ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

Access to finance and firm growth: The case of Ethiopian SMEs

By

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A thesis Submitted to Department of Economics in Partial Fulfillment of the Requirements for the Degree of Master of Science in Financial Economics of Addis Ababa University

March, 2023

Certification

The undersigned certify that I have read this thesis entitled "**Access to finance and firm growth: The case of Ethiopian SMEs**" in the process of guiding the author and thereby recommend it for submission to the Department of Economics of Addis Ababa University in the partial fulfillment of the award of the Degree of Master of Science in Financial Economics of Addis Ababa University.

Signed: ……..... Date: ……

Dr. Befikadu Degefe

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ACKNOWLEDGEMENT

First and foremost I would like to thank God for blessing me and truly giving me the faith, courage, inspiration, and steadfastness in my life. He has always been there for me with his mother Virgin Marry.

My next deepest and heartfelt thanks go to my advisor, Dr. Befikadu Degefe, for his indispensible support, encouragement and assistance. Lucky I am for having such an insightful mentor. Without his proper guidance, insightful comments and instructions, this paper would not have been possible.

It is also a pleasure to thank my colleagues and friends for their guidance and assistance in the course of this study. Their unwavering support, constructive comments and concerns have provided me the space and energy to complete the study.

Finally, I would like to thank my parents who have devoted all their efforts in me. As always, I am grateful for their valuable support and encouragement.

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Acronyms

FeMSEDA: Federal Micro and Small Enterprises Development Agency

ReMSEDA: Regional Micro and Small Enterprises Development agency

GDP- Gross Domestic Product

GTP: Growth and Transformation Plan

MSEs: Micro and Small Enterprises;

MSMEs: Micro, Small and Medium Enterprises;

SMEs: Small and Medium Enterprises

NPC: National Plan Commission of Ethiopia

OECD: Organization for Economic Cooperation and Development

SDGs: Sustainable development goals

WB: World Bank

WBES: The World Bank Enterprise Survey

Abstract

This study conducts an empirical investigation of the effects of access to finance on the growth of Ethiopian SMEs. In order to achieve this, the study made use of an enterprise-level data set from the World Bank's Enterprise Surveys. The study specifically uses the World Bank Enterprise Surveys two year panel data set for Ethiopia (i.e. for the year 2011 and 2015). The dataset consists of 1,486 Ethiopian firms of which the largest share (907) is micro and small firms. The study used descriptive and econometric analysis to process the data, obtain the relevant estimation results and fully discuss the purposes under the study. Both subjective and objective measures of access to finance were used for the sake of robustness. The subjective measure of access to finance is obtained from the ranking of access to finance as no obstacle or severe obstacle to business operations. The objective measure of access to finance measures whether firms are credit constrained or not. The study found that firm growth is significantly constrained by access to finance. Firm age is also found to have a negative relationship with firm growth while innovative firms have a better chance of growth than noon-innovative firms. Firm's access to finance is strongly determined by factors such as firm age, firm size, collateral, firm's innovative practices, and firm's export orientation. However, whether these factors constrain access to finance depends on firm size.

Key words: *Access to finance*; *firm growth*; *small and medium enterprises (SMEs), Ethiopia*

Chapter One
Introduction

1.1 Background of the study

Small and Medium enterprises (SMEs) play a crucial role for economic growth (Gherghina, Botezatu, Hosszu & Simionescu, 2020) and development of countries (Zeidy, 2020). They have been a matter of concern and considered as engine of economic growth in both developed (Honjo & Harada, 2006) and developing economy (Zeidy, 2020). The importance of SMEs, however, is more pronounced in developing and emerging nations (Amsi, Ngare, Imo & Gachie, 2017; Gherghina *et al.*, 2020; Zeidy, 2020; Ho, 1980).In the context of Ethiopia, a systematic literature review by Endris and Kassegn (2022) found that micro, small and medium enterprises (MSMEs) significantly contributed to the sustainable development goals of Ethiopia through creating employment, alleviating poverty, and improving living standards.

Accounting for over 90% of firms worldwide (Chávez, Koch-Saldarriaga & Quesada, 2018), SMEs are the most common employers across the world (Kuntchev, Ramalho, Rodríguez-Meza & Yang, 2013) which provide 70 percent of all employment (Dasewicz *et al.*, 2020). They are vital in driving growth, creating employment and fostering innovation (Zeidy, 2020). Also, the share of employment and job creation among SMEs is even larger for low-compared to middle or high-income countries (Rao, Kumar, Chavan, & Lim, 2021). In addition, SMEs are reported to stabilize a national economy in both developed and developing countries by helping the economy cope with the shocks of economic cycles (Myslimi & Kaçani, 2016). OECD (2017) adds sustainable industrialization and income disparity reduction to the list of SMEs contribution to an economy as it spread the benefits of economic growth to people and places too often left behind. All these may explain why SMEs have been the subject of systemic and targeted intervention by governments and international aid organizations around the world (Ayyagari, Demirgüç-Kunt & Maksimovic, 2017).

Despite constituting an important component of the private sector in the developing world and its increasing roles in the economy, SMEs are struggling with many challenges and constrains (Endris and Kassegn, 2022; Rao *et al.*, 2021). These challenges could be firm-level variables, industry-level variables and or macroeconomic variables (Coad and Hölzl, 2012). Personality of the entrepreneur, foreign ownership, managerial growth aspirations, firm size, firm age and export status of firms are some of the firm level variables discussed by Coad and Hölzl. SMEs contributions also depend on their access to strategic resources, such as skills, knowledge networks, and finance, and on public investments in areas such as education and training, innovation and infrastructure (OECD, 2017).

The literature, with growing evidence, reveals that access to finance is one of the most pressing issues that hinder the growth of SMEs (Endris and Kassegn, 2022; Ullah, 2020; Gherghina *et al.*, 2020; Zeidy, 2020; Chávez *et al.*, 2018; Beck & Cull, 2014; Beck & Demirguc-Kunt, 2006; Udell, 2011; James, 1986). Beck (2007) found that, the probability that a small firm lists financing as a major obstacle is 39% compared to 36% for medium-size firms and 32% for large firms. In the Ethiopian context, a baseline survey conducted by the Ethiopian Development Research Institute (EDRI) in 2018 revealed that lack of access to credit is the second most pressing challenges that micro and small enterprises in Ethiopia are facing in their daily operation and growth next to adequate working premises. Based on the survey more than 70% of MSEs had no access to credit from any of the potential sources and hence rely on their own funds to finance their investment and working capital (Gebreeyesus, Ambachew, Getahun,, Assefa, Abebe, Hassen, & Medhin,, 2018). Of the Ethiopian SMEs that had access to loans, micro finance institutions (MFIs) are the main source of finance for both their investment and working capital. Endris and Kassegn (2022) also identified access to finance, access to electricity and trade regulation as the major constraints hindering the development of SMEs in Ethiopia.

Access to finance affects SMEs entry to the market and their decision on the acquisition of fixed capital and financing of its working capital. The initial capital requirement is the most important barrier for SMEs to enter to the market (Ho, 1980). Ho (1980) found that, only little of the initial capital invested in the small enterprises in Korea are financed from the organized credit market or the informal credit market (private lenders). The bulk of the initial capital was rather financed from the accumulated savings of the entrepreneurs and their immediate circle of friends and relatives (i.e. non-institutional credit sources) (Ho, 1980). This implies that SMEs rely mostly on internal financing (Dong & Men, 2014; Kuntchev *et al.*, 2013) and informal credit markets (Kuntchev *et al.*, 2013; Ho, 1980) to finance working capital and/or additional fixed asset investments.

The literature so far, however, focuses on developing and emerging economies (Brixiová, Kangoye, & Yogo, 2020) and SMEs financing in Africa has received little research attention in the area of small business management (Rao *et al.*, 2021; Brixiová *et al.*, 2020). There is also inconsistency in the literature regarding the effect of access to finance on firm growth. Beck (2007) found that financial obstacles faced by smaller firms slow their growth. However, Ho (1980) argued that lack of bank credit may not be an insurmountable obstacle to the development of the small enterprises as long as funds are available from non-institutionalized sources.

There are researches on whether SMEs in Ethiopia are able to access adequate financial service (e.g., Weltbank, 2015; Guta, 2018; Fanta, 2015; Bigsten & Gebreeyesus, 2007). However, very little is currently known about the effect of access to finance on the growth of SMEs and about the determining characteristics of access to finance in the Ethiopian context.

The Ethiopian context may be unique in various ways. In financial inclusion, Ethiopia performs quite low relative to other countries (Tekie & Sisay, 2019). Only 35% of adults in Ethiopia own account with formal financial institutions (Tekie & Sisay, 2019). Whereas, comparative figures are 82%, 59% and 50% for neighboring Kenya, Uganda, and Rwanda respectively (World Bank, 2018 as cited in Tekie and Sisay, 2019). In addition, Ethiopian gross domestic saving to GNP ratio[1] is far below the average of Sub-Saharan Africa (SSA) (Wolday & Tekie, 2014).

Moreover, several of the papers written on access to finance using the World Bank's Enterprise Surveys data focus on the perception measure while this study employed both subjective and objective measures of access to finance. For the objective measure of access to finance, the study follows Kuntchev *et al.*, 2013. The aim of this paper is, thus, to critically examine the effect of access to finance on SMEs' growth in Ethiopia. The paper also investigates the determinants of firm's financial access.

1.2 Statement of the problem

Considering the importance of SMEs in promoting growth and dynamism in an economy (Chavis, Klapper & Love, 2011; Kuntchev *et al.*, 2014), it is essential to understand the different factors that can promote or constrain the creation and development of SMEs.

The accessibility of finance is vital in the improvement, development and accomplishment of SMEs (Ou and Haynes, 2006). Chávez *et al.* (2018) and Ahmed and Hamid (2011) revealed that access to finance heavily constrains firm growth. Using firm level survey data on business environment across 80 countries, Ayyagari *et al*., (2006) reported that of all characteristics of business environment only finance, political instability and crime are robustly linked to firm growth. This claim is further confirmed by Ayyagari *et al.*, (2008) who stated that finance has the largest direct effect on firm growth and is more binding than other constraints.

Credit is particularly essential for SMEs in a variety of ways. SMEs do not have access to the capital markets where they can issue publicly traded stock and corporate bonds, even in the most developed economies. Besides, SMEs capacity to accumulate much saving is limited. Thus, they tend to be dependent on financial institutions, trade credit and non-institutional creditors to finance working capital and investment in fixed capital. The availability of credit may also enhance SMEs decision to adopt technologies that will raise their income.

Access to the right kind of finance according to the firm's need is fundamental for the growth of any firm (Chávez *et al.*, 2018 & Ahmed and Hamid, 2011). However, the literature, with growing evidence, reveals

[1] Beck and Cull (2014) reported a positive correlation between financial depth and the share of small firms with a formal bank loan where financial depth is measured through Bank credit to GDP ratio.

that access to finance is one of the most pressing issues that hinder the growth of SMEs (Ullah, 2020; Gherghina *et al.*, 2020; Zeidy, 2020; Chávez *et al.*, 2018; Kuntchev *et al.*, 2014; Beck & Cull, 2014; Beck & Demirguc-Kunt, 2006; Udell, 2011; James, 1986). Beck (2007) found that access to finance and cost of finance are rated by 30% and 35% of SMEs as major growth constraints respectively more than any other characteristics of the business environment.

The same financial constraint is also reported in Korea and Taiwan where financial institutions were largely owned by government and credit were allocated administratively (Ho, 1980). Credit was flowed primarily to those enterprises (government or private) or projects the government favored. Generally, financial systems dominated by government-owned banks seem less effective in providing credit to SMEs (Beck & Demirguc-Kunt, 2006). In a similar vein Endris and Kassegn (2022) identified access to finance, access to electricity and trade regulation as the major constraints for the development of the SMEs in Ethiopia.

Small enterprises are constrained by institutional credit because of high cost of credit (Beck & Cull, 2014) may be because of high transaction costs (Ho, 1980; Ayyagari, Demirgüç-Kunt, & Maksimovic, 2018; Chávez *et al.*, 2018). Lack of reliable credit information, lack of suitable collateral and weak legal institutions are also cited as institutional constraints that impede access to finance for SMEs (Ayyagari *et al.*, 2018). Additionally, default risks are perceived to be substantially higher for small enterprises than for large enterprises (Ho, 1980; Chávez *et al.*, 2018). Adverse selection and moral hazard problems associated with information asymmetry are also relatively significant for small firms (Dong & Men, 2014; Ayyagari *et al.*, 2018; Stiglitz & Weiss, 1981). SMEs have relatively limited publicly available information as financial reporting requirements for these enterprises tend to be low. Many SME's, particularly the smaller ones, cannot afford audited financial statements. As a result, banks have more difficulties in assessing the creditworthiness of SMEs, which can discourage lending to these firms. Higher transaction costs and greater risks involved are often reflected in higher interest rates and fees for SMEs relative to larger firms, particularly in developing countries (Ayyagari *et al.*, 2018).

Various way outs from the problem of access to finance by SMEs are indicated in the literature. The importance of legal institutions on SMEs access to credit is addressed by Beck, Demirguc-Kunt and Maksimovic (2008). Beck *et al*. revealed that firms in countries with poor property right protection use less external finance, especially bank finance. Better property right protection increases external financing of small firms significantly more than it does for large firms (Beck & Demirguc-Kunt, 2006).

Financial development significantly affects SMEs access to financial services (Beck, 2007; Beck, 2013). For example, Ho (1980) suggests the establishment of special financial institutions to serve the largely ignored finance needs of SMEs. Microfinances emerge to fill this gap and solve the access to finance

problems of the poor households and SMEs (Chávez *et al.*, 2018) as such borrowers may not meet the stringent conditions set by banks. Berger and Udell (1995), on their part, suggest that long relationships between a financial institution and the borrower can help overcome problems of information asymmetry prevalent in SMEs. Small, community based financial institutions might be better in relationship lending, while transaction-based lending is more cost effectively done by large financial institutions that can exploit the necessary economies of scale that investment in technology implies (Beck & Cull, 2014).

The extant literature, however, lacks consistency concerning the effect of access to finance on SMEs growth. There are studies that found a positive relationship between access to finance and growth (Chávez *et al.*, 2018; Beck, 2007) while others found a neutral relationship between those variables (Ho, 1980). In addition, SME financing in Africa has received little research attention in the top five journals in the area of small business management (Rao *et al.*, 2021). The literature so far rather focuses mostly on developing and emerging market economies and Africa is the most excluded in terms of access to finance partly due to the underdevelopment of its financial system (Brixiová *et al.*, 2020).

Thus, this study, proposes to examine whether access to finance is a binding constraint for the growth of Ethiopian SMEs using World Bank's 2011 and 2015 Enterprise Surveys (WBES) data. The Ethiopian context is different as financial inclusion (Tekie & Sisay, 2019), financial development (Wolday & Tekie, 2014) and financial innovations are low in the country. Specifically, this study tries to address the following research questions:

1 Is access to finance among the top challenges of SMEs in Ethiopia?
2 What determines access to finance by SMEs in Ethiopia?
3 Does access to finance affect growth of SMEs in Ethiopia?

3.1 Objectives of the study

The overall objective of this study is to examine the effect that access to finance has on SMEs growth in Ethiopia. Specifically this study intends to:

- Identify the business obstacles perceived as the most constraining by Ethiopian SMEs
- Identify determinants of access to finance for Ethiopian SMEs
- Examine the effect of SMEs access to finance on their growth

3.2 Significance of the study

Given the significance and contribution of SMEs to the world economy, it is important to have a good understanding of the challenges that hinder growth of SMEs. Micro and small enterprise development is considered as the primary strategy of GTP II to expand employment and reducing poverty particularly on

women and youths in Ethiopia (NPC, 2016). Thus, understanding how financial obstacles affect firms of different sizes is of significant importance.

The study will have an important contribution to the literature as: (1) it is being conducted in a new, Ethiopian SMEs, context; and (2) it adopts Kuntchev *et al.'s* (2013) innovative way of measuring access to finance. Thus, the study may offer insights for scholars, professionals, policymakers, and other stakeholders to gain understanding about the existing reality of SMEs and to design interventions aimed at alleviating problems of access to finance by SMEs operating in Ethiopia.

3.3 Scope of the study

The present study covers the effect of access to finance on growth of Ethiopian SMEs using the 2015 World Bank Enterprise Survey data. No WBES data were collected in Ethiopia since 2015. Though a lot of attributes could affect firm growth, this study emphasizes only on the contribution of access to finance to growth of Ethiopian SMEs and determinants of firms access to finance.

3.4 Organization of the paper

The study is organized as follows. Chapter two presents review of relevant theoretical and empirical literature. Chapter three describes the methodology and dataset to be employed. Chapter four presents both the descriptive and the regression results on the determinants of access to finance and the effect of access to finance on firm growth. Finally, chapter five concludes the paper.

Chapter Two

Review of the Literature

2. Introduction

This chapter is divided into three sections. Section 2.1 presents the theoretical literature while, section 2.2 presents the empirical literature. Section 2.3 summarizes the literature and presents the research gap.

2.1 Theoretical Review

2.1.1 Theory of Firm Growth

Firm growth has been an object of research since the beginning of research in economics (Coad & Hölzl, 2012). Areas of interest include how growth varies across firms; whether small firms grow faster than large firms; attributes affecting firm growth. These questions are important for countries trying to industrialize and create jobs (Bigsten & Gebreeyesus, 2007). There are three key theories of growth of a firm, namely, the stochastic models, the integrated theory and the stage model.

Stochastic models of firm growth dominate the firm growth literature (O'Farrell and Hitchens, 1988). This model argues that growth is a product of random effects. Gibrat's law is the workhorse of empirical research into firm growth (Coad & Hölzl, 2012) and is considered as a point of departure in the firm growth literature. Gibrat's law states that the growths of firms are in dependent of their size.

Within the industrial economics paradigm, Marris (1966) developed a formal integrated theory of growth of firms. Marris suggests that there are four major determinants of firm growth: (1) the demand constraint; (2) the managerial constraint; (3) the financial constraint; and (4) the growth aspiration the management pursues. The customers required to absorb output, the capital required to expand capacity, limits to the expansion that existing managers can achieve and to the rate at which management can expand its managerial capacity coupled with the objective that a management pursues affects rates of firm growth.

The other dominant theory of firm growth, particularly explanatory in the case of small-firms, is the stage model of growth (Churchil & Lewis, 1983). It considers the development sequence of very small-firms (O'Farrell & Hitchens, 1988). In this model, the nature of the tasks required for success is expected to be different from one stage to the next.

2.1.2 Theory of Access to Finance

Financial services can be analysed from the two dimensions of demand and supply (Weltbank, 2015). The demand side examines the choice made by individuals with regard to services provided by financial

institutions, while the supply side relates to financial services provision and/or financial intermediation. Theories on access to financial services provide a general framework for demand for financial services and financial intermediation. Figure 1 below depicts the dominant demand and supply side theories of access to finance.

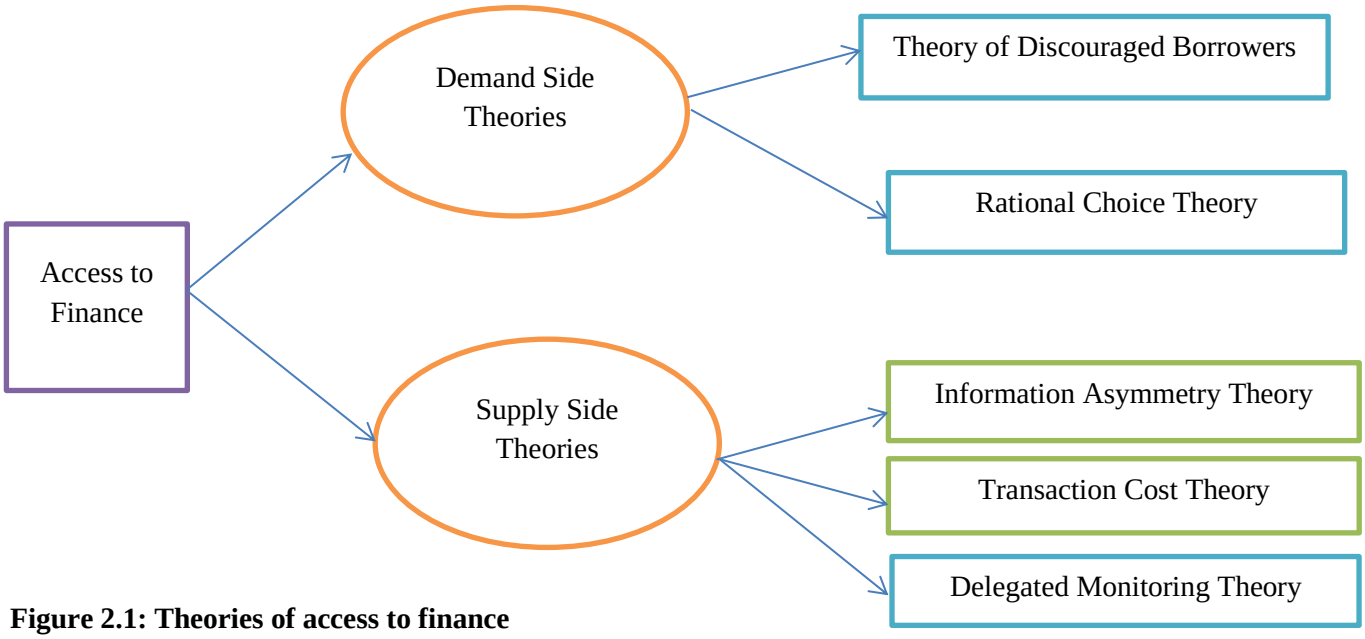


Figure 2.1: Theories of access to finance

2.1.2.1 Theory of Discouraged Borrowers

Discouraged borrowers are good firms, requiring finance, which choose not to apply for a bank loan because they feel they will be rejected (Kon & Storey, 2003). Screening process of banks, the size of application costs and the interest rate banks charge compared to that of informal financing sources and lenders are causes of borrower discouragement (Kon & Storey, 2003).

The higher the bank's screening error, the higher the application cost and the more insignificant the gap between interest rates of banks and other lenders, the more it discourages good borrowers to apply for a bank loan.

According to Kon and Storey (2003), the processing cost comprises the costs of paying others to provide information required by the bank; the applicants time in completing forms, traveling to, and meeting with, the bank; and the discomfort which many entrepreneurs experience in passing on information about themselves and their enterprise to a third party.

2.1.2.2 Rational Choice Theory

The efficiency and effectiveness of financial markets depends on the rationality of investors (Wang & Tong, 2020). Borrowers are assumed to be rational profit maximizers with complete information and able to perform complex arithmetic calculations unfettered by cognitive and other limitations (Block-Lieb & Janger, 2005). The idea is that the less a loan costs, the more borrowers will use it and vice versa. In other words, the more costly the loan gets to SMEs in relative terms, the less the SMEs demand such loan.

2.1.2.3 Information Asymmetry Theory

Informational differences between buyers and sellers are common characteristics of markets and informational asymmetries are more pronounced in financial markets (Leland & Pyle, 1977). Creditors could only distinguish potential borrowers imperfectly by using the observable characteristics of the applicant, such as age and education, age of the firm, and the purpose for which funding is required, etc. (Kon & Storey, 2003). Asymmetric information gives rise to an adverse selection problem that causes projects which are poor from the banks' point of view to drive out good projects (Stiglitz & Weiss, 1981). Increasing interest rate, in response to an increase in monitoring and processing cost of small loans, may not be a solution. Stiglitz and Weiss argued that increasing interest rate may affect the riskiness of the pool of loans itself by either: 1) sorting potential borrowers (the adverse selection effect); or 2) affecting the actions of borrowers (the incentive effect). Those who are willing to pay high interest rates may, on average, be worse risks and the rise in the interest rate may induce firms to undertake projects with lower probabilities of success but higher payoffs when successful.

On the contrary, the inability of lenders to discover all of the relevant characteristics of borrowers results in investment in excess of the socially efficient level (Meza & Webb, 1987). This means that asymmetric information causes good projects to draw in bad projects rather than bad projects driving out good ones. Borrowers tend to have more information about their credit worthiness and moral rectitude than what the lenders may have about them. They also possess inside information about their own projects for which they seek financing and they may have rewards not to be straightforward about their projects and manners.

It is no surprise that lenders would benefit from knowing the true characteristics of borrowers. Their ability to monitor their borrowers' credit worthiness and conduct depends greatly on the extent of available borrower information. In relative terms, small businesses tend to be more opaque to lenders than large firms as financial reporting requirements are more stringent for the latter. Because of this, lenders may favor large firms than SMEs in their lending decisions.

2.1.2.4 Transaction Cost Theory

Part of credit assessment, credit processing and credit monitoring costs are independent of the loan amount and makes small loans unattractive for lenders (Beck, 2007). Benston and Smith (1976) also pointed out that larger business loans are made in preference to smaller loans as larger loans require lower operating expenses per dollar loaned. Thus, banks may favor lending to large firms as SMEs loans tends to be more costly.

2.1.2.5 Delegated Monitoring Theory

A financial intermediary obtains funds from depositors and lends to entrepreneurs. Depositors delegate the task of monitoring the outcomes of entrepreneurs' projects to the financial intermediaries (Diamond, 1984). The financial institution must assess information correctly and sufficiently to arrive at sound loan decisions and monitor the ex-post behaviour of the entrepreneur to ensure smooth loan repayments along with interest. Depositors may withdraw their savings to discipline the financial institution if they believe that the interest is not being upheld by the financial institution or if they believe that the activities of the financial institutions are not in their interest. This decision of the depositors will affect the loanable funds that the financial institutions avail for SMEs. Credit information required to arrive at informed credit decisions and proper monitoring may relatively be inadequate for small firm borrowers than for the large ones.

2.2 Empirical Review

Empirical studies indicate the importance of SMEs in promoting economic growth and creating job opportunities. For instance, Ethiopian MSMEs are the chief sources of job and income with a significant contribution to the country's GDP (Abera, Vermaack, Gebrekirstos, Minwuyelet, Tsegay, Hagos, & Gidey, 2019). SMEs also played an important role in the Chinese economic growth between 1978 and 2008 (Gou and Huang, 2019).

Despite the economic contribution of small business to economic growth and job creation, its growth is hindered by various firm level and macro factors. Smaller firms have been growing more rapidly than larger and older firms (Hart, 2000; Evans, 1987). A study conducted using census-based panel data from Ethiopian manufacturing firms from1996 to 2003 indicated that size is inversely related to firm growth (Bigsten and Gebreeyesus, 2007). On the contrary, Gibrat's law claims that growth is independent of firm size. There are also studies that suggested a non-uniform relationship between firm size and growth rates across size. For instance, Hart and Oulton (1996) as cited in Coad and Hölzl (2012) suggested that firm growth is negatively related to firm size for samples of small firms, while growth rates are independent of size for large firms.

A firm's age has also been observed to have an influence on its growth (Coad and Hölzl, 2012). Some studies found a negative relationship between firm age and firm growth (Evans, 1987). While other studies found a non-linear relationship between age and growth. For example, Bigsten and Gebreeyesus (2007) found that growth decreases with age for 9 years old firms and younger, whereas growth increases with age for older firms.

Access to finance is another factor mentioned strongly in the firm growth literature as an obstacle to firm growth, especially to SMEs. For example, access to finance is identified to be the most severe obstacle for MSMEs growth in Ethiopia (Endris and Kassegn, 2022). Similarly, Ullah (2020), Chávez *et al.* (2018), Ayyagari *et al.,* (2008), and Flaminiano and Francisco (2021) identified access to finance as one of the most critical constraints to firm growth. All this supports Beck (2007) who pointed out that access to and cost of finance is one of the most constraining features of the business environment by SMEs, of which the cost of finance is even more constraining. A study by Wang (2016) which uses the Enterprise Surveys from the World Bank covering data from 119 developing countries also concluded that SMEs perceive access to finance as the most significant obstacle to their growth. Such financial constraint is accepted to affect the efficiency and productivity of firms. For example, a systematic literature review by Endris and Kassegn (2022) identified that finance constrained firms are more inefficient and less productive relative to unconstrained firms in sub-Saharan Africa.

As pointed out by Berger and Udell (2006), credit availability for SMEs is largely influenced by lending technologies[2], financial institution structure and lending infrastructure. For example, SMEs are more credit constrained due to higher transactions costs and higher risk premiums (Chávez *et al.,* 2018; Kuntchev *et al.,* 2013). The effect of firm size on access to finance has been discussed in the literature for long. According to Beck *et al*. (2005), the smallest firms are the most credit constrained and consistently, Beck and Cull (2014) reported that business size is positively related to access to finance. In addition, Chávez *et al. (2018)* revealed that almost 70% of SMEs do not use external financing from financial institutions, and another 15% are underfinanced. This limited access to finance to SMEs may be attributed to the fact that SMEs are opaquer, lack sufficient assets to put up as collateral, have no credit history or have shorter credit history and do not have audited financial statements (Beck, 2007; Beck & Cull, 2014). In other words, transaction cost and information asymmetries are behind the variation in access to finance across firms of different sizes.

[2] According to Berger and Udell (2006), lending technology includes financial statement lending, small business credit scoring, asset-based lending, factoring, fixed-asset lending, leasing, relationship lending, and trade credit. Financial institution structure incorporates large versus small, foreign-owned versus domestic-owned, state-owned versus privately owned, competition. Lending infrastructure comprises information environment; legal, judicial, bankruptcy, social, tax, and regulatory environments.

Some countries has long recognised SMEs access to finance problem and even raised it to their national development agenda. Law of the People's Republic of China on Promotion of Small and Medium-sized Enterprises in 2003 (Gou and Huang, 2019) is a good example. This law was enacted to improve the business environment for SMEs, promoting their sound development, creating more job opportunities and promoting entrepreneurship and innovation.

There are inconsistencies in the literature on the effect of collateral on access to credit. Collateral requirements are identified to be one of the main impediments that prevent African SMEs from accessing traditional forms of financing (Endris and Kassegn, 2022; Beck & Cull, 2014). However, a study on 75,854 Slovenian firms in the period 1995–2011 by Volk and Trefalt (2014) revealed that even if micro firms' have collateral, banks are still unprepared to finance them, possibly due to the level of risk. Collateral seems to alleviate the financial constraint problem only for larger firms, but not for micro firms (Volk & Trefalt, 2014).

At least part of credit assessment, credit processing and credit monitoring costs are independent of the loan amount and makes small loans unattractive for lenders. These fixed transaction costs and the resulting higher lending costs will increase cost of financing for SMEs. Increase in interest rate will attract only riskier borrowers to the pool and may entice borrowers to undertake riskier projects. Thus, creditors will not even be willing to lend at a higher interest rate. That is why the relationship between interest rates and credit supply are not linear (Beck, 2007). The impossibility to use interest rates as screening mechanism entices lenders to use collateral, warrants or assessment based on audited information as screening devices. When it comes to information asymmetries, credit assessment and monitoring costs of SMEs tends to be higher than large firms.

Financial obstacles to SMEs are not uniform across nations. For example, Chávez *et al.,* (2018) reported that SMEs in the least-developed regions like Sub-Saharan Africa, East Asia and the Pacific and South Asia are more likely to encounter significant financing obstacles. This may be attributed to the level of financial and legal development in these regions. Firms in countries with higher levels of financial and legal development have lower financial obstacles than firms in countries with less developed financial and legal institutions (Beck, 2007). The effect of financial and legal development on the financial constraint-growth relationship is significantly stronger for small firms than for large firms ((Kuntchev *et al.,* 2013; Beck, 2007).

Furthermore, Beck and Cull (2014) reported that older firms, foreign-owned firms, firms with simplest organizational forms (such as partnerships and sole proprietorships) and female-managed firms are more likely to have access to formal loan in Sub-Saharan Africa. This is consistent with Beck (2007) who pointed out that smaller, younger and domestic enterprises report higher financing obstacles even after

controlling for other firm characteristics. However, Kuntchev *et al.* (2013) found that firm age is not a significant predictor of access to finance. Foreign-owned firms have a better access to finance presumably because they have access to internal funding within the multinational enterprise (Beck & Cull, 2014). From information asymmetry point of view, older firm may accesses credit easier than younger firms as they may have been released from asymmetric information problems by improving their public reputation.

When it comes to the sources of credit, evidence from microdata in the People's Republic of China and five Southeast Asian economies (Indonesia, Malaysia, Philippines, Thailand, and Viet Nam) showed that SMEs typically resort to internal sources and use informal non-bank credit sources more than banks (Wignaraja & Jinjarak, 2015). This is confirmed by Chávez *et al. (*2018) reporting that banks provide a lower share of investment loans to SMEs and charge them higher fees and interest rates, especially in developing economies. Beck (2007) also pointed out that small firms finance a significantly larger share of their new investment with internal sources than large firms and only less than ten percent of their investment needs are financed by bank loan. Micro firms' switches to external financing as their primary source for financing growth once the external financing constraint relaxes (Volk and Trefalt, 2014).

Trade credit is another source of finance for firms. Large firms are argued to have an advantage in trade credit, while small firms rely on equity and informal finance (Volk & Trefalt, 2014). On the contrary, Chávez *et al. (*2018) found that small firms with less well-established banking relationships or firms operating in less developed financial markets hold significantly higher levels of accounts payable.

Microfinance institutions also help to bridge the credit gap by providing small loans to small businesses and new entrepreneurs using collateral substitutes such as group guarantees and the microloan can increases over time based on sound repayment patterns (Chávez *et al.,* 2018). After economic liberalisation in 1994, the Government of Ethiopia adopts microfinance as a prime component of its new economic development agenda in the context of the traditional banks' poor performance in supplying suitable financial products for small farmers and micro, small and medium enterprises (MSMEs) (Wiedmaier-Pfister, Gesesse, Amha, Mommartz, Dufllos, & Steel, 2008). However, according to Wiedmaier-Pfister *et al.,* financial services for the low-income population, poor farmers and MSMEs are still characterised by limited outreach and high transaction costs for clients.

Wellalagea and Fernandez (2019) investigated the relationship between external financing and firm-level innovation of SMEs in Central Asia and Eastern Europe and found that having formal finance is positively associated with firm-level product innovation and process innovation. However, according to Wellalagea and Fernandez formal finance is not equally important for young and old firm's product and

process innovation. They found that formal finance has a more significant effect on young firms' product and process innovation; whereas informal finance seems more relevant to older firms' innovation.

The financing needs of exporting firms are different to other firms for a number of reasons. For example, exporters have a more serious need for working capital financing due to the longer payment delays associated with selling abroad. However, there is inconsistency in the literature about the effect of firm's export status on its access to finance. According to Beck, Demirgüç-Kunt & Maksimovi (2005), exporters face lower financing obstacle. On the contrary Ullah (2020) reported that exporting firms are more credit constrained than non-exporting firms.

When it comes to SMEs in Ethiopia, Weltbank (2015) conducted an ad-hoc side survey with 16 Ethiopian financial institutions including microfinance institutions and public and private commercial banks and identified some firm specific obstacles for SME financing. These obstacles are: inability to manage risk, poor quality financial statements, lack of knowledge of business management, lack of awareness on how to be bankable, lack of collateral, and informality of SMEs.

Cross country studies found an association between financial development and access to finance. Kuntchev *et al.* (2013), for example, found that in countries with high private credit to gross domestic product ratios, firms are less likely to be credit constrained. Using firm-level survey data, Ullah (2020) and Beck, Demirgüç-Kunt and Maksimovi (2005) also show that firms in countries with developed financial systems obtain more external financing than firms in countries with less-developed institutions.

2.3 Summary and Research Gap

SMEs have been the focus of recent academic and policy debates (Ayyagar *et al.*, 2018). This is not surprising provided the role they play for economic development (Gherghina *et al.*, 2020; Zeidy, 2020). They are considered as fundamental parts of a dynamic and healthy economy (Kuntchev *et al.,* 2013). SMEs are even more important in developing countries (Amsi *et al.*, 2017; Gherghina *et al*., 2020; Zeidy, 2020) where labor is abundant and capital is scarce. They tend to be more labor-intensive than, and use less capital to produce the same goods as, large enterprises (Ho, 1980). SMEs accounts for 90 percent of all businesses operating in Africa, and they are responsible for 80 percent of the continent's employment (Dasewicz *et al*., 2020). In other words, SMEs play a crucial role for economic development of African countries in driving growth, creating employment - especially among youth - and spearheading innovation (Zeidy, 2020.

Several studies were conducted to identify the factors contributing to firm growth in the context of both developed and developing economy. Firm size, firm age, process and product innovation, management experience and access to finance are among the factors considered in the firm growth literature (Evans,

1987; Hart, 2000; Bigsten and Gebreeyesus, 2007; Coad and Hölzl, 2012; Chávez *et al.*, 2018; Flaminiano and Francisco, 2021; Wellalagea and Fernandez, 2019). However, the literature lacks harmony.

In addition, the effect of access to finance on firm growth is not addressed in the context of Ethiopia. Different contexts may force firms to deal with access to finance problems differently. For example, level of financial development (Becker, 2007), fintech technologies (Fasano & Cappa, 2022), country-level corruption and level of institutional developments (Ullah, 2020) affect SMEs extent of financial constraints.

Even more, according to Quartey, Turkson, Abor and Iddrisu (2017), financing the development and growth of SMEs has been of serious concern to policy makers in Sub-Saharan Africa (SSA) for two important reasons. First, for the region to be able to compete effectively in the increasingly globalized environment, its SMEs should grow and transform into a stage where they will be able to adapt efficient production techniques. Second, given that SMEs are a cornerstone for the creation of employment in the region.

Against this background, this study intends to examine the effect of access to finance on the growth of Ethiopian SMEs and to identify important determinants of SMEs access to financing in the country.

Chapter Three

Research Methodology

1. Introduction

This chapter outlines the research design and methodology to be employed in this study. It describes the research design, data collection methods and data analysis and presentation of the research findings.

3.1 Research Design

Research design is the overall plan of how we will go about answering our research question (Saunders Lewis and Thornhill, 2019). This study uses a quantitative research approach as such approach is recommended when predetermined and highly structured data collection techniques are used. According to Saunders *et al*., quantitative research is usually associated with a deductive approach and it examines relationships between variables, which are measured numerically and analysed using a range of statistical and graphical techniques.

3.1.1 Data

This study will use the World Bank's 2011 and 2015 Enterprise Surveys (WBES) data. The surveys cover a broad range of topics including sales, costs of inputs/labor, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilization, land and permits, taxation, informality, business government relations, innovation and technology, and performance measures.

The survey employed a stratified random sampling with replacement technique. The strata for the surveys are firm size (number of employees), business sector, and geographic region within a country. Based on firm size, the surveys provide three strata, namely, small (5-19 employees), medium (20-99 employees), and large (100+ employees). However, this study used the definition for micro and small enterprises contained in the National MSE Development Strategy (2011) (See Table 3.1). In the dataset, 303 large, 276 medium and 907 micro and small Ethiopian firms were included in the sample.

Sector breakdown in the survey are in to manufacturing, retail, transport, and other services. In case of Ethiopia, specific manufacturing sub-sectors including food, textiles and garments, non-metallic mineral products and other manufacturing are selected as additional strata. About 383 manufacturing, 83 retail, 84 transports, and 298 other service enterprises were included in the 2015 Survey. The study control for industry effects by including industry dummy variables.

In terms of geographic coverage, the WB Enterprise Surveys include firms operating in six regions of the country, namely, Addis Ababa, Oromia, Tigray, Amhara, SNNPR and Dredawa. In the 2015 Survey, about 54% of the sample firms were operating in Addis Ababa followed by Oromia (16%) and Tigray

(13%). Only 8%, 6% and 3% of the sample firms were operating in Amhara, SNNPR and Diredawa, respectively. The effect of operating regions is controlled by using region as a dummy variable.

3.1.2 Measuring Access to Finance

Access to finance is one of the business obstacles considered in the World Bank Enterprise Survey. The other obstacles that the survey that the survey considers are: access to land, business licensing and permits, corruption, courts, crime, theft and disorder, customs and trade regulations, electricity, inadequately educated workforce, labor regulations, political instability, practices of competitors in the informal sector, tax administration, tax rates, and transport.

The World Bank Enterprise Surveys forward two groups of questions on business obstacles including access to finance. The first types of questions ask establishments to express their opinion about the magnitude of the obstacle caused by the elements of the business environment. Establishments are exposed to one challenge at a time and asked to state if an element of the business environment is an obstacle or not. A 0 score implies that the element is not an obstacle at all and a score of 5 implies that an element is a sever obstacle. The second types of questions ask firms to select the single most important business obstacle among the list of 15 possible challenges. Furthermore, to identify weather access to finance is a key business obstacle facing SMEs in Ethiopia, this study considered the percentage of SMEs that reported access to finance as the single most important constraint.

This study adopts Kuntchev *et al.*'s (2013) innovative way of identifying credit-constrained firms considering their ability to obtain new credit and use them. Using the finance section of the Enterprise Surveys, Kuntchev *et al*. (2013) constructed four groups that measure the extent of which firms were credit constrained. These are fully credit constrained (FCC), partially credit constrained (PCC), may be credit constrained (MCC), and not credit constrained (NCC). Figure 2 below provides a decision tree of the criteria that Kuntchev *et al*. (2013) uses for classifying firms as FCC, PCC, MCC and NCC. The extreme right part of the figure shows that FCC firms have no external loans as either their loan applications were rejected or they did not apply for loan deterred by the potential loan's terms and conditions.

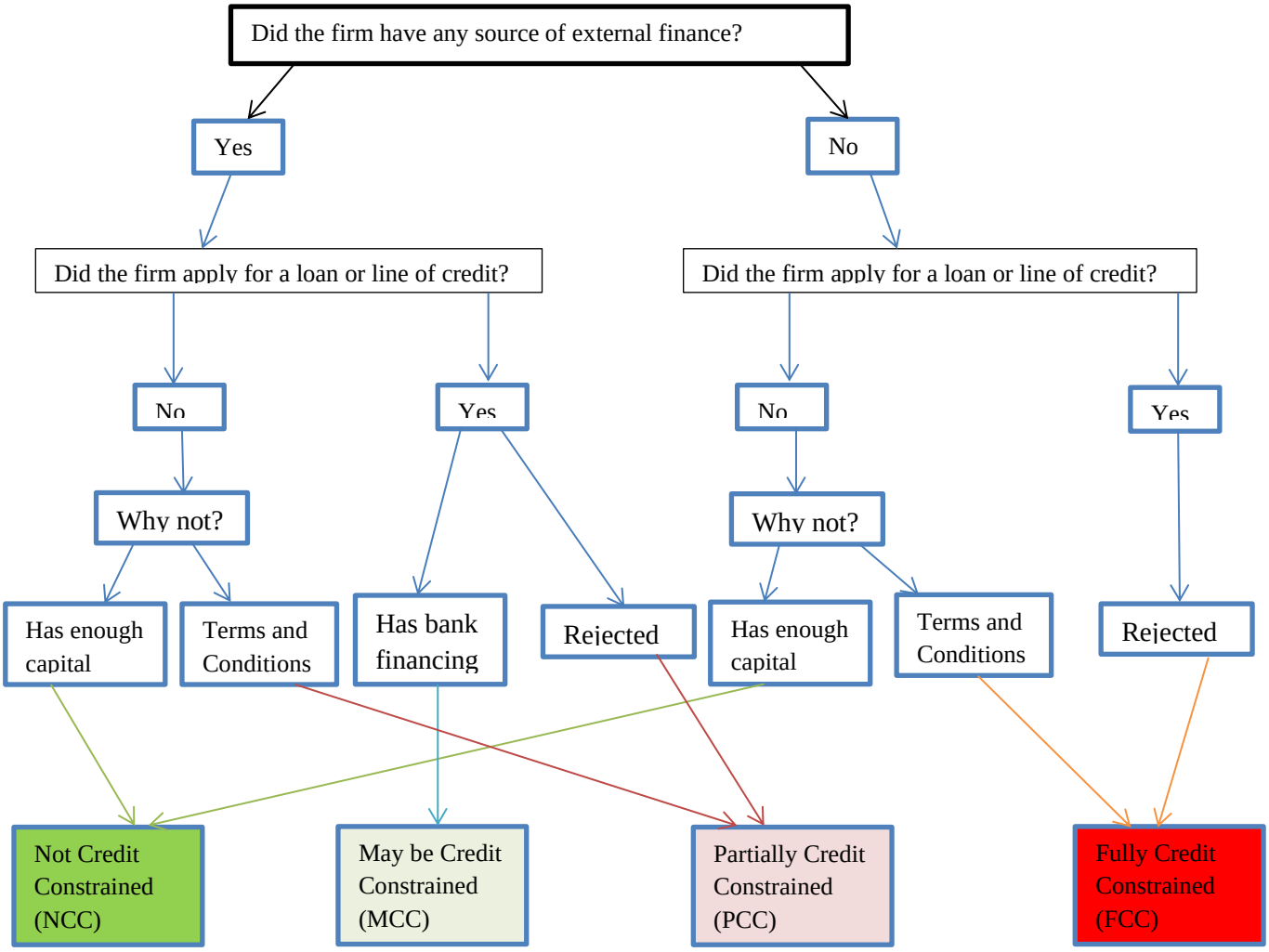


Figure 3.1: Criteria for identifying credit constrained firms, Adopted from Kuntchev *et al*. (2013)

Firm size can be a very important factor in how firm growth is constrained by access to finance. Hence, in this study size is a dummy variable that takes the value of 1 for micro and small firms, 2 for medium firms and 3 for large firms.

3.1.3 Measuring Firm Growth

There are varieties of indicators of firm growth (Coad and Hölzl, 2012) and there is no consistency in the dimension of growth (O'Farrell and Hitchens, 1988). Some refer to employment while others to profits, value added, turnover, and total assets to measure firm growth. However, employment or total sales are the most commonly used indicators in the empirical analysis (Delmar, 1997 as cited in Coad and Hölzl, 2012). This study uses both sales and employment as a measure of firm growth for two reasons. One, the World Bank's Enterprise Surveys reports no asset, profits, and capital data for Ethiopian firms to be able to compute growth rate using such indicators. Two, though sales growth is an important measure of firm growth (), it has its own limitations. For example, Coad and Hölzl (2012) indicated three advantages of

using employment as a measure of firm growth compared to sales: (1) sales may overstate the size of the firm as it may not only reflect the value added of the firm but also material purchase; (2) use of employment as an indicator of firm size reduces measurement problems compared to financial measures such as sales, as it does not require deflation; and (3) employment as a measure of growth of small firms may be more robust than sales and profits. In addition, sales growth is more volatile and more prone to reporting and measurement biases (Fowowe, 2017). Thus, using both sales and employment to measure growth improves the robustness of the results.

From the firm growth literature, there are two basic approaches to measure growth: the absolute growth and the relative growth measures. According to Coad and Hölzl (2012), absolute growth is relatively frequently used in the small entrepreneurial firm growth literature, whereas relative growth measures are predominantly used in the industrial organization and labor economics literature. Log-differences of size are cited as a best measure of relative growth rates (Tornqvist *et al*., 1985 cited in Coad and Hölzl, 2012). That is,

$$g_{it} = \log(S_{it}) - \log(S_{it-1})$$

where S_{it} is the size of firm *i* at time *t*.

Thus, employment growth is defined as:

$$\text{Employment Growth}_{it} = \log(Employees_{it}) - log(Employees_{it-2})$$

Where $Employees_{it}$ is the employment of firm *i* at time *t*.

Whereas, sales growth can be defined as:

$$\text{Sales Growth}_{it} = \log(Sales_{it}) - log(Sales_{it-2})$$

3.1.4 Modeling Determinants of Access to Finance

The study employed an ordered logit model, in which the dependent variable will be the ordinal variable: 1=NCC, 2=MCC, 3=PCC, and 4=FCC. The independent variables will include the basic characteristics of firms, top manager's experience, owner's characteristics and collateral. The estimation model of access to finance as a dependent variable can be constructed as:

$$Finance_{it} = \beta 0 + \beta 1\, SIZE_{it} + \beta 2\, age_{it} + \beta 3\, age^2_{it} + \beta 4\, collateral_{it} + \beta 5\, experience_{it} + \beta 6\, sex_{it} + \beta 7\, ownership_{it} + \beta 8\, region_{it} + \beta 9\, export_{it} + \beta 10\, sector_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots (1)$$

Where: Y_i is the outcome variable which represents whether firm i is FCC, PCC, MCC or NCC. The higher values of Y_i denote lower values of access to finance. In the case of NCC and MCC, there is no hard evidence of being credit constrained.

3.1.5 Modeling SMEs Growth

The study will use both descriptive and econometric techniques to carry out the data analysis. The descriptive analysis will be used to explore the distribution of access to finance across firms of different characteristics. In addition, the descriptive analysis will be used to understand how much constraining is access to finance for firms growth and performance, as per the firms perception, among the other business obstacles.

The econometric model of this study is builds on Beck *et al*. (2005). Two econometric models will be used in the study. The first model will be used to identify whether access to finance is important for firm growth and the second model will be used to investigate the determinants of SMEs access to finance in Ethiopia. Many factors have been included as explanatory variables in growth rate regressions (Coad and Hölzl, 2012). Access to finance is the explanatory variable in this study while firm size, firm age, productivity, products and process innovation, top managers work experience, and region are control variables. Size is measured in terms of employment. Age is measured by the number of years since establishment.

Productivity is included to examine the prediction that more efficient firms grow/survive while the less efficient ones contract/exit (Kuntchev *et al.*, 2013). The productivity variable in this model is measured by sales per employee. Products and process innovation takes the value of one if the firm has introduced any new products and services within the last three years and zero otherwise. Top manager's experience is measured by the number of years the top manager worked in the sector.

Region takes the values of one (1) if the firm is located in Addis Ababa, Oromia, Tigray, Amhara, SNNPR and Dredawa respectively and zero otherwise. It is expected to capture differences among firms in their access to better financial infrastructure, skilled labor, raw materials, and outputs. The statistical model to identify determinants of SMEs' growth can be stated as;

$$Firm\ Growth = f(access\ to\ finance, firm\ age, firm\ size, products\ and\ process\ innovations,$$
$$nationality\ of\ ownership, experience\ of\ top\ management, productivity\ and\ others)$$

Thus,

$$Firm\ Growth_{it} = \beta 0 + \beta 1\ access\ to\ finance_{it} + \beta 2\ size_{it} + \beta 3\ age_{it} + \beta 4\ age^{2}_{it} + \beta 5\ ownership_{it} + \beta 6\ experience_{it} + \beta 7\ innovation_{it} + \beta 8\ region_{it} + \beta 9\ sector_{it} + \varepsilon_{it} \ldots\ldots(2)$$

The independent variables were described in Table 3.1 below.

Table 3.1: Description of variables

Dependent (D) and Independent (I) Variables	***Description***
Firm Growth	• Sgrowth is the logarithm of the ratio of reported sales by firm i for the current period to sales reported three years ago. • Lgrowth is the logarithm of the ratio of reported employment by firm i for the current -period to reported employment three years ago.
Access to finance	Ordinal variable: Access to finance is 1=NCC, 2=MCC, 3=PCC, and 4=FCC. Thus, higher values denote higher levels of credit constraint.
Firm size	Dummy variable: • Micro and Small-number of employees between 0 and 30 • Medium-number of employees between 31 and 99 • Large-number of employees>99
Firm Age (I)	Age of the firm at the time of the survey (years) constructed by subtracting the reported year of establishment from the survey year.
Experience (I)	Top manager's years of working experience in the sector
Sex	Dummy variable: (1) represents if the firm is owned by female and zero otherwise.
Ownership	Dummy variable: 100% domestically owned-1; otherwise-0
Innovations	Dummy variable: (1) represents if the firm has introduced any new products and services within the last three years and otherwise zero.
Productivity	Proxied by output to number of employees
Exportshare	Measured as the percentage of sales accounted for by exports
Collateral	A dummy variable that 1 represents if the firm needs to pledge any sort of collateral while getting credit from the bank and zero otherwise.
Region	Region takes the value of 1 if the firm is located in Addis Ababa, Oromia, Tigray, Amhara, SNNPR and Dredawa, zero otherwise.
Sector	Sector equals one if firm i operates in the manufacturing sector and 2 if it operates in the service sector.

Chapter Four

Data Analysis and Discussion

This chapter presents data analysis and discussion part of the study. The effect of access to finance on firm growth is analysed using the data from the World Bank's Enterprise survey (WBES) data base. Graphical method of analysis is used to analyze the perception data and to understand the distribution of financial obstacle among firms of different sizes, industries, and operating regions. Descriptive statistics is used to understand the average, and standard deviation of the different variables of interest in the study. It also presented the minimum and maximum values of the variables which help in getting a picture about the maximum and minimum values a variable can achieve. Finally random effect (RE) regression model is used to analyze the hard data extracted from the survey.

The data is obtained from the World Bank's Enterprise surveys for the year 2011 and 2015 and the survey has an access to finance component. Both descriptive and econometric techniques are used to analyze the data. The study employed a series of robustness checks, including controlling for firm characteristics, industry effects, regional effects, and the main results continue to hold. The study also winsorized the growth rates at the top and bottom 1% and employed Durbin–Wu–Hausman test (augmented regression test) to check for endogeneity.

4.1. Descriptive Analysis

The WBES for Ethiopia is a firm-level survey of a representative sample of the private sector. The survey uses stratified random sampling where the strata are firm size, business sector, and geographic region within the country. Regarding firm size levels, this study uses the classifications contained in the National MSE Development Strategy (2011).

Table 4.1: Distribution of the sample firms by regions and size

	Firm size			
Sampling Region	Micro & Small	Medium	Large	Total
Addis Ababa	487	205	223	915
Amhara	85	14	13	112
Dredawa	16	4	7	27
Oromia	146	34	38	218
SNNPR	51	7	12	70
Tigray	122	12	10	144
Total	907	276	303	1,486

Source: The World Bank Enterprise Survey (2011& 2015)

The size stratification of the firms is defined as Micro and Small (MSEs) if the numbers of employees are 30 and below, Medium (MEs) if the numbers of employees are between 31 and 99, and Large (LEs) if the number of employees are 100 and above. As shown in Table 4.1, MSEs account 61% of the sampled firms while close to 19% and 20% of the sampled firms are Medium and Large enterprises respectively. Regarding the regional distribution of the sampled establishments, close to 62% of the firms were

operating in Addis Ababa while Oromia, Tigray and Amhara hosting 14.7%, 9.7% and 7.5% of the firms respectively. Dredawa hosts only less than 2% of the sampled establishments while 4.7% of the establishments are operating in SNNP (See Table 4.1).

The manufacturing and services sectors are the primary business sectors of interest in the World Bank's Enterprise Survey. The industry distribution of sampled Ethiopian firms is shown in the Table below.

Table 4.2: Distribution of the Sample establishments by Industry and Size

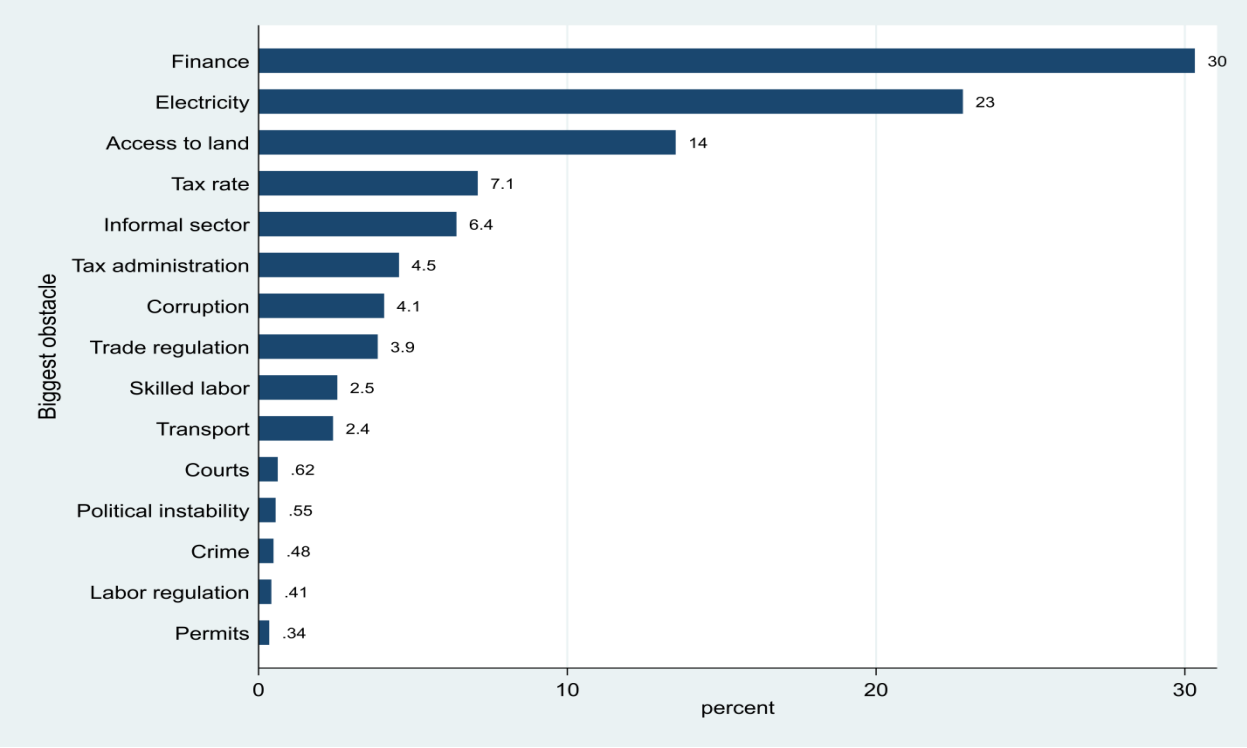
	Firm size			
Sector	Micro and Small	Medium	Large	Total
Manufacturing	357	151	210	718
Service	550	125	93	768
Total	907	276	303	1486

Source: The World Bank Enterprise Survey (2011& 2015)

As shown in Table 4.2, majority of the sampled enterprises are engaged in the service sector. Besides, the Table shows that MSEs, which dominated the service sector, account 61% of the sampled enterprises. Majority of the medium and large firms, however, are manufacturing enterprises.

The World Bank Enterprise survey asks firms to identify the biggest obstacle they are facing among a given list of 15 obstacles. The graph below highlight the biggest obstacles experienced by private sector firms in Ethiopia.

Fig. 4.1: The biggest obstacle perceived by firms in Ethiopia

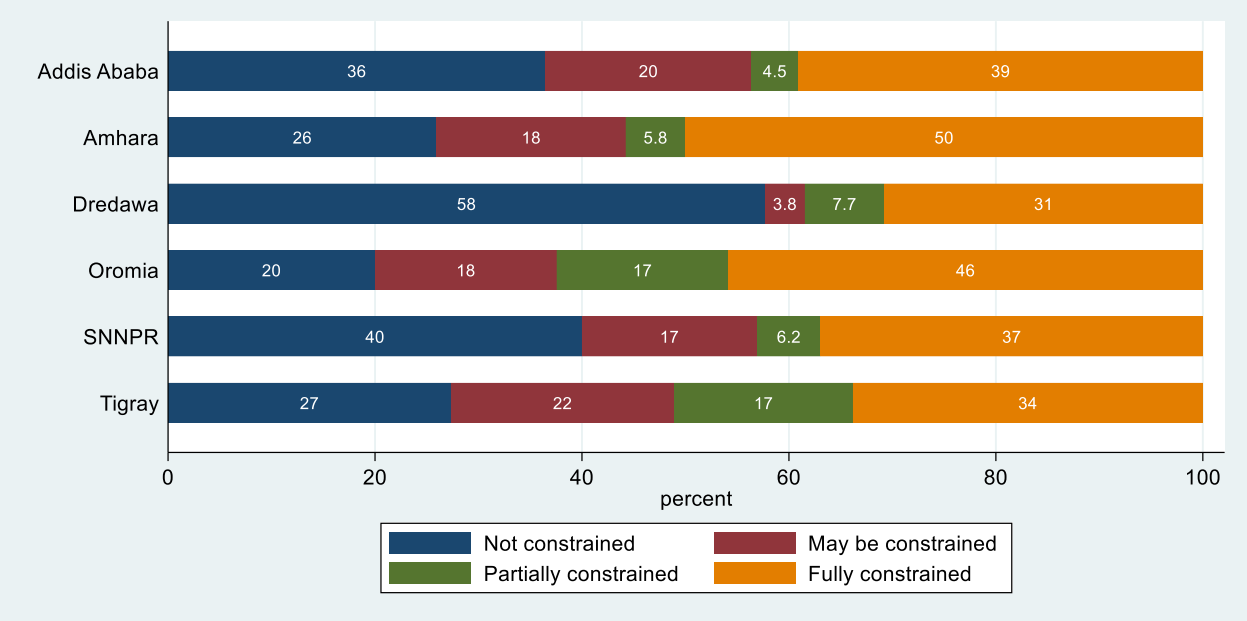


Source: The World Bank Enterprise Survey (2011& 2015)

To identify the biggest obstacle among the given list of challenges, the frequency with which a given obstacle was selected by firms as its biggest obstacle is used. As indicated in Fig. 4.1, over 30% of the firms identified access to finance as their biggest obstacle followed by electricity (23%) and access to land (14%). Only less than 1% of the sampled establishments chooses business licensing and permits (0.34%), labor regulation (0.41%), crime/theft (0.48%), political instability (0.55%), and courts (0.62%) as their biggest obstacle of doing business.

The level of financial and legal developments is an important determinant of firms' access to finance (Beck, 2007). Due to this, financial obstacle is not expected to be uniform across firms operating at different regions in Ethiopia. For example, firms operating in Addis Ababa, where the financial infrastructure is expected to be better, are expected to be less financially constrained than firms operating in rural areas. Figure 4.2 below presents the nexus between access to finance and firms operating regions.

Fig. 4.2: Access to finance across regions



Source: The World Bank Enterprise Survey (2011& 2015)

Both subjective and objective measures of access to finance are used in the study. Following Kuntchev et al. (2013), the study makes use of objective information such as use of external sources of finance, outstanding loans or lines of credit, and loan applications in creating four objective measures of access to finance. This objective measure of access to finance is used in Fig. 4.2.

As expected, access to finance constrains firms differently across regions (see Fig. 4.2). Firms operating in the Amhara and Oromia regions are the most financially constrained. For example, out of firms operating in the Amhara and Oromia region, 50% and 46% respectively are fully constrained. In the case of Dredawa, the least financially constrained region, only 31% of the establishments are fully constrained.

To further understand the nature of the financial obstacle they are facing, firms were asked to choose specific financing issues that prohibit them from applying for loan. As displayed in Table 4.3, 42.3% of firms have sufficient capital and do not need a loan. Out of those non-loan applicants, in need of loan,

36% did not apply because of the high collateral requirements of creditors. Only 9.4% of the firms are prohibited by the size of interest rate from applying for a loan.

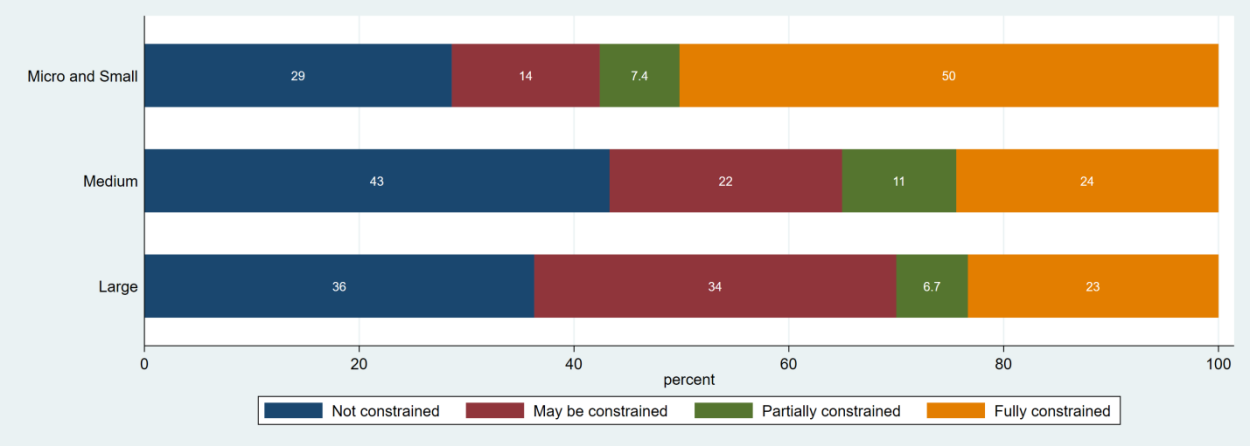
Table 4.3: Main reason for not applying for new loans or new lines of credit	Freq.	Percent	Cum.
No need for a loan - establishment had sufficient capital	453	42.34	42.34
Application procedures were complex	71	6.64	48.97
Interest rates were not favorable	58	5.42	54.39
Collateral requirements were too high	222	20.75	75.14
Size of loan and maturity were insufficient	43	4.02	79.16
Did not think it would be approved	59	5.51	84.67
Other	164	15.33	100.00
Total	1070	100.00	

Source: The World Bank Enterprise Survey (2011& 2015)

The importance of collateral on bank's lending decision in Ethiopia is discussed in the extant literature. For example, as per Weltbank (2015), about a third of Ethiopian SMEs are discouraged from applying for loan or line of credit because collateral requirements are high.

Firm size can be an important factor in determining whether firm operation is constrained by financial obstacles. For example, small firms are expected to face tougher financial obstacle than large firms. Small firms may not be able to provide adequate collateral, may be more opaque, and may not have established relationships with creditors. Fig. 4.3 below compares the credit constraint status of micro and small, medium, and large-sized firms in Ethiopia.

Fig. 4.3: Access to finance across firm size



Source: The World Bank Enterprise Survey (2011& 2015)

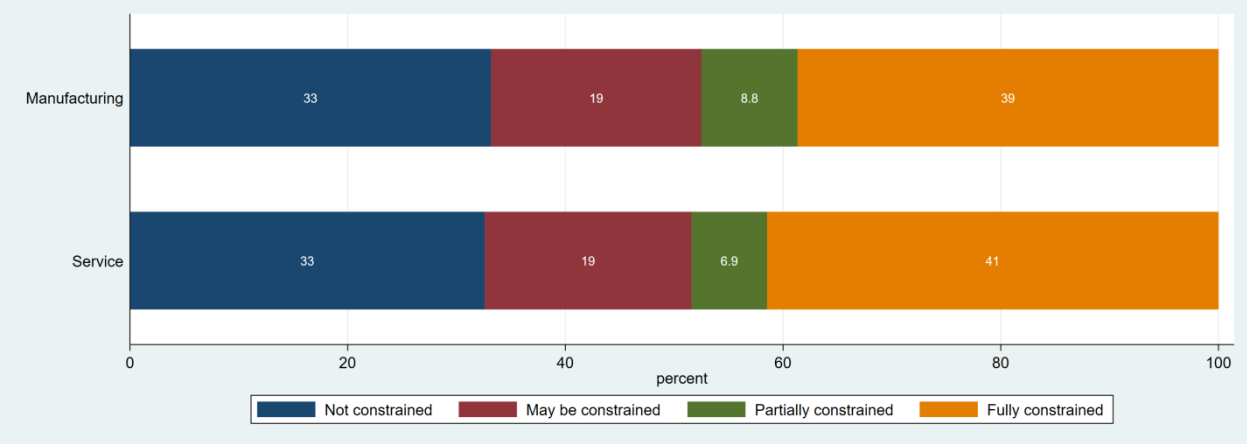
As shown in Fig. 4.3, firm size is important in determining access to finance where access to finance is measured objectively. For example, MSEs (50%) are much more credit constrained than medium (24%) and large (23%) firms. However, much difference is not observed between medium and large firms in their access to finance. This is consistent with the findings of Kuntchev *et al.* (2013) who argues that the proportion of SMEs that are fully credit constrained is always larger than the proportion of large firms.

Firms are asked to estimate the proportion of their working capital and purchase of fixed assets that are financed from various sources. Over all 68.98% and 73.81% of the sampled firms fully finance their working capital (funds available for day-to-day operations) and purchases of fixed asset respectively using their internal funds or retained earnings. Whereas 77.44% and 83.10% of the firms do not use any

bank loan to finance their working capital and to pay for the acquisition of fixed asset. Significant difference is not observed between SMEs and large firms in their use of bank loan to finance working capital and fixed asset. As depicted in Table 4.12 in the Appendix, majority of the firms (regardless of their size) operating in Ethiopia are financing their working capital and fixed asset using their internal fund/retained earnings. For example, on average 86.42% of SMEs finance their working capital using internal funds or retained earnings while the figure is 80.27% for large firms. Only 9.38% of SMEs and 16.33% of large firms used bank loan to finance their working capital. Credit purchases and customer advances, loan from non-bank financial institutions, and other money lenders, relatives, friends are used to finance working capital only by less than 5% of the sampled firms. The result is not much different for purchases of fixed asset. SMEs (84.83%) and large firms (80.15%) used internal funds/retained earnings to pay for purchase of fixed asset.

To understand whether firms credit status is affected by the sector that they engaged in, the study constructs Fig 4.4 below.

Fig. 4.4: Access to finance across sectors



Source: The World Bank Enterprise Survey (2011& 2015)

The distribution of credit constrained (partially constrained and fully constrained) and non-credit constrained (not constrained and may be constrained) firms are similar between the manufacturing and service sectors (see Fig. 4.4). Thus, access to finance for firms operating in Ethiopia does not vary across industry.

Summary Statistics

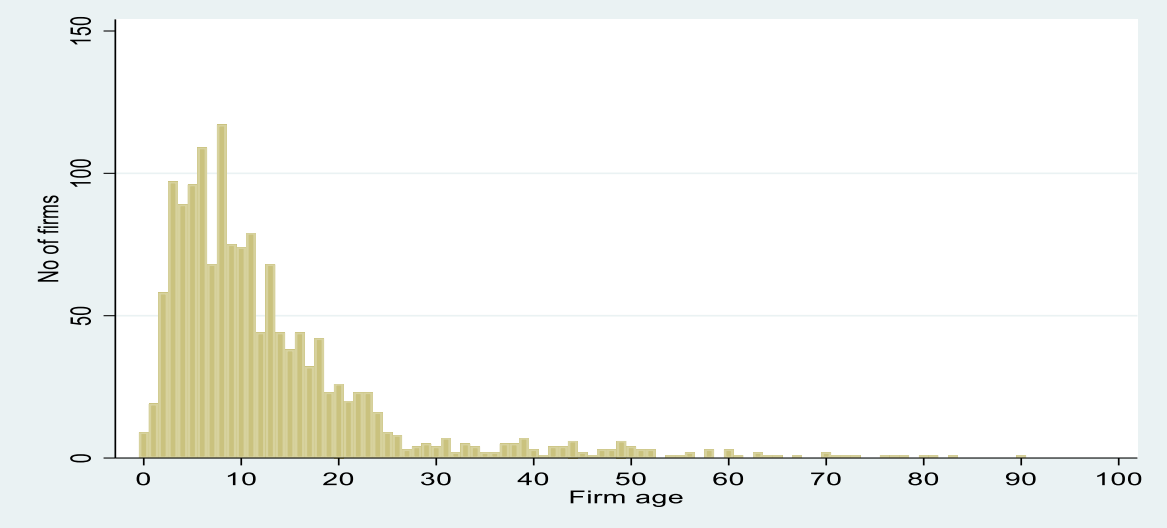
Summary statistics on a number of indicators of firm growth and access to finance by sampled Ethiopian firms operating within six regions of the country are reported in Table 4.4 below.

Table 4.4: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Lgrowth	1327	.209	.38	-2.015	2.303
Sgrowth	1036	.361	.769	-2.617	8.484
FirmAge	1476	12.968	12.148	0	90
Experience	1466	14.031	9.936	1	60
Exportshare	1484	6.147	21.288	0	100

The sampled firms have an average age of close to 13 years and managers with an average experience of 14 years. The average annual growth rate is 20.9% when employment is used as a measure of firm growth while it is 36.1% when sales growth are used as a proxy for firm growth. Figure 4.5, which presents age distribution for population of firms, reveals that only small proportion of the sampled Ethiopian firms has over 20 years of life.

Fig. 4.5: Frequency plot over firm age



Source: The World Bank Enterprise Survey (2011& 2015)

In Table 4.4 the percentage of sales exported of the establishments, on average, is just over 6% considering both direct and indirect exports. One reason why exports are low may be that incentives provided for exporters are insufficient to motivate the private sector to engage in exports (Gebreyesus and Demile, 2017).

4.2. Regression results

In this section, the determinants of firms' access to finance and the effect of access to finance on growth of SMEs are discussed where access to finance is measured using both objective and subjective data. The study undertakes model selection and specification tests, such as the Hausman specification, normality, multicollinearity, and heteroskedasticity. As per the model specification test, the true model is the random-effect (RE) model (see Table 4.9 and Table 4.10 in the Appendix). Wrongly assuming fixed effect (FE) model when the true model is RE will lead to an inefficient fixed-effect estimator. Thus, RE model is used in the study.

Also, for the sake of robustness, the study undertakes (1) additional estimations that employ subjective measures of access to finance (see Table 4.5 below), (2) separate regression analysis for SMEs and large firms (see Table 4.7 and Table 4.8 in the Appendix), and (3) two measures of firm growth i.e, sales and employment.

4.2.1. Access to finance

This study analyzed the relationship between firm characteristics and credit constraints among SMEs in Ethiopia using estimates of marginal effects at the means from logistic regressions in Table 4.5.

Table 4.5:
Regression Results-Determinants of access to finance

The regression estimated are

1. Access to finance= $\beta_1$collateral +. B_2firmsize + β_3FirmAge + $\beta_4$age^2 + $\beta_5$dom_own + β_6 innovation + $\beta_7$exportshare + $\beta_8$region + β_9 sector + β_{10}sex

Collateral is a dummy variable that takes the value of 1 if collateral is required for obtaining credit and 0 otherwise. *Firmsize* is a dummy variable that take the value of 1 if a firm is *micro & small,* 2 if a firm is *medium*, and 3 if a firm is *large.* Micro & small-size firms employ 0-30 employees, medium-size firms employ 31-99 employees, and large-sized firms employ more than 100 employees. Finance is a dummy variable that takes the value of 1 if finance is 'not constrained' 2 if finance is 'may be constrained' 3 if finance is 'partially constrained' and 4 if finance is 'fully constrained'. Finance was also measured for the sake of robustness check using subjective information (perception data) in which it takes the value of 0 if finance is 'not an obstacle'; 1 if finance is a 'minor obstacle'; 2 if finance is a 'moderate obstacle'; 3 if finance is a 'major obstacle'; and 4 if finance is a 'very severe obstacle'.

	(1)		(2)
	Finance-Objectively Measured	Marginal effects	Finance-Subjectively Measured
Collateral	-0.558***	-0.558***	-0.583***
	(-4.71)	(0.119)	(-5.55)
Size- Medium	-0.914***	-0.914***	-0.358*
	(-5.73)	(0.160)	(-2.56)
Large	-0.825***	-0.825***	-0.509***
	(-4.93)	(0.167)	(-3.40)
FirmAge	-0.0292*	-0.0292**	-0.0388***
	(-2.43)	(0.0120)	(-3.56)
Age^2	0.000315	0.000315*	0.000378*
	(1.69)	(0.000186)	(2.26)
dom_own	0.168	0.168	0.214
	(0.85)	(0.197)	(1.14)
Innovation	-0.305**	-0.305***	0.132
	(-2.60)	(0.118)	(1.26)
Exportshare	-0.00588*	-0.00588**	-0.00311
	(-2.27)	(0.00259)	(-1.26)
Amhara	0.495*	0.495**	0.377
	(2.11)	(0.235)	(1.88)
Dredawa	-0.874*	-0.874**	-1.363***
	(-2.04)	(0.428)	(-3.76)
Oromia	0.304	0.304*	-0.0387
	(1.87)	(0.163)	(-0.26)
SNNP	-0.652*	-0.652**	-1.439***
	(-2.33)	(0.280)	(-5.25)
Tigray	-0.409*	-0.409**	0.381
	(-2.12)	(0.193)	(1.95)
Sector-Service	-0.265*	-0.265**	-0.323**
	(-2.24)	(0.118)	(-3.01)
Sex-Female	0.303	0.303	0.254
	(1.58)	(0.192)	(1.52)
Constant		-1.913***	
cut1		(0.283)	
_cons	-1.913***		-1.946***
	(-6.77)		(-7.64)
N	1,278	1,278	1,354

Note; standard errors in parenthesis; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The first model is used to examine the determinants of SMEs access to finance in the context of Ethiopia. To test the association between the credit constraint status and firm characteristics, an ordered logit model were considered in which the dependent variable is the ordinal variable where 1=NCC, 2=MCC, 3=PCC, and 4=FCC. Therefore, higher values of this ordinal variable signify higher levels of credit constraint. From the data used in the study, 47.7% of the sampled Ethiopian establishments are at least partially constrained. This is a significant figure that needs the attention of policymakers.

Column two of Table 4.5 above shows estimates of the marginal effects after controlling for region and sector characteristics of firms. There is a significant and negative relationship between collateral, innovation, firm age, export as share of total sales, or firm size with credit constraint, i.e. the lower the export as a share of total firm sales, the younger the firm, or the smaller the firm the higher the probability of being credit constrained. The result is not surprising given the fact that SME lending in Ethiopia comprises of only 7% of bank portfolios (Weltbank, 2015). Consistent with Ullah (2020), older firms report lower financial constraints than younger firms. The result in relation to size is also in agreement with the finding that small firms are the most financially constrained (Beck et al., 2006; Kuntchev *et al.* 2013). Using the World Bank's Enterprise Survey, Kuntchev *et al.* (2013) observed a strong relation between firm size and their access to credit, where smaller firms are more credit constrained. Young and small firms are more financially constrained as these firms are relatively opaque than old and large firms. Besides, they may have more difficulties in acquiring finance from external sources due to their lack of established track record/credit information. The result in relation to firm age contradicts that of Weltbank (2015) who revealed that firm age is not a significant factor in predicting the probability of receiving a loan.

In relative terms, information asymmetry problems are expected to be less for large firms as they are required to file detailed financial reports. Small firms are also less likely to develop bank-borrower relationship necessary for securing external funding than large firms (Quarteyet *et al*., 2017). The relatively high adverse selection and moral hazard problems associated with small and young firms (Stiglitz & Weiss, 1981) may also contribute to these firms financial constraint. In support of the claim by Nichter and Goldmark (2009), lack of collateral is also behind the greater financial constraints that small firms are facing.

Financial institutions in Ethiopia have to change their business model to address the financing needs of SMEs (Weltbank, 2015). Weltbank argued that the Ethiopian financial institutions lack a dedicated and specialized SME unit or department within their organizational structure, their loan appraisal techniques are still mostly based on traditional relationship lending rather than on transactional technologies such as credit scoring, and their products are highly standardized with very limited product innovation. Besides, the financial institutions rely strongly on collateral in their lending decisions and collateral rates in

Ethiopia are the largest in Sub Saharan Africa (Weltbank, 2015). Firms not having collaterals are more probable to be financially constrained compared to those having assets for use as collateral (See Table 4.5 above). Unlike large firms, SMEs are by their very nature unable to provide the required collateral in obtaining formal banking sector loans and hence will be more probable to be constrained. Table 4.5 depicted that firms with adequate collateral are about 55.8% less constrained than otherwise. The result is not surprising given that creditors require collateral to minimize their adverse selection and moral hazard problems. Ayyagari *et al.* (2018) found lack of reliable credit information and lack of collateral as constraints that impede SMEs access to finance, which is supported by this study. The claim by Volk and Trefalt (2014) that collateral alleviates the financial constraint problem only for larger firms (not for micro firms) are not supported in this study. In the contrary, the result as shown in the Table 4.7 in the Appendix revealed that collateral is more important for SMEs than for large firms.

Innovative firms, firms that introduce new or improved products or services, are less probable to be credit constrained than non-innovative firms. To be specific, as indicated in Table 4.5, innovative firms are 30.5% less likely to be financially constrained than non-innovative firms. This result is supported by the literature. For example, Khan, Shah, and Rizwan(2017) argued that the impact of financial constraints is lower for the more novel, radical innovations than the less novel products. This implies that SMEs investment in product and process innovation eases their financial constraint.

Access to finance is also significantly driven by the operating region and sector of firms. As compared to firms operating in Addis Ababa, firms operating in Amhara and Oromia region are more probable to be financially constrained and the result is statistically significant at 5% and 10% respectively. In the contrary, firms operating in Dredawa, SNNPR, and Tigray regions are less probable to be financially constrained compared to those operating in Addis Ababa. Sector wise, firms in the service sector are less probable to face financial constraint than manufacturing firms. Specifically, firms operating in the Amhara region are about 49.5% significantly more likely to be credit constrained relative to firms operating in Addis Ababa. Dredawa's case is a bit surprising. Firms operating in this region are about 87.4% significantly less likely to be credit constrained compared to establishments in Addis Ababa.

Gender and domestic ownership, as shown in Table 4.5 above, don't make a significant difference on firms access to finance as the results are statistically insignificant. The result is in contrast with that of Dutta and Mallick (2022) who reported that firms with majority female ownership do perceive more constraints on accessing finance relative to firms with minority or zero female ownership (note that mostly owners are managers in the case of SMEs). In addition, Wellalage and Locke (2017) reported that enterprises owned and managed by females are less likely to be credit constrained compared to firms managed by males. However, as shown in Figure 4.6 in the Appendix, firms managed by females are more financially constrained than firms managed by males.

As expected, the higher share of firm sales exported, the lessor that firms get financially constrained. Their access to foreign currency, which is in a very short supply in an economy like ours, may enable exporters get better financial service from local banks. The result that exporting firms report lower financial constraints is in agreement with that of Beck *et al*. (2005) while it contradicts with that of Ullah (2020).

The study also conducts a separate regression for SMEs and large firms as presented in Table 4.7 in the appendix. Strikingly, collateral, innovation, firm age, and export as share of total sales have no significant effect on large firms access to finance. The result indicates that whether these factors constrain access to finance depends on firm size.

4.2.2. Firm growth

The role that small and medium enterprises play in economic development, their contribution to employment creation and economic diversification is widely recognized (Ayyagari *et al*., 2007). The Ethiopian government prepares the Growth and Transformation Plan (GTP, 2010/11-2014/15) in which the micro and small enterprises (MSEs) are considered as an important policy direction for employment creation in the country (NPC, 2016). Given this, this study aimed at examining how significantly access to finance constrains growth of SMEs in Ethiopia and Table 4.6 below shows the regression results.

Table 4.6:
Regression Results-Determinants of firm growth

The regression estimated are

1) Labor growth= $\beta_1$finance + $\beta_2$firmsize+ β_3FirmAge + $\beta_4$age^2 + $\beta_5$dom_own + $\beta_6$innovation + $\beta_7$exportshare + β_8 region + $\beta_9$sector + β_{10}sex + β_{11}electricity

2) Sales growth= $\beta_1$finance + $\beta_2$firmsize+ β_3FirmAge + $\beta_4$age^2 + $\beta_5$dom_own + $\beta_6$innovation + $\beta_7$exportshare + β_8 region + $\beta_9$sector + β_{10}sex + β_{11}electricity

Collateral is a dummy variable that takes the value of 1 if collateral is required for obtaining credit and 0 otherwise. *Firmsize* is a dummy variable that take the value of 1 if a firm is *micro & small,* 2 if a firm is *medium*, and 3 if a firm is *large.* Micro & small-size firms employ 0-30 employees, medium-size firms employ 31-99 employees, and large-sized firms employ more than 100 employees. Finance is a dummy variable that takes the value of 1 if finance is 'not constrained' 2 if finance is 'may be constrained' 3 if finance is 'partially constrained' and 4 if finance is 'fully constrained'. Lgrowth is the logarithm of the ratio of reported employment by firm i for the current period to reported employment three years ago. Sgrowth is the logarithm of the ratio of reported sales by firm i for the current period to reported sales three years ago.

	(1)	(2)
	Lgrowth	Sgrowth
Access to finance		
May be constrained	-0.00414	-0.0978
	(-0.14)	(-1.63)
Partially constrained	0.00793	-0.118
	(0.19)	(-1.42)
Fully constrained	-0.0338	-0.216***
	(-1.29)	(-3.94)
Firm size		
Medium	0.0137	-0.0208
	(0.46)	(-0.35)
Large	-0.0100	-0.105

	(-0.31)	(-1.62)
FirmAge	-0.0178***	-0.0157**
	(-7.38)	(-3.18)
age2	0.000194***	0.000172*
	(5.22)	(2.30)
dom_own	0.0610	0.0205
	(1.59)	(0.27)
Innovation	0.0950***	0.150***
	(4.27)	(3.29)
Exportshare	-0.000558	-0.000889
	(-1.09)	(-0.89)
Region		
Amhara	-0.00861	-0.0102
	(-0.20)	(-0.12)
Dredawa	-0.0315	-0.0454
	(-0.41)	(-0.29)
Oromia	-0.0899**	-0.0422
	(-2.79)	(-0.62)
SNNP	-0.0904	0.0106
	(-1.78)	(0.11)
Tigray	0.0104	0.0153
	(0.27)	(0.20)
Sector	0.0237	-0.0788
	(1.01)	(-1.65)
Sex	-0.0257	0.0887
	(-0.70)	(1.19)
Electricity		
Minor obstacle	-0.0316	0.0445
	(-0.78)	(0.54)
Moderate obstacle	-0.0495	0.0697
	(-1.25)	(0.86)
Major obstacle	-0.0968*	-0.0217
	(-2.24)	(-0.25)
Very severe obstacle	-0.0142	0.0913
	(-0.33)	(1.04)
_cons	0.359***	0.531***
	(5.98)	(4.26)
N	1145	900

Note standard errors in parenthesis; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.6 is about determinants of firm growth. Employment growth and sales growth are used as a proxy of firm growth. As expected, access to finance is a significant constraint to sales growth. However, contrary to expectations, when employment growth is used as a proxy of firm growth, access to finance doesn't have a significant effect on firm growth. As can be observed in the above table, a fully credit constrained firm in Ethiopia has 21.6 percentage points lower sales growth and 3.38% lower employment growth than firms who are not credit constrained. The result is in support of that of Ullah (2020) who reported that financially constrained firms have lower growth. Thus, as reported by Weltbank (2015), financing constraints is one of the main reasons preventing SMEs in Ethiopia from playing their role in employment creation and economic diversification.

It can also be seen from Table 4.6 that some of the control variables have a significant effect on firm growth. For example, firm age has a negative and significant effect on growth. However, the square of age has a positive relationship with growth, implying a non-linear relationship between them. This inverse relationship between growth and age is consistent with Coad, Daunfeldt, and Halvarsson (2018) who found that young firms experience a sudden burst of growth shortly after entry, and that soon afterwards their growth rates slow down. Most importantly, the effect of firm age on growth depends on firm size (see Table 4.8 in the Appendix). Evan (1987) also found firm growth to decline with age. As can be seen in Table 4.8, firm age, in relative terms, is more significant for SMEs than large firms. Therefore, this study presents strong evidence that young firms experience a sudden surge of growth shortly after entry, and that soon afterwards their growth rates slow down with age and size. The justification for the negative relation between growth and age is the learning hypothesis in which firm growth is highest during this learning period.

Firm size is one of the most important dimensions for distinguishing among heterogeneous firms. In both models, firm size is identified to have a negative effect on firm growth implying that small firms grow faster than large firms. This result is somewhat inconsistent with Gibrat's law of proportionate effect which states that firm growth is independent of firm size. However it supports other empirical studies that rejected the hypothesis of independence of firm growth from size (Coad and Hölzl, 2012; Bigsten and Gebreeyesus, 2007; Hart, 2000; Evans, 1987). Studies such as Evans (1987) found that firm growth decreases with firm size. The assumption that larger firms will grow more as they may have more internal resources and a better access to external resources is not supported.

Firm-level innovations are expected to have a positive influence on growth as it will enhance firms productivity. As expected, Ethiopian firms that introduced new or improved products or services significantly outperformed the non-innovative firms (see Table 4.6 above). Thus, the implementation of product or process innovations results in extra productivity growth for both large and small firms. However, as can be seen in Table 4.8 in the Appendix and consistent with that of Mansfield (1962), innovation had a greater impact on a small firms growth rate than on that of large firms.

Moreover, export as a percentage of total sales contributes positively for firm growth while firm growth rates are not different between female and male managers. In relation to their operating location, firms located in Addis Ababa (the capital city) grow faster. This may be due to the better infrastructure and larger markets for inputs and outputs that firms operating in Addis Ababa have.

4.3. Robustness checks

In this section the study shows that results are robust to different model specifications. The study performs three robustness checks:

First, the study estimated two different models of the logistic regressions to predict the likelihood of the regressors explaining a firm's access to finance. The core model used objective measures of access to finance while the perception data (subjective measure) are used in the other. The results obtained, as presented in column three of Table 4.5, more or less support what is found in the core model (column one). The exception is the factor 'innovation'. When the access to finance is measured using the perception data, innovative firms are not different in their access to finance from non-innovative firms. However, firms that introduce new or improved products or services are less probable to be credit constrained than non-innovative firms in the core model.

Second, the study also conducts a separate regression for SMEs and large firms as presented in Table 4.7 in the Appendix. Strikingly, collateral, innovation, firm age, and export as share of total sales have no significant effect on large firms access for finance. The result indicates that whether these factors constrain access to finance depends on firm size.

Third, two measures of firm growth are used: (1) sales growth and (2) employment growth. Separate econometric analysis was also conducted for SMEs and large firms. The results convey an important message that the significance of these firm growth determinants depends on the size of firms. Additionally, firm growth were analysed separately for SMEs and large firms.

Chapter Five

Conclusion and Recommendation

This chapter summarizes the major findings of the study with respect to determining factors of access to finance and the effect that access to finance has on the growth of Ethiopian SMEs. Possible recommendations and limitations are also reported in the chapter.

5.1. Conclusion

The overall objective of this study was to examine the effect of access to finance on growth of Ethiopian SMEs using the 2011 and 2015 WBES data set. To meet this objective, this study provides econometric evidence on the relationship of firm-level sales and employment growth to access to finance, firm age, firm size, and other factors such as innovation, export as a percentage of sales and ownership of firms. To address the second and third objectives of the study, two measures of access to finance were used from the WBES data set. Access to finance is measured both objectively using hard data and subjectively using perception data. It is described in association with firm size, sectors, firms operating regions, and gender. Firms in Ethiopia perceived access to finance as the most pressing obstacle for their operation and growth. However, it is not equally a constraint for firms of all sizes, operating regions, and gender.

Firm age, firm size, collateral, innovation, and export share are identified to have a significant negative effect on firms access to finance. In other words, large, old, innovative, and exporting firms with adequate collateral are less likely to be financially constrained than otherwise. Thus, firms investment in product and service innovation may ease their financial constraint. The effect of innovation and export share, however, are significant only when access to finance is measured objectively. Interestingly, the effect of collateral, innovation, and export share on access to finance depends on firm size. None of these factors, for example, have a significant influence on large firms financial access.

In support of Quarteyet *et al*.(2017), small firms face more challenges in accessing finance. Unlike large firms, small firms may not have adequate collateral, be unable to prove creditworthiness, not have adequate credit history and may not have a developed bank-borrower relationship necessary for securing external funding. In addition, in contrast to findings of Dutta and Mallick (2022), this study observes that the likelihood that firms managed by females to be financially constrained is not significantly different from male managed firms.

When it comes to the determinants of firm growth, the study found a significant positive relationship between growth, access to finance, and innovation controlling for regional and sectorial effects. A fully credit constrained firm in Ethiopia has 21.6 percentage points lower sales growth and 3.38% lower employment growth than firms who are not credit constrained. Firm age and size on the other hand, are

negatively associated with firm growth. The effect of age on firm growth, however, is not linear. Again, the influences of access to finance, innovation, and firm age on firm growth are size dependent, where these factors are more important for SMEs than large firms.

5.2. Recommendation

As small firms grow faster than large firms, policies aimed at encouraging small firms might have a significant effect on employment and sales growth. The findings of this study revealed that access to finance is one of the challenges for SMEs in Ethiopia. The Ethiopian government shall take well calibrated serious of interventions to ensure that the financial institutions address the SMEs market segment. For example, the government may provide incentives to financial institutions for serving such segment, or for having separate window for SME lending. Given the fact that the financial institutions rely heavily on collateral in their credit decision, establishing movable and immovable collateral registry would also be important for expanding the scope of secured lending and hence improving access to financial services. Moreover, the young and the small firms are the most financially constrained may be because of their opacity and policy makers shall support development/strengthening of depth of credit information such as credit bureaus. This may boost the confidence of creditors in lending to SMEs as reliable and value added credit information is possible with the existence of credit bureaus.

Finally, institutional framework for alternative sources of funding such as leasing, factoring, and joint venture capital may need to be developed or amended so that collateral will not be an issue.

5.3. Limitations of the study

Based on the WBES panel data set for the Ethiopian firms, this paper fills an empirical gap in the literature on firm growth in Ethiopia. However, it is not without limitations. The data set includes few micro enterprises (firms with fewer than 5 employees) and therefore firms that are excluded from the analysis are expected to be significant. As a result, the scope of the findings is limited to small, medium and large firms and it remains to be seen if it applies to the micro enterprises in the country. Thus, future work is required to address this issue.

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Appendix A

Table 4.7: Panel Ordered logit results separately for SMEs and Large firms

	(1)	(2)	(3)
VARIABLES	Access to finance for all firms	Access to finance for SMEs	Access to finance for Large Firms
Collateral	-0.558***	-0.648***	-0.398
	(0.119)	(0.145)	(0.280)
Size			
Medium	-0.914***	-0.968***	-
	(0.160)	(0.175)	
Large	-0.825***		
	(0.167)		
FirmAge	-0.0292**	-0.0362*	-0.0369
	(0.0120)	(0.0190)	(0.0259)
age2	0.000315*	0.000555	0.000371
	(0.000186)	(0.000402)	(0.000332)
dom_own	0.168	0.189	0.130
	(0.197)	(0.283)	(0.328)
Innovation	-0.305***	-0.342**	-0.306
	(0.118)	(0.143)	(0.274)
Exportshare	-0.00588**	-0.00860***	0.000788
	(0.00259)	(0.00328)	(0.00555)
Region			
Amhara	0.495**	0.498*	0.301
	(0.235)	(0.272)	(0.689)
Dredawa	-0.874**	-1.156**	0.0195
	(0.428)	(0.521)	(0.915)
Oromia	0.304*	0.195	0.849**
	(0.163)	(0.194)	(0.426)
SNNP	-0.652**	-0.916***	0.495
	(0.280)	(0.327)	(0.710)
Tigray	-0.409**	-0.500**	-0.00764
	(0.193)	(0.216)	(0.748)
Sector-Service	-0.265**	-0.268*	-0.292
	(0.118)	(0.140)	(0.297)
Sex-Female	0.303	0.283	0.283
	(0.192)	(0.219)	(0.587)
Constant	-1.913***	0.502	-1.334**
	(0.283)	(0.401)	(0.522)
Observations	1,278	1,025	253
Number of panelid	1,033	868	204

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4.8: Panel results separately for SMEs and Large firms

	SMEs		Large Firms	
	(1)	(2)	(3)	(4)
	Lgrowth	Sgrowth	Lgrowth	Sgrowth
Finance				
May be constrained	-0.00504	-0.105	0.00699	-0.0546
	(-0.14)	(-1.44)	(0.11)	(-0.48)
Partially constrained	0.00445	-0.0966	-0.0199	-0.279
	(0.10)	(-1.02)	(-0.19)	(-1.55)
Fully constrained	-0.0415	-0.227***	-0.00104	-0.195
	(-1.44)	(-3.69)	(-0.02)	(-1.40)
Firm Age	-0.0249***	-0.0175*	-0.00872	-0.0164
	(-7.06)	(-2.22)	(-1.77)	(-1.84)
age2	0.000341***	0.000228	0.0000776	0.000178
	(4.73)	(1.39)	(1.24)	(1.59)
dom_own	0.0856	0.101	0.0286	-0.137
	(1.69)	(0.96)	(0.47)	(-1.21)
Innovation	0.0987***	0.118*	0.0823	0.228*
	(3.92)	(2.21)	(1.63)	(2.54)
Exportshare	-0.000446	-0.000919	-0.000625	-0.000793
	(-0.75)	(-0.74)	(-0.58)	(-0.46)
Region				
Amhara	0.0281	-0.0171	-0.143	-0.0991
	(0.59)	(-0.18)	(-1.26)	(-0.43)
Dredawa	0.0123	-0.0391	-0.158	-0.0496
	(0.14)	(-0.22)	(-0.95)	(-0.16)
Oromia	-0.0874*	-0.0978	-0.0556	0.153
	(-2.43)	(-1.26)	(-0.72)	(1.03)
SNNP	-0.0865	-0.0211	-0.0858	0.0894
	(-1.53)	(-0.19)	(-0.71)	(0.38)
Tigray	0.0287	-0.0267	-0.167	0.248
	(0.70)	(-0.33)	(-1.07)	(1.02)
Sector-Service	0.0333	-0.103	-0.0167	0.00636
	(1.30)	(-1.88)	(-0.28)	(0.06)
Sex-Female	-0.0203	0.0793	-0.139	0.115
	(-0.53)	(0.98)	(-1.12)	(0.53)
Electricity				
Minor obstacle	-0.0273	0.00914	-0.0510	0.315
	(-0.64)	(0.10)	(-0.36)	(1.37)
Moderate obstacle	-0.0485	0.0559	-0.0888	0.232
	(-1.15)	(0.63)	(-0.65)	(1.04)
Major obstacle	-0.0853	0.0145	-0.167	0.0172
	(-1.84)	(0.15)	(-1.15)	(0.07)
Very Severe Obstacle	-0.0169	0.0994	-0.0383	0.165
	(-0.36)	(1.02)	(-0.27)	(0.73)
_cons	0.373***	0.518***	0.334	0.323
	(5.29)	(3.38)	(1.93)	(1.14)
N	924	716	221	184

Notes: t statistics in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.9: The Hausman test

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
finance				
2	-.2152927	-.0910439	-.1242488	.1659843
3	-.2288378	-.1251671	-.1036707	.2434382
4	-.1160284	-.2013225	.0852941	.1563136
firmsize				
2	-.2726592	-.0207032	-.251956	.228046
3	-.1025024	-.1087625	.0062602	.2858792
FirmAge	.0090899	-.0157932	.0248831	.0159192
age2	-.0003114	.0001725	-.0004839	.0002528
1.sex	.4710542	.0933564	.3776978	.2360545
1.dom_own	.1997902	.0169218	.1828684	.2223037
1.innovation	.2795909	.1501605	.1294304	.129336
exportshare	-.0004514	-.0009279	.0004765	.003207
2.sector	-.0530218	-.0890845	.0360627	.205602

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

  Test:  Ho:  difference in coefficients not systematic

              chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                       =       11.33
            Prob>chi2 =      0.5013
```

Table 4.10: The Breusch and Pagan Lagrangian multiplier test for random effects

```
. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        Lgrowth[panelid,t] = Xb + u[panelid] + e[panelid,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                 --------+------------------------------
                 Lgrowth |    .1373063       .3705487
                       e |    .1166192       .3414956
                       u |    .0086326       .0929119

        Test:   Var(u) = 0
                              chibar2(01) =     3.55
                           Prob > chibar2 =   0.0297
```

Table 4.11: The robust regression using the random effect model

```
. xtreg Sgrowth i.finance i.firmsize FirmAge age2 i.sex i.dom_own i.innovation exportsh
> are i.region i.sector, re robust

Random-effects GLS regression                   Number of obs     =         902
Group variable: panelid                         Number of groups  =         751

R-sq:                                           Obs per group:
     within  = 0.0469                                         min =           1
     between = 0.0450                                         avg =         1.2
     overall = 0.0517                                         max =           2

                                                Wald chi2(17)     =       56.04
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =      0.0000

                                              (Std. Err. adjusted for 751 clusters in panelid)
```

Sgrowth	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
finance						
May be constrained	-.0910439	.0554897	-1.64	0.101	-.1998018	.017714
Partially constra..	-.1251671	.0743439	-1.68	0.092	-.2708783	.0205442
Fully constrained	-.2013225	.0561026	-3.59	0.000	-.3112815	-.0913635
firmsize						
Medium	-.0207032	.0678364	-0.31	0.760	-.1536601	.1122537
Large	-.1087625	.061008	-1.78	0.075	-.228336	.010811
FirmAge	-.0157932	.0047562	-3.32	0.001	-.0251152	-.0064712
age2	.0001725	.0000642	2.69	0.007	.0000467	.0002983
sex						
Female	.0933564	.0696506	1.34	0.180	-.0431563	.2298692
dom_own						
Yes	.0169218	.0810361	0.21	0.835	-.141906	.1757496
innovation						
Yes	.1501605	.0469112	3.20	0.001	.0582163	.2421046
exportshare	-.0009279	.0007371	-1.26	0.208	-.0023725	.0005167
region						
Amhara	-.0176555	.0834304	-0.21	0.832	-.181176	.145865
Dredawa	-.0479393	.111549	-0.43	0.667	-.2665713	.1706927
Oromia	-.004754	.0762272	-0.06	0.950	-.1541566	.1446486
SNNPR	.0244557	.1034524	0.24	0.813	-.1783072	.2272187
Tigray	.0211866	.0575915	0.37	0.713	-.0916907	.134064
sector						
Service	-.0890845	.0469362	-1.90	0.058	-.1810777	.0029088
_cons	.5772247	.1109952	5.20	0.000	.3596782	.7947712
sigma_u	0					
sigma_e	.67973546					
rho	0	(fraction of variance due to u_i)				

Figure 4.6: Gender of management and access to finance

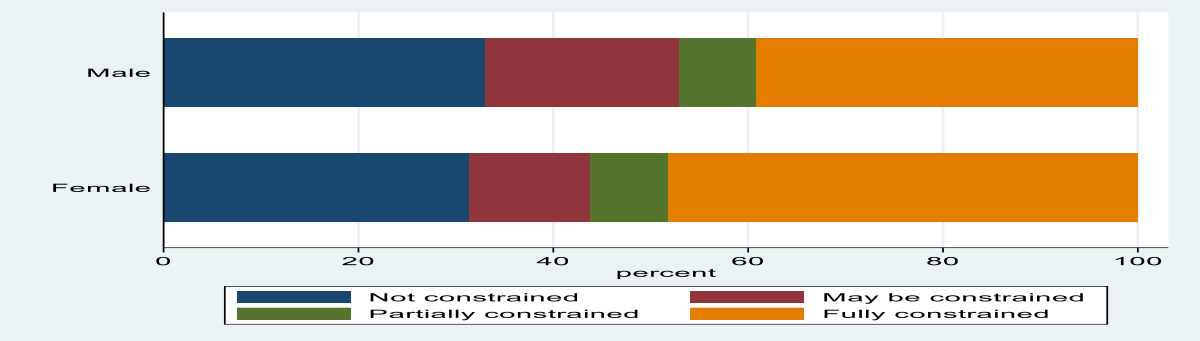

Table 4.12: Sources of financing of firms working capital and purchase of fixed asset

	Sources of financing for							
	SMES				***Large firms***			
	Working Capital		***Purchases of Fixed Assets***		***Working Capital***		***Purchases of Fixed Assets***	
	Average	***Stdv.***	***Average***	***Stdv.***	***Average***	***Stdv.***	***Average***	***Stdv.***
Internal funds or retained earnings	86.42%	25.98	84.83%	30.96	80.27%	28.37	80.15%	32.21
Owners' contribution or issued new equity shares			2.97%	14			6.45%	21.38
Borrowed from banks	9.38%	22.73	9.3%	25.37	16.33%	26.31	13.01%	26.88
Borrowed from non-bank financial institutions	1.14%	8.25	1.21%	10.12	0%	0	0.41%	4.19
Credit purchase and customer advance	2.10%	10.11	0.17%	2.23	1.73%	9.74	0.09%	0.85
Other, moneylenders, friends, relatives, etc.	1%	5.83	1.52%	9.82	1.66%	10.16	0%	0

Table 4.13: Durbin-Wu-Hausman Test for endogeneity

```
. hausman iv ., constant sigmamore
```

	Coefficients (b) iv	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
firmsize				
2	-.0725548	-.0288984	-.0436564	.
3	-.160359	-.1097163	-.0506427	.
1.sex	.1101298	.0929033	.0172265	.
FirmAge	-.0181317	-.0163132	-.0018185	.
age2	.0002033	.0001786	.0000246	.
1.dom_own	.0245498	.0172607	.0072891	.
1.innovation	.1348893	.1555273	-.0206379	.
exportshare	-.0012735	-.0009343	-.0003392	.
region				
2	.0015431	-.0190091	.0205522	.
3	-.0905563	-.0510177	-.0395386	.
4	.0108839	-.0056151	.016499	.
5	.0002901	.0218019	-.0215118	.
6	.0039907	.0190793	-.0150886	.
2.sector	-.1025801	-.0859197	-.0166605	.
_cons	.8730302	.5835993	.2894309	.

```
                b = consistent under Ho and Ha; obtained from xtivreg
    B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:  Ho:  difference in coefficients not systematic

          chi2(15) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                   =       16.11
        Prob>chi2 =      0.3748
        (V_b-V_B is not positive definite)
```