najberg, S. (2000). Trade liberalisation in Brazil: creating or exporting jobs? *The Journal of Development Studies, 36*(3), 78-99.
Munch, J. R., & Skaksen, J. R. (2008). Human capital and wages in exporting firms. *Journal of international Economics, 75*(2), 363-372.
Musso, P., & Schiavo, S. (2008). The impact of financial constraints on firm survival and growth. *Journal of Evolutionary Economics, 18*(2), 135-149.
Nafziger, E. W., & Terrell, D. (1996). Entrepreneurial human capital and the long-run survival of firms in India. *World Development, 24*(4), 689-696.
National Bank of Ethiopia. (2015/16). Annual Report. Addis Ababa, Ethiopia.
National Planning Commission, N. (2016). Annual Report Addis Ababa, Ethiopia.
NBE. (2011). Annual Report. Addis Ababa: National Bank of Ethiopia.
NBE. (2013/14). Annual Report: National Bank of Ethiopia.
Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society*, 1417-1426.
Nickell, S., Nicolitsas, D., & Dryden, N. (1997). What makes firms perform well? *European economic review, 41*(3), 783-796.
NKURUNZIZA, J. (2005). Credit can precipitate firm failure: Evidence from Kenyan manufacturing in the 1990s, CSAE WPS: Oxford.
Ofa, S., Spence, M., Mevel, S., & Karingi, S. (2012). Export diversification and intra-industry trade in Africa. *Economic Commission for Africa. Addis Ababa*.
Park, A., Yang, D., Shi, X., & Jiang, Y. (2010). Exporting and firm performance: Chinese exporters and the Asian financial crisis. *The Review of Economics and Statistics, 92*(4), 822-842.
Pérez, S. E., Llopis, A. S., & Llopis, J. A. S. (2004). The determinants of survival of Spanish manufacturing firms. *Review of Industrial Organization, 25*(3), 251-273.

Poddar, T. (2004). *Understanding Indias export dynamism of the 1990s.* Paper presented at the European Trade Study Conference.

Prentice, R. L., & Gloeckler, L. A. (1978). Regression analysis of grouped survival data with application to breast cancer data. *Biometrics*, 57-67.
Raj, S. N. R., & Sen, K. (2012). Did International Trade Destroy or Create Jobs in Indian Manufacturing? *The European Journal of Development Research, 24*(3), 359-381.
Rand, J., & Torm, N. (2012). The benefits of formalization: Evidence from Vietnamese manufacturing SMEs. *World Development, 40*(5), 983-998.
Ranjan, P., & Raychaudhuri, J. (2011). Self-selection vs learning: Evidence from Indian exporting firms. *Indian Growth and Development Review, 4*(1), 22-37.
Rankin, N., Söderbom, M., & Teal, F. (2006). Exporting from manufacturing firms in sub-Saharan Africa. *Journal of African Economies, 15*(4), 671-687.
Revenga, A. (1997). Employment and wage effects of trade liberalization: the case of Mexican manufacturing. *Journal of labor Economics, 15*(S3), S20-S43.
Roberts, M. J., & Tybout, J. R. (1997). The decision to export in Colombia: an empirical model of entry with sunk costs. *The American Economic Review*, 545-564.
Roper, S., Love, J. H., & Hígon, D. A. (2006). The determinants of export performance: Evidence for manufacturing plants in Ireland and Northern Ireland. *Scottish Journal of Political Economy, 53*(5), 586-615.
Sasidharan, S. (2015). Impact of Foreign Trade on Employment and Wages in Indian Manufacturing. *South Asia Economic Journal, 16*(2), 209-232.
Sen, K. (2009). International trade and manufacturing employment: Is India following the footsteps of Asia or Africa? *Review of Development Economics, 13*(4), 765-777.
Sharma, C., & Mishra, R. K. (2011). Does export and productivity growth linkage exist? Evidence from the Indian manufacturing industry. *International review of applied economics, 25*(6), 633-652.
Shiferaw, A. (2006). Entry, survival, and growth of manufacturing firms in Ethiopia. *ISS Working Paper Series/General Series, 425*, 1-36.
Siba, E., & Gebreeyesus, M. (2017). Learning to export and learning from exporting: The case of Ethiopian manufacturing. *Journal of African Economies, 26*(1), 1-23.
Sinani, E., & Hobdari, B. (2010). Export market participation with sunk costs and firm heterogeneity. *Applied Economics, 42*(25), 3195-3207.
Slaughter, M. J. (2001). International trade and labor–demand elasticities. *Journal of international Economics, 54*(1), 27-56.
Söderbom, M., Teal, F., & Harding, A. (2006). The determinants of survival among African manufacturing firms. *Economic Development and cultural change, 54*(3), 533-555.
Stampini, M., & Davis, B. (2009). Does nonagricultural labor relax farmers' credit constraints? Evidence from longitudinal data for Vietnam. *Agricultural economics, 40*(2), 177-188.
Stiglitz, J. E. (2002). Employment, social justice and societal well-being. *International Labour Review, 141*(1-2), 9-29.
Strobl, E., & Thornton, R. J. (2002). Do large employers pay more in developing countries? The case of five African countries.
Sun, X., & Hong, J. (2011). Exports, ownership and firm productivity: Evidence from China. *The world economy, 34*(7), 1199-1215.
Te Velde, D. W., & Morrissey, O. (2003). Do workers in Africa get a wage premium if employed in firms owned by foreigners? *Journal of African Economies, 12*(1), 41-73.
Tybout, J. R. (2003). Plant-and firm-level evidence on "new" trade theories. *Handbook of international trade, 1*, 388-415.
UNCTAD. (2007). Transnational Corporations, Exctractive Industries and Development. New work and Geneva: United Nations Conference on Trade and Development.

UNCTAD. (2011). *World Investment Report: non-equity modes of international production and development*: UN.
UNCTAD. (2016). World Investment Report 2016. *Investor nationality: Pollcy challenges, United Nations, Geneva*.
Van Biesebroeck, J. (2005). Exporting raises productivity in sub-Saharan African manufacturing firms. *Journal of international Economics, 67*(2), 373-391.
Vartia, L. (2004). Assessing plant entry and exit dynamics and survival–Does firms' financial status matter? *Mimeograph, European University Institute*.
Vivarelli, M. (2014). Innovation, employment and skills in advanced and developing countries: A survey of economic literature. *Journal of Economic Issues, 48*(1), 123-154.
Vu, H., & Lim, S. (2013). Exports and Firm survival: The first evidence from Vietnam private manufacturing SMEs. *Economics Bulletin, 33*(2), 1259-1268.
Vu, V. H. (2012). Higher productivity in Exporters: self-selection, learning by exporting or both? Evidence from Vietnamese manufacturing SMEs.
Vu, V. H., Lim, S., Holmes, M. J., & Doan, T. (2012). Firm exporting and employee benefits: first evidence from Vietnam Manufacturing SMEs.
Wade, R. (1990). *Governing the market: Economic theory and the role of government in East Asian industrialization*: Princeton University Press.
Wagner, J. (2001). A note on the firm size–export relationship. *Small Business Economics, 17*(4), 229-237.
Wagner, J. (2002). The causal effects of exports on firm size and labor productivity: first evidence from a matching approach. *Economics letters, 77*(2), 287-292.
Wagner, J. (2007a). Exports and productivity: A survey of the evidence from firm-level data. *The world economy, 30*(1), 60-82.
Wagner, J. (2007b). Productivity and Size of the Export Market. *Jahrbücher für Nationalökonomie und Statistik, 227*(4), 403-408.
Wagner, J. (2012). Exports, imports and profitability: First evidence for manufacturing enterprises. *Open Economies Review, 23*(5), 747-765.
Wagner, J. (2013). Exports, imports and firm survival: first evidence for manufacturing enterprises in Germany. *Review of World Economics, 149*(1), 113-130.
WB. (2015). Fourth Ethiopia economic update: overcoming constraints in the manufacturing sector *Washington, DC: World Bank Group. Web: http://documents. worldbank. org/curated/en/2015/07/24756616/fourthethiopia-economic-update-overcoming-constraints-manufacturing-sector*.
Were, M. (2011). Is There a Link Between Casual Employment and Export-Orientation of Firms? The Case of Kenya's Manufacturing Sector. *The Review of Black Political Economy, 38*(3), 227.
Wooldridge, J. (2009). Introductory Econometrics: A Modern Approach (Mason, OH: South-Western). *R. Desbordes and V. Verardi, 181*.
Wooldridge, J. M. (2005). Simple solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogeneity. *Journal of applied econometrics, 20*(1), 39-54.
World Bank. (2016). *World Development Indicators 2016*. Excel. Retrieved from: http://databank.worldbank.org/data/download/archive/WDI_excel_2016_04.zip
Yasar, M., Nelson, C. H., & Rejesus, R. (2006). Productivity and exporting status of manufacturing firms: Evidence from quantile regressions. *Review of World Economics, 142*(4), 675-694.
Zingales, L. (1998). The survival of start-ups: Do their funding choices and bank relationships at birth matter. *The Journal of Finance, 53*(3), 905-938.