

# **Determinants of firm growth in Lesotho's Manufacturing Sector: An Empirical Evidence**

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## **ABSTRACT**

The purpose of this study is to analyse the effect of access to finance on manufacturing firm growth in Lesotho. To achieve this objective, the study made use of both subjective and objective measures of access to finance obtained from the World Bank Enterprise Survey (WBES) dataset. This dataset has interesting dynamics in terms of firm growth determinants. The survey is at firm-level and the sample used in this study is panel data of 27 manufacturing firms. Pooled ordinary least squared (OLS) regressions are employed to first test the simple correlations between access to finance on firm growth. Most importantly, the study identifies and analyses the causal relationship between firm growth and access to finance using instrumental variable approach. The results show that firms that are finance and credit constrained are less likely to grow. The results remain consistent despite the use of different indicators of access to finance. The implication of this is that the removal of financial barriers will benefit small to medium-sized firms, which embody much of Lesotho economy's latent dynamism. This will also encourage entry of new firms. Higher entry of firms results in a more competitive market whereby the less efficient firms will exit the market and more efficient ones will be forced to become innovative to survive and grow.

**Keywords:** Manufacturing firms, firm growth, access to finance, World Bank enterprise survey.

## 1. Introduction

Why is access to finance fundamental to the development of countries that receive it? This question has attracted a lot of debates in the financial economic literature over the past decades. The obvious question is why access to finance should have any fundamental impact on firm growth, different from other determinant of firm growth. The extensive body of literature emphasises on non-finance determinants of firm growth such as government regulations and tax systems (Chu et al., 2007), firm characteristics (Assefa, 1997; Khan and Siddiqi, 2008; Habtamu et al., 2013), political and legal factors (Yusuf, 1995; Beck et al., 2005; Jasra et al., 2011), bureaucratic quality and corruption (Faruq et al. 2013) and Technological factors and infrastructure (Swierczek & Ha, 2003; Clover & Darroch, 2005; Nabli, 2007; Olawale & Garwe, 2010) as key determinants of firm growth. Conversely, there exist a rich evidence of literature that upholds access to finance as the key determinant of firm growth in both developing countries and economies in transition (see for instance Benzing et al., 2005; OECD, 2017; Chu et al., 2008; Malhotra et al. 2007 and ACCA, 2009). These theorists emphasise that inadequate levels of capital which are accumulated through access to finance, often limit the firm growth.

This is particularly so in most Sub-Saharan African countries where a lot of firms are at Micro, Small and Micro Enterprises (MSMEs) scales and access to finance remain the critical challenge for these firms to survive the markets which are sometimes riddled with market imperfections. The World Bank (2016) indicate that 95% of MSMEs in Zambia own bank accounts whilst only 16% of such MSMEs had access to bank credit mainly because they satisfied the minimum required collateral, which amounted to 146% of the loan amount. Central to the growth of firms is access to financial resources for several reasons. First, as stated by Beck and Demirguc-Kunt (2006) it gives access to a firm to pursue productive investment activities and to improve those that are already existing. Second, it makes it easy for firm to make intertemporal capital budgeting structures that will increase the economies of scale over time, that have been constraint by lack of or short-term insignificant amount of loans. Just as the World Bank Ghana (2016) points out that 71% of the countries in the world identify access to finance as a major constraint to MSME growth while in SSA, Olomi and Urassa (2008) highlights that access to finance is topmost determinant of MSME growth.

In the specific case of Lesotho, literature alludes to three fundamental constraints to firm growth, namely finance, operation space as well as competition, despite the fact that MSMEs employ over 120,000 people, making it the second largest employer after the government, in which case manufacturing sector alone accounts for the total employment of over 45, 000 people [Bureau of Statistics (BoS) (2017)]. Although African Growth and Opportunity Act (AGOA) is considered footloose as it is unstable foreign investment with no guarantee of existence, and its vulnerability to cost efficient Asian competition into the U.S markets, AGOA has nonetheless, been the success story behind manufacturing sector of Lesotho, with the major exports in textile and apparel. In addition, even though there has been a very little to no technological skills transfer from Chinese (who control the manufacturing sector of Lesotho) to the employed locals within the manufacturing sector, Lesotho's textile and clothing industry has benefited a lot from AGOA, achieved very rapid

growth and became the largest exporter of textile and clothing to the USA in sub-Saharan Africa in 2002. Nonetheless, there was an acute decline in manufacturing exports in 2009 that resulted from the likelihood of the inexistence of AGOA beyond 2012. Nonetheless, opportunities still exist to diversify the manufacturing sector. This therefore means that, it is crucial for Government of Lesotho (GoL) to maintain the momentum of this sector as it is of immense importance for Lesotho's economic sustainability.

Although there's substantial body of literature on firm growth across the globe, the empirical evidence on firm growth and access to finance nexus in the specific case of Lesotho is still scant. Furthermore, the lack of accurate and reliable information about firms, firm growth and access to financial resources in Lesotho provides a challenge in policy formulation. It is therefore against this background expounded above that this study seeks to examine the relationship between firm growth and access to finance in the manufacturing sector in Lesotho. Therefore, this case study contributes to the existing literature on firm growth and access to finance. The paper also contributes to increasing application of time-series techniques in empirical effectiveness research through the application of panel data models as opposed to the usual cross-sectional data analysis that is often used in the literature. On the policy front, it provides the GoL with guiding information in formulation of structural reforms for the manufacturing sector.

The rest of the paper is organized as follows. Section 2 presents an overview of the Lesotho's manufacturing sector while Section 3 discusses the relevant literature review. Section 4 describes the data sources and section 5 presents the methodology used in the study. Section 6 presents the descriptive statistics and section 7 discusses econometric results of the study. Finally, Section 8, concludes the paper and provides some policy implications.

## **2. An Overview of Lesotho's Manufacturing Sector**

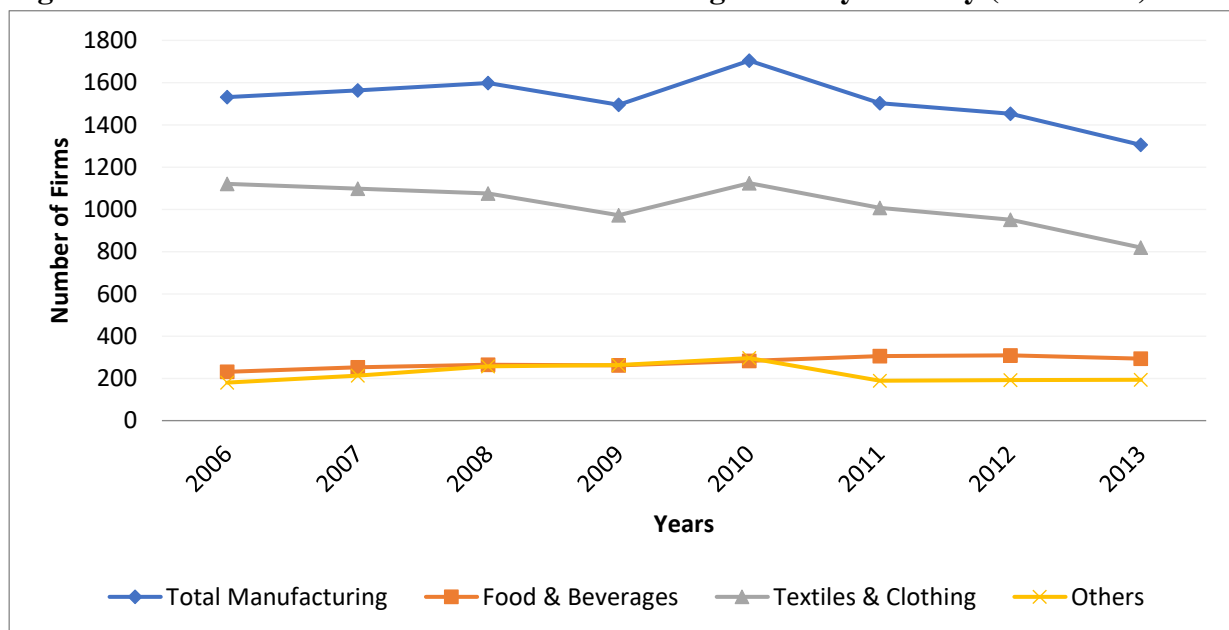
The manufacturing firms have been an important driver of economic growth and employment creation in Lesotho. Manufacturing firms' contribution to GDP grew by 24.2% from 10.4% in 1999 to 34.6% in 2017 (CIA, 2017). The share of Lesotho's manufactured products in total exports is 55.2% (WTO, 2018). Manufacturing firms in Lesotho are comprised of food products and beverages, textiles, clothing, footwear and leather, electrical and electronic appliances, furniture, ceramics, handicrafts and jewellery. Textile and clothing firms, which are mainly foreign companies, are the dominant sector, followed by food products and beverages. In the recent past there have been investments in other key sectors, such as electronics and plastic products. There are about 45 industrial firms within the textile and clothing sector which employs approximately 41,764 workers (BOS, 2017). The textile and clothing industrial firms create a large portion of workers of manufacturing firms (about 91%), most of whom are women. FDI is mostly from Taiwan, South Africa (SA), Netherlands, United Kingdom and other Southern African Development Community (SADC) countries. Majority of the industrialised firms service the USA and regional markets under preferential trade agreements. Lesotho took advantage of AGOA and became one of the largest textile and clothing manufacturing industry in Sub-Saharan Africa (SSA). In 2014, the country's

textile and clothing exports to the USA amounted to USD300 million (M4.2 billion at an exchange rate of M14=USD1). Following the growth of textile and clothing sector, more companies specialising in manufacturing of car seat covers, clean cookstoves and circuit breaker switches emerged.

The government of Lesotho offers several incentives for manufacturing firms (Lesotho National Development Corporation – LNDC, 2018). These include, but not limited to, first, tax incentives that include 10% corporate income tax on manufacturing profit and no withholding tax on dividends distributed by manufacturing firms to local or foreign shareholders. Second, the country participates in several regional trade arrangements that include Southern African Customs Union (SACU), SADC and AGOA which gives manufacturing firms access to more than 1,544 million consumers, worldwide. The third incentive is access to infrastructure where the GoL through the LNDC and Basotho Enterprises Development Corporation (BEDCO) leases fully-serviced industrial plots and customized factory buildings to their respective clientele. Lastly, access to finance through initiatives like equity participation and Partial Credit Guarantee Scheme.

The three figures below (Figure 1 – 3) provide an analysis of the number of manufacturing firms over time and the direction of exports by destination and by products.

**Figure 1: The number of firms in the manufacturing sector by industry (2006-2013)**

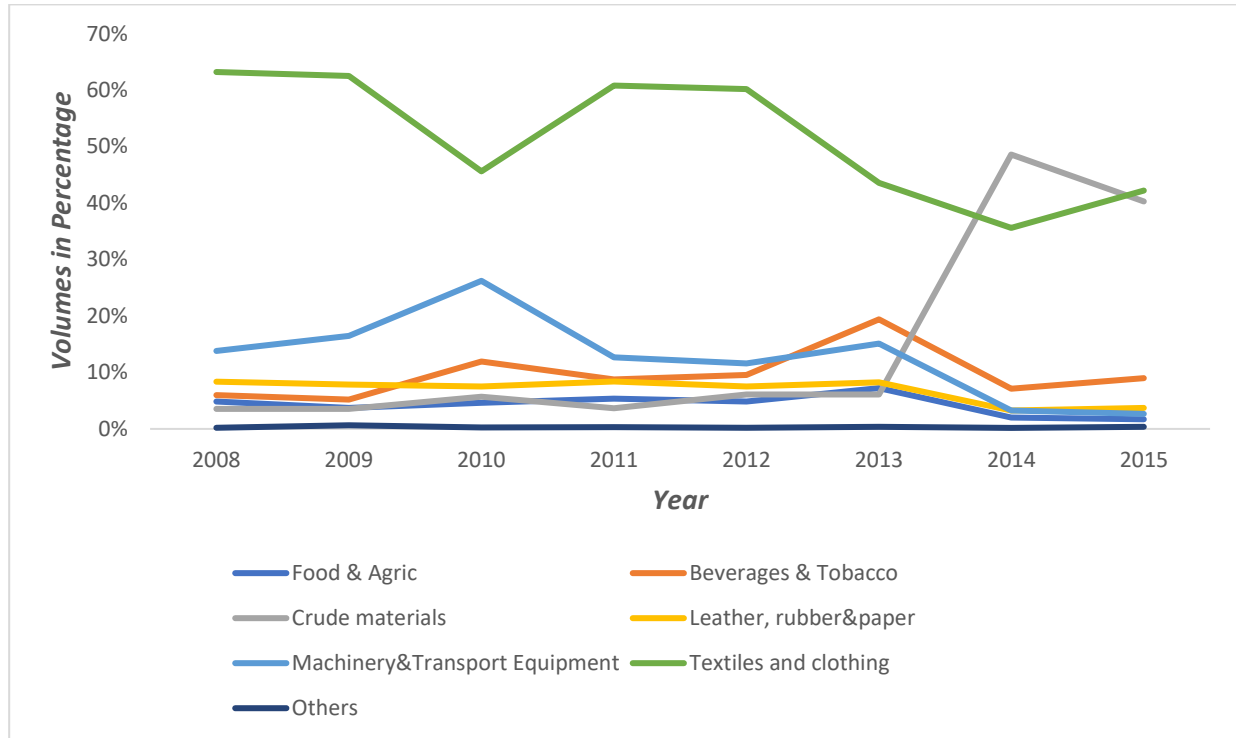


Source: UNDP, Lesotho Country Analysis 2017

Figure 1 presents the number of manufacturing firms by industry in Lesotho between 2006 and 2013. The results show that total number of manufacturing firms generally declined during the sampled period. This is mainly attributable to the closure of large number of firms in the textiles and clothing industry during that period, following the economic crisis in 2008. This is also confirmed by a sharp decline in textile and clothing sector between 2008 and 2010 as shown in Figure 1. The food and beverages sector is showing a slight upward trend as a sign of possible diversification in the manufacturing sector.

Next, is a graphical presentation of the direction of exports by products for the period 2008 – 2015.

**Figure 2: The direction of Lesotho’s exports by Products (2008 – 2015)**

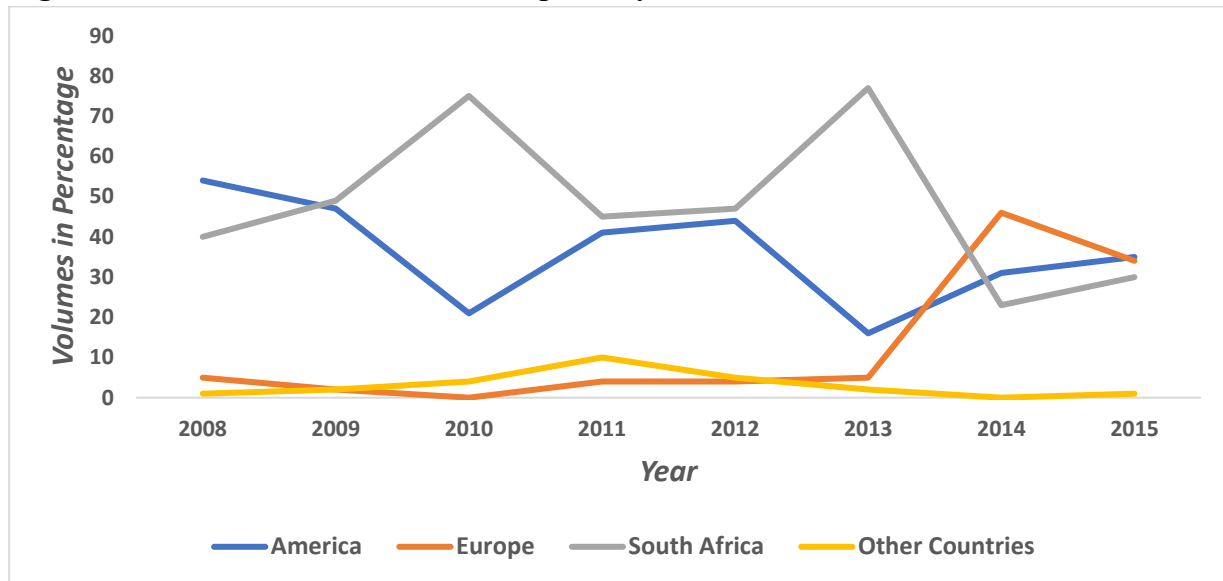


Source: Lesotho Bureau of Statistics

Figure 2 shows that total exports have been declining over time and this was brought about by a sharp decline in the main export product, textiles and clothing during the sampled period. This resulted in several textiles and clothing industrial firms having to close following the uncertainties that lied behind renewal of AGOA trade preferences beyond 2012. Firm performance generally declined as a result.

Additionally, Figure 3 presents an illustration of the direction of exports by destination and it is evident that the direction is mainly towards the South African and United States of America’s markets.

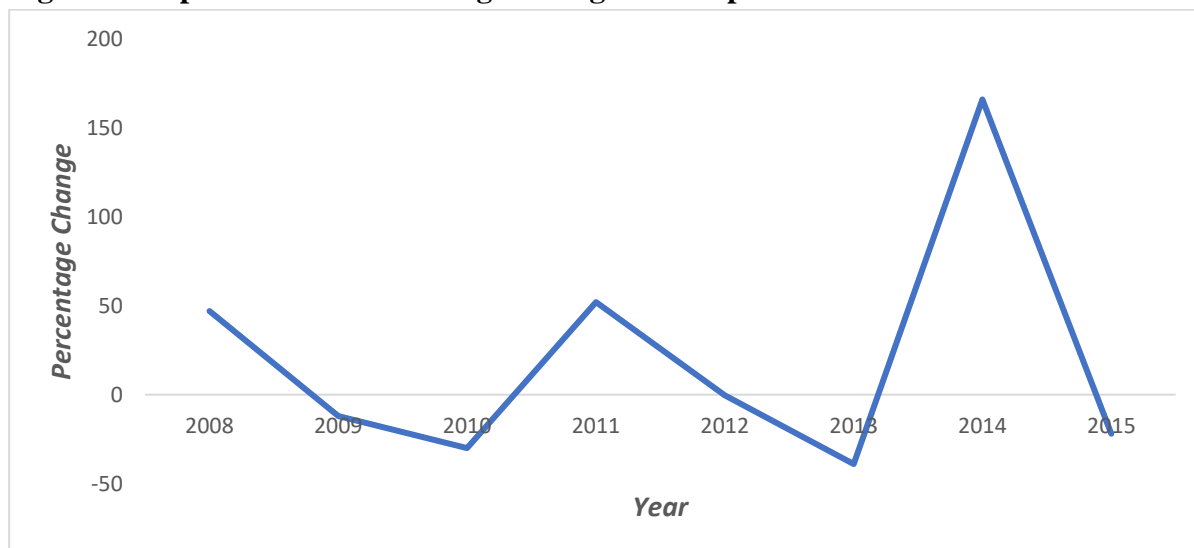
**Figure 3: The direction of Lesotho’s exports by destination**



Source: Lesotho Bureau of Statistics

The results also show that export volumes to the rest of the world are marginal. Overall, exports have been declining over time and this is confirmed by Figure 4, which shows the annual percentage change in the volumes of exports during the sampled period. Generally, declining exports imply poor firm performance.

**Figure 4: Export Annual Percentage Change for the period 2008-2015**



Source: Lesotho Bureau of Statistics

However, there are several challenges facing manufacturing firms in Lesotho. These include low productivity, limited industrial infrastructure, low diversification of products and over reliance on one sector and one market as an export driver. Lesotho benefits from preferential market access to the EU, Australia, New Zealand, Canada and Japan but the industry’s export potential in this respect has not been fully explored yet. The GoL has put in place numerous strategies in collaboration with several international agencies to address these challenges. The core of Lesotho’s policies and

national plans is the National Vision 2020 which was developed in 2001. The National Vision 2020 is aimed at building productive capacities for a strong economy and to facilitate the development of productive capacities of manufacturing firms, the GoL developed the Industrial Policy. The industrial policy also pursues implementation of the SADC Industrial Upgrading and Modernisation Programme (IUMP). The GoL also embarked in an Investment Policy aimed at creating a stable, predictable and transparent investment environment which encourages increased investment. A recent government initiative is the development of the National Strategic Development Plan (NSDP II). NSDP II identifies manufacturing firms as the key engine for Lesotho's economic growth and the government is committed to building an enabling infrastructure for the firms. It is therefore important to understand the dynamics of this sector in terms of opportunities as well as challenges.

### **3. Literature Review**

#### **3.1 Theoretical Underpinnings**

There is currently an increased interest in studies on firms and firm growth in all economies of the world. This is because several studies have proved its importance which is above all centred on its ability to drive job creation, maintain competitiveness of economies and contribute significantly to economic growth. The increasing interest in firms and firm growth led to developments of different theories of firms and their growth. The most common theories included technological theory, financial theory, organisational theory as well as transactional theory. Amongst these theories, the two most relevant theories to this particular study are technological and financial theories. Different texts explain technological theory differently. Nonetheless, this study is in line with the standard Solow (1956) type theory that argues that firms experience growth through combination of labour inputs, capital inputs as well as technology. This theory postulates that firms use different production functions to determine their output level given the prices of goods and factor payments. According to this theory, often firms face the diminishing returns to scales. That is, often firms find the marginal cost of production is proportional to the production output level. Had it been not due to the diminishing returns to scale, supply could expand without affecting the prices of goods.

Contrariwise, financial theory is more related to a firm's capital structure. This theory generally predicts that a firm chooses its optimal feasible strategy to finance its operations. Within the same bounds of capital structures, there is a competing capital structure theory and the traditional theory of capital (see Solomon, 1963). The former theory explore the debt financing, equity financing and the market value of the firm nexus while the latter suggests that there exists an optimal debt to equity ratio where the overall cost of capital is the minimum and market value of the firm is the maximum. While both of these capital structure theories are plausible, they predict widely different outcomes. However, on either side of this point, changes in the financing mix can bring positive change to the value of the firm. One popular alternative to traditional capital structure theory is the Modigliani and Miller (MM) approach (Miller & Modigliani, 1961). The MM approach has two central propositions. The first says that capital structure and company value have no direct correlation instead the firm's value is dependent on expected future earnings. The second proposition then asserts that financial leverage increases expected future earnings but not the value of the firm. This

is because leverage-based future earnings are offset by corresponding increases in the required rate of return. Finally, the pecking order theory (Myers and Majluf, 1984) of capital structure posits that the cost of financing increases with asymmetric information. This theory emphasizes that firms prioritize their financing sources in order of the easiness to obtain, giving the first priority to internal financing, followed by debt financing and often external equity comes as the last resort.

Empirical research has identified key determinants of firm growth. These include amongst others, characteristics of the entrepreneur, access to resources like finance and human resource. On identifying the main factors underlying the growth of firms, several theories come into play. One set of theories address the influence of enterprise size and age on growth (Evans 1987; Heshmati 2001; Morone and Testa 2008), while the other set deals with the influence of variables such as strategy, organization, and the characteristics of the enterprise's owners (Fazzari et al. 1988; Lumpkin and Dess 1996; Freel and Robson 2004) on growth of the firm. Mateev and Anastasov (2010) found that firm growth is related to size as well as other specific characteristics like financial structure and productivity. Business environment can be perceived through four theoretical frameworks (Davidsson and Wiklund 2000). Firstly, when the focus of the firm is on its resources, such as expansion of business activities, financial resources and educated staff, the growth is to be studied from the resource-based perspective. Secondly, growth studies applying strategic adaptation as a perspective focus more on power distribution, structural complexities, and control mechanisms. The third theoretical perspective of firm growth is motivation perspective which focuses on the individual and their actions. Lastly, configuration perspective deals with the growth process focusing on managerial problems and how they can be dealt with at various stages of growth. The scope of this study covers the first perspective of enterprise growth, that is, resource-based.

Firm growth is closely related to survival and has consequences for employment opportunities (Smallbone and Wyr 2000), a significant contributor to economic growth (Baumol 2002), is a way to introduce innovation (Curran and Blackburn 1994) and lastly, the evolution of the size of incumbents and new entrants determines market concentration. That is, if small firms grow at a high rate, market competitiveness increases. Conversely, increases in the size of large firms will affect market concentration. The regulation of market concentration to avoid the creation of monopolies and oligopolies (Shepherd 1979) has been one of the main interests of governments. The analysis of firm growth may therefore help to clarify the concentration of firms in a market. A study of firm growth can shed light on the importance of the selection process after a firm has entered the market (Audretsch and Mata, 1995). Once a firm enters a market a selection process takes place (Jovanovic, 1982) whereby less efficient firms decrease in size and disappear and more efficient ones survive and grow. The analysis of firm growth therefore shows how firms behave once they enter the market, their market opportunities, turbulence and level of efficiency.



### **3.2 Empirical literature**

#### ***Firm growth and firm characteristics***

The empirical research on firm and firm growth emanates from as early as yearly 1900s. For instance, on firm growth and firm size, Gibrat (1931) came up with Gibrat's Law that observed through research that firm growth as a random process. This research mainly focused on the relationship between firm growth and firm size. Later on, in the 1990s, Acs and Audretsch (1990) tested Gibrat's Law within the USA manufacturing sector for the period 1976-1980 and found that the Law still holds. That is, the growth rate of firms is independent of its size. Kumar (1985) and Chen, Babb and Schrader (1985) in a study of agribusiness sector firms also found no relationship between size and growth. Contrary to the above-mentioned studies, Evans (1987) found that firm size affects firm growth negatively in 89 out of 100 industries of the manufacturing sector analysed. Similar results were found by Hall (1987), Mata (1994), Becchetti and Trovato (2002) and Dunne et al. (1989). On a firm's internal capacity, Ramachandran and Shah (1999) examined the link between minority entrepreneurship and firm performance in sub-Saharan Africa. They found that the educational attainment of firm managers influenced the performance of firms. Among the group of firms owned by Africans, a higher growth rate occurred for those firms which had managers with secondary or university levels of education. In addition, their findings indicated that, generally, firms owned by non-indigenous Africans began with large sizes and grew faster than firms owned by indigenous Africans. The study focused on Tanzania, Kenya, Zimbabwe and Zambia and used 1992 and 1994 data from the Regional Program on Enterprise Development. Seker and Correa (2010) used firm level data from the World Bank enterprise survey to analyse the stylized fact on the relation between growth, size, and age holds for Turkish firms. Analysis showed that there are some irregularities on firm growth rates. Medium-sized firms are the least growing group of firms in the economy. They also investigated whether the investment climate plays any role in affecting growth. Analysis showed that better access to finance significantly increases growth of firms.

#### ***Constraints to Firms growth***

On firm growth, some empirical researchers focused exclusively on the challenges faced by firms. Amongst the major challenges to firm growth, access to finance, access to non-financial inputs and cost constraints were found to be on the frontline constraints. For instance, Levy's (1993) found the similar constraints in the leather industry in Sri Lanka as well as in the construction and furniture industry in Tanzania. In the similar manner, Beck (2007) observed that MSMEs are more likely to be constrained by financing and other institutional obstacles relative to large enterprises. Later on, Pissarides *et al.* (2003) used survey data from 437 executive officers of MSMEs in Russia and Bulgaria to detect the biggest obstacles to MSMEs growth. Variables were chosen by ranking the highest rated constraints. Suppliers that are not ready to deliver were found to be the topmost constraints followed by access to land; access to land was also followed by access to finance and other production constraints, respectively. In addition to this, the finance problems were divided into two more detailed categories, namely, the difficulty of obtaining finance due to high interest rates and the financing problem for business expansion. Their results showed that the constraint on external finance is the most serious impediment to firm growth, while licensing doesn't appear to be a significant determinant of firm growth. Aterido et al. (2009) using data on more than 56,000 enterprises in 90 countries, found access to finance and corruption to be the top factors hindering firm growth.

In an attempt to understand challenges and prospects of private firms in Nigeria, Osemeke (2010) carried out a research on the means to stimulate and support private firms. Amongst the most prominent recommendations, the author emphasises that in order to achieve a desired sustainable private sector led growth of the economy, it is imperative for government to continuously put in place policies and programs that will encourage private sector participation and contribution to the development process. In the similar manner, Agwu and Emeti (2014) researched issues, challenges and prospects of SMEs in Port-Harcourt City, Nigeria. The study found that poor financing, inadequate social infrastructures, lack of managerial skills and multiple taxation constitute major challenges in the performance of SMEs between October 2012 and November 2013. Yin (2012) and Ji (2011) have drawn the conclusion that relative to privately-owned firms, state-owned firms are found to be too big to fail, particularly so because they face less challenges. For instance, in their research, they found that access to finance is not of a bigger challenge for state-owned firms. Resultantly, these firms experience increasing sales growth rates compared to their counterparts. Thus, the first instance implication is that the ownership of a firm also plays an important role in determining the growth of a firm. African Development Bank (2013) addressed some of the key concerns of firms in the Middle East and North Africa (MENA) about the environment in which they operate in, as ways of unlocking their transformative potential. Four areas of concern stood out: political instability, corruption, unreliable electricity supply and inadequate access to finance. Bouazza et al (2015) analysed the factors influencing the growth rate of firms in Algeria and explored the extent to which their success or failure depends on the wider business climate. The study used data from the World Bank Enterprise Surveys 2007-2012 to identify the most binding constraints on firm performance in Algeria and compared them with the constraints faced by other surveyed firms located in the Middle East and North Africa (MENA) region and in member countries of the Organization for Economic Cooperation and Development (OECD). They were also compared to the world average. This study also examined different internal factors that may be responsible for the unstable and limited growth of firms. The research revealed that growth of firms in Algeria is hampered by several interrelated factors, which include business environmental factors that are beyond the firm's control and internal factors of the firm. The external factors include the legal and regulatory framework, access to external financing and human resources capacities. The internal factors comprise entrepreneurial characteristics, management capacities, marketing skills and technological capacities. From these studies, it is evident that key challenges are country and/or region specific.

### ***Firm growth and access to Finance***

Some studies narrowed down their research scope to focusing only on the direct effect of access to finance on firm growth. Pissarides (1999) investigated the relationship between access to finance and firm growth using survey data from the European Bank for Reconstruction and Development. The author confirmed that access to finance has a significant effect on firm growth in transitional economies due to the undeveloped capital market; where credit is accorded due to historical working practice and thus state banks are more likely to lend to state or larger enterprises. In support of this, Konings et al. (2003) when investigating the investment and financial constraints in transitional economies from data for Eastern European countries found that financing constraints are a bigger obstacle for fast reformers than for slowly reforming economies. Koech (2009) also did a survey of

the financial constraints hindering growth of MSMEs in Kamukunji District, Kenya and used a quantitative and descriptive design to study sixteen types of businesses in five locations of Kamukunji District. Structured questionnaires were used to collect the data from 100 businesses. Business owners completed all the questionnaires that included background, growth and financial constraints of their businesses. His study identified cost, capital market and capital access as the highest contributing factors to constraining MSMEs growth into large business enterprises. Further findings indicated that profits and sales were factors that were found to influence firm growth. Chavis et al. (2010) found out that 31% of examined firms regarded access to finance as the major constraint from data offered by the World Bank Enterprises Survey 2006-2009.

In addition, Wang (2013) studied the impact of microfinance on firm growth. The study revealed that firms with higher financial risk and lower level of productivity were more likely to seek microfinance. Furthermore, the paper found that firm characteristics including product innovation efforts and managerial and entrepreneurial attitudes were the keys that determine the likelihood of receiving micro financing. A study conducted in Lesotho by Makhetha and Sebolelo (2015) focused on Problems and Prospects of MSMEs Loan Management and tried to identify some underlying problems from the bank's perspective. This study was based on primary data which was collected through personal interviews with structured questionnaires and direct observations. The findings indicated that banks appear to be facing serious challenges of high cost of gathering information and collateral. Both high costs to gather reliable information on MSMEs and high administration costs on loans made to MSMEs were found to have fundamental impact on MSME lending. Though lack of finance appeared to be a major challenge hindering MSMEs growth, this hindrance may be mostly enhanced by constraints that are within MSMEs themselves.

In summary, the above literature review shows that determinants of firm growth differ from one sector to the next, from developed to developing economies and even within the developing economies; it differs from one country to the next. The determinants of firm growth that came out include firm characteristics such as firm size, ownership, location; government regulations such as business licencing and tax procedures and access to finance. Access to finance has been pointed out several times in African countries as having a direct and significant effect on firm growth. African countries face a lot of financing constraints because of underdeveloped financial market, which hinder firm growth. From the reviewed literature, it can be observed that there are limited studies on firm growth and access to finance specific to Lesotho and because studies on firm growth are economy and country specific, conducting this study becomes essential. This study is, therefore, concerned with analysing the direct effect of access to finance on Lesotho's manufacturing firm growth.

#### **4. Data description and sources**

The data used in this study is obtained from the World Bank Enterprise Survey (WBES) dataset. The survey is at firm-level, conducted from 130,000 firms across 135 countries. The data is collected using face-to-face interviews with managing directors, accountants, human resource managers and other relevant firm staff by private contractors on behalf of the World Bank. Interviews are

conducted using a manufacturing questionnaire which includes topics such as firm characteristics, gender participation, access to finance, annual sales, costs of inputs/labour, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilization, land and permits, taxation, informality, business-government relations, innovation and technology and performance measures. Over 90% of the questions objectively ascertain characteristics of a country's business environment. The remaining questions assess the survey respondents' opinions on the obstacles to firm growth and performance.

In the case of Lesotho, the survey has been conducted on 150 enterprises in 2009 and 2016, covering several aspects of business environment along with measures of firm performance. The survey covers two sectors, manufacturing and services. The sample used in this study covers 27 formal (registered) manufacturing firms in Lesotho with more than four employees. These 27 firms were surveyed in both 2009 and 2016 manufacturing survey. Manufacturing firms include food, textiles, garments, electronics, fabricate metal products, chemicals and plastics and rubber. Firms with 100% government ownership are not included in the sample.

## **5. Methodology**

In the literature, the effect of access to finance on firm growth has been analyzed using different methodologies. These include but are not limited to; difference-in-difference approach, simple Ordinary Least Squares (OLS), Tobit and Probit models. To address the already stated objectives, this study uses panel data estimation techniques.

### **5.1 Conceptual Framework**

This study makes use of both subjective and objective measures of access to finance from the WBES dataset to achieve its objectives. Most studies on firm growth use a combination of both financial and non-financial measures to measure firm growth (Fowowe, 2017). Financial measures are usually represented by profit, revenue, return on investment, returns on equity and earnings per share (Santos and Brito, 2012; Chong, 2008). Financial measures have the advantage of being objective, simple and easy to understand. However, their main disadvantage is that they are not easily available and historical in nature, therefore offering only lagged information. They can also be subject to manipulations and incompleteness (Santos and Brito, 2012; Chong, 2008). Non-financial measures include number of employees, revenue growth, revenue per employee, market share, customers' satisfaction, customers' referral rates, employees' satisfaction, social and environmental performance. The non-financial measures have the disadvantage of being subjective (Santos and Brito, 2012; Chong, 2008). Owing to the limitations of the financial and non-financial measures, it has become the generally acceptable standard to employ a hybrid approach combining both financial and non-financial measures of firm growth.

The study follows Dinh et al. (2012); Aterido et al. (2011); Aterido and Hallward-Driemeier (2010), to measure firm growth using growth in employment. This is because other measures are unavailable in the dataset except employment and sales. The main reason for selecting employment growth as

opposed to sales growth is because sales growth is more volatile and more prone to reporting and measurement biases. This is particularly so if survey respondents are reporting sales from 3 years ago (Dinh et al., 2012). Also, for tax reasons, firms might not report actual sales (Dinh et al., 2012). Following Dinh et al. (2012) firm growth is calculated as the log difference between the current number of permanent employees and the number of permanent employees three years before the survey year, divided by the difference between the survey years. Calculation of firm growth in this manner reduces the impact of outliers on firm growth. This is given as:

$$FG_{it} = \left[ \frac{\ln S_{it} - \ln S_{i,t-3}}{3} \right] \quad (1)$$

where  $FG$  = Employment growth;  $S_{it}$  = Current number of permanent employees;  $S_{i,t-3}$  = Number of permanent employees 3 years before the survey year.

To assess the role of credit on firm growth, the study draws from the framework that was used by Fowowe (2017). Most similar studies (for example Fowowe, 2017) have used cross-sectional estimations, which have two main limitations. First, it does not determine the cause and effect. Second cross-sectional data cannot be used to analyse the time-specific characteristics of firm behaviour over time. As a result, this study extended the existing literature by using panel data for Lesotho manufacturing firms. Our analysis further accounts for endogeneity using instrumental variable estimation.

## 5.2 Empirical model specification

To estimate the effect of access to financial constraints on firm growth, the study uses subjective measures of the business environment obtained from the WBES. Financial constraint, denoted FC, is the primary variable of interest and is measured in two ways. The first measure is in the original categorical form as obtained from WBES respondents' ranking access to finance (along with 15 other variables) on a scale of 1 – 5 (1 being no obstacle and 5 being a very severe obstacle). The second measure is where categorical FC variables are used to create financial constraint dummy (FCD) variable; where FCD equals to 1 if finance is an obstacle (minor, moderate, major and very severe) and equals to 0 if finance is not an obstacle. Thus, if finance is a constraint to firm growth, it should have a negative sign. Although subjective measures offer useful insight into the business environment, they have some shortcomings. Firstly, subjective measures are firm perceptions of the business environment and this could reflect idiosyncratic differences in the degree of optimism or pessimism of the respondents (Aterido et al., 2011; Fowowe, 2017). Also, answers could be influenced by the experience and performance of the firm (Aterido et al., 2011; Fowowe, 2017). In light of this, it is important to also incorporate objective measures to examine how finance affects firm growth in Lesotho.

The study also makes use of the objective measure of access to credit provided in the WBES to estimate the effect of participation in financial markets on firm growth. The measure used is named credit constrained status (CCS) and is an ordinal variable whose higher values denote higher access to finance. The definition of CCS is adopted from Kuntchev et al. (2013), who used the WBES dataset to construct 4 groups that measure the extent to which firms were credit constrained during the fiscal year referenced in each survey. The first group is called Full Credit Constrained (FCC),

the second group is called Partially Credit Constrained (PCC), the third group is called Maybe Credit Constrained (MCC), and the fourth group is called Non-Credit Constrained (NCC). According to Kuntchev et al. (2013), firms in the FCC group do not have any type of external finance because either loan applications were rejected or the firm did not even bother to apply even though they needed additional capital. The firms in the PCC group used external sources of finance for working capital and/or investments during the year under review, have an outstanding loan at the time of survey and did not apply for a loan the previous fiscal year. This is because firms in this group managed to find some other forms of external finance and, consequentially, they are only partially credit constrained. The MCC group includes firms that had access to external finance and there is evidence of them having bank finance, they are classified under the possibility of maybe being credit constrained as it is impossible to ascertain whether they were partially rationed on the terms and conditions of their external finance. The NCC group assumes a firm did not apply for a loan and that the reason for not applying for a loan was having enough capital for the firm's needs.

Thus, the basic econometric model estimated is as follows:

$$FG_{it} = \beta_0 + \beta_1 AF_{it} + \varepsilon_1 \quad (2)$$

Where  $FG$  = Employment growth of the firm, as illustrated in equation (1) above;  $AF$  = Access to finance is defined in this study using three variables. First, FC categorical comprising of no obstacle to access to finance (*NoFC*), *minor FC*, *moderate FC*, *major FC* and *very severe FC*. Second, FC dummy ( $FCD$ ) where  $FCD = 1$  if  $FC = \text{Minor FC, moderate FC, major FC and very severe FC}$  and 0, otherwise. Lastly,  $CCS$  is an ordinal variable where 1 = FCC, 2 = PCC, 3 = MCC, 4 = NCC; and  $\varepsilon_1$  = The error term which captures the effect of all variables that are not included in the model.<sup>1</sup>

Equation (2) first employs a simple OLS regression model which measures the direct effect of access to finance on firm growth. However, to avoid omitted variable bias, additional control variables are included. These are variables measuring other business environment constraints, denoted  $OC$  which investigate how important financial exclusion is a constraint to firm growth relative to other obstacles (Ayyagari et al., 2008) and is included in the subjective measure of access to finance ( $FC$  and  $FCD$ ). Other control variables include firm characteristics to capture firm size ( $SMALL$ ,  $MEDIUM$ ,  $LARGE$ ), establishment is local or foreign owned ( $FOREIGN$ ), firm age ( $AGE$ ), business regulatory conditions ( $TREG1$ ,  $FREG2$ ) and informal payments ( $BRIBERY$ ). The inclusion of firm characteristics helps in controlling for the differences in objective conditions facing firms with different characteristics (Aterido et al., 2011).

Thus, the study's estimation uses the following less restricted model for subjective measure of FC:

$$FG_{it} = \beta_0 + \beta_1 FC_{it} + \beta_2 OC_{it} + \beta_3 FS_{it} + \beta_4 FRN_{it} + \beta_5 AGE_{it} + \beta_6 REG_{it} + \beta_7 BR_{it} + \beta_8 SUB_{it} + \varepsilon_2 \quad (3)$$

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<sup>1</sup> A summary of definition of the various variables is attached as Table A1 in the Appendix.

Where *FC* = Subjective measure of access to finance; *OC* = A matrix of the remaining top 4 of 5 of the highest ranked constraints of the business environment: political instability (PI), corruption, practices of competitors in the informal sector (IS) and tax rates; *Firm Size* = Size of the firm, where: *SMALL* = firms employing between 5 and 19 employees; *MEDIUM* = firms employing between 20 and 99 employees; *LARGE* = firms employing above 100 employees; *FOREIGN* = States origin of the firm, whether local or foreign owned; *AGE* = Firms' age; *REG* = Regulatory frame-work. This indicator is defined using 2 variables: *TREG1* = The percentage of senior management time that was spent in dealing with government regulations; *FREG2* = The frequency of inspections or requirements for meeting by tax officials; *BR* = State the percentage of total annual sales paid in informal payments; *SUB* = The subsector the firm belongs to within the manufacturing sector.

The second less restricted model to be estimated measuring objective FC is as follows:

$$FG_{it} = \beta_0 + \beta_1 CCS_{it} + \beta_2 FS_{it} + \beta_3 FRN_{it} + \beta_4 AGE_{it} + \beta_5 REG_{it} + \beta_6 BR_{it} + \beta_7 SUB_{it} + \varepsilon_3 \quad (4)$$

## 6. Descriptive analysis

We begin our analysis by first presenting the descriptive relationships between firm growth and indicators of access to finance.

### 6.1 Firm growth

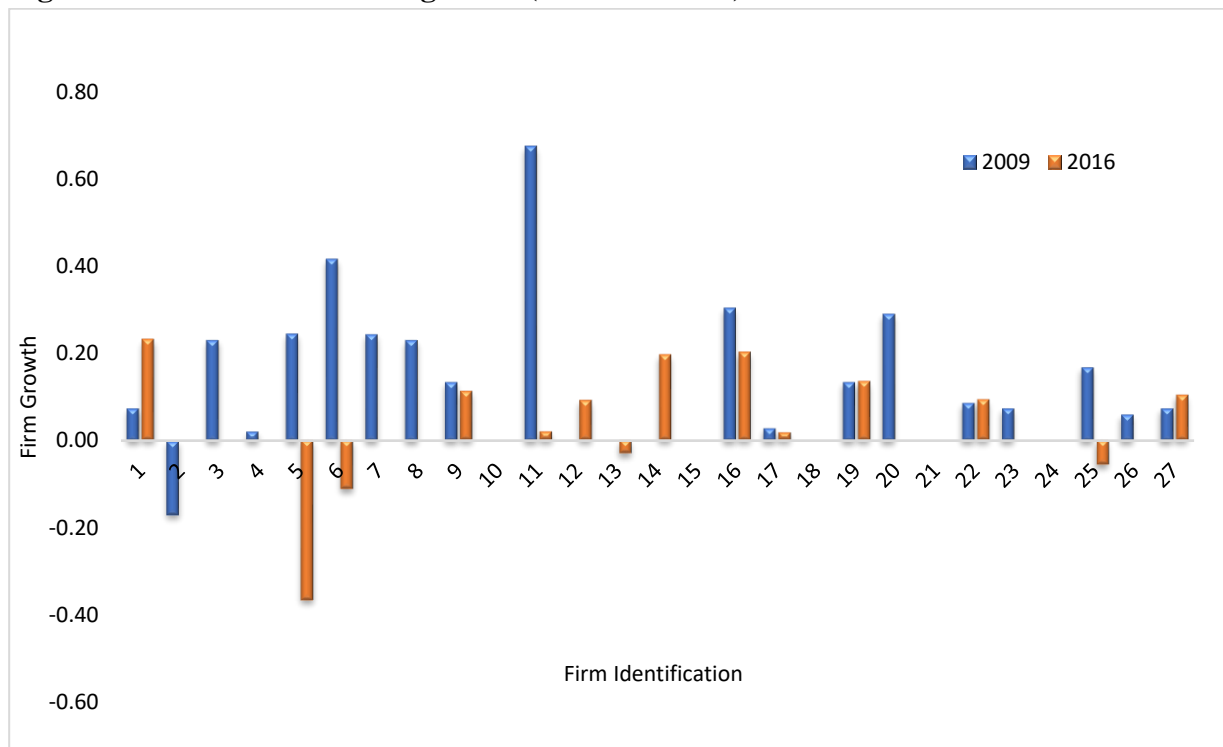
We start by first presenting the descriptive analysis for firm growth as the main dependent variable of this study. The following important insights are drawn from the results.<sup>2</sup> Firstly, that not all firms experienced growth in the years under review. Specifically, 29.6% and 48% of firms in 2009 and 2016, respectively, appear to have been stagnant and experienced zero growth. Secondly, 66.7% of the manufacturing firms in the sample have experienced actual growth in 2009 which reduced to 37% in 2016. Thirdly, a total of 3.7% firms in 2009 experienced negative growth and the number increased to 14.8% in 2016. Lastly, more firm growth was experienced in 2009 than in 2016. The highest firm growth is 0.68 experienced in 2009 and the lowest is -0.37 which was experienced in 2016. Furthermore, 40.7% and 29.6% of firms in 2009 and 2016, respectively, had higher than the sample average firm growth of 0.12 in 2009 and 0.02 in 2016. This further confirms that there was more growth of manufacturing firms in 2009 than in 2016. In terms of growth rate, which is shown in Table A2, it can be observed that only 3 firms; firm 1, firm 22 and firm 27, experienced positive growth rate while firm 1 experienced the highest growth rate. Some firms experienced negative growth rate and firm 5 had the lowest growth rate of -2.49. It can also be observed that 59.3% of firms in the sample have a declining employment rate.

In addition, Figure 5 presents the distribution of firm growth by firm for each year.

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<sup>2</sup> The results are presented in Table A2 in the Appendix

**Figure 5: Distribution of firm growth (2009 and 2016)**



The results provide further evidence that there was more firm growth in 2009 than in 2016, only one firm had negative firm growth in 2009. By 2016, however, most firms have below 20% firm growth and the number of firms with negative firm growth increased.

**Table 1: Summary of Firm Growth and manufacturing sectors**

Sectors	Firm Growth		Mean	Std Dev.
	2009	2016		
Food	0,15	0,04	0,10	0,08
Chemicals	-0,17	0,00	-0,09	0,12
Garments	0,14	0,05	0,10	0,07
Plastics and Rubber	0,19	-0,06	0,06	0,18
Fabricate Metal Products	0,16	0,03	0,09	0,09
Textiles	0,00	0,00	0,00	0,00
Electronics	0,04	0,05	0,04	0,01

Table 1 presents a summary of firm growth by industry within the manufacturing sector over time. The results reveal the following insights. Firstly, that only the textiles industry is showing evidence of stagnation, with no growth between 2009 and 2016. Secondly, manufacturers of chemicals experienced on average, declining growth. Thirdly, the remaining industries except chemicals and textiles, experienced positive average growth. The four better performing industries on average are food, garments, fabricate metal products and plastics and rubber with higher than average firm

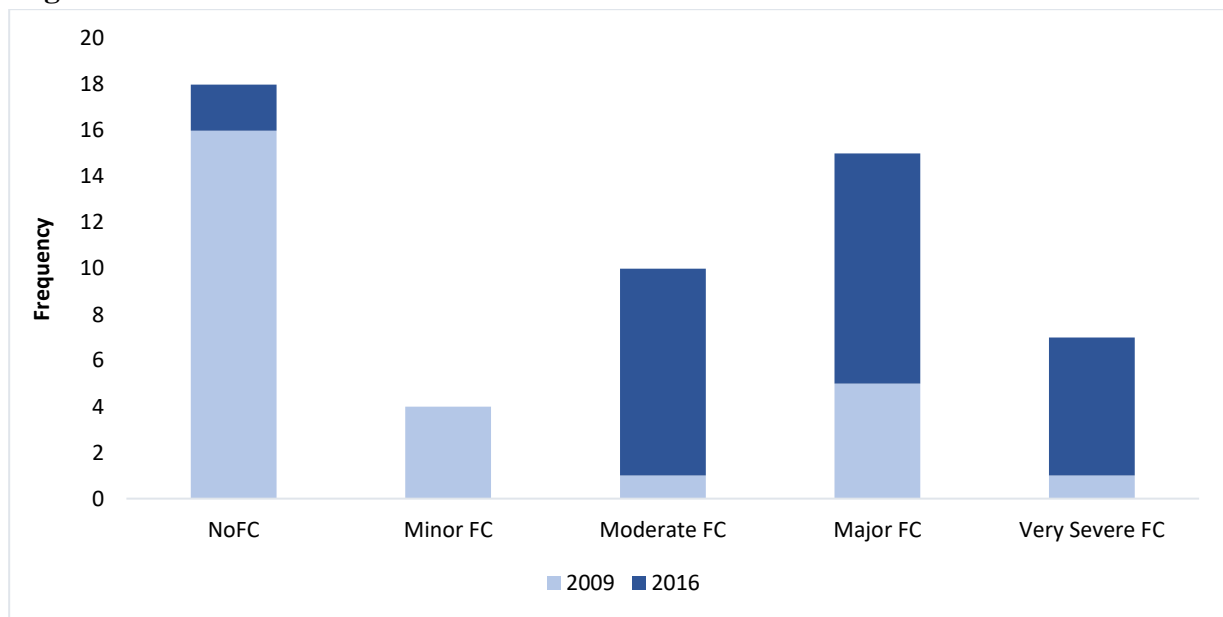


growth of 4%. Lastly, manufacturers of chemicals and plastics and rubber show a large variation due to a relatively large change in firm growth, on average, from 2009 to 2016. Generally, the results show a decline in growth of some sectors such as food, garments and plastics and rubber. This may have resulted from uncertainties that lied behind the renewal of AGOA beyond 2012. Some firms closed and firm performance declined as a result.

### 6.2 Access to finance

Next the study presents a descriptive analysis of indicators of access to finance. Figure 6 presents a graphical distribution of access to finance variables by firm.

**Figure 6: Distribution of access to finance obstacle**

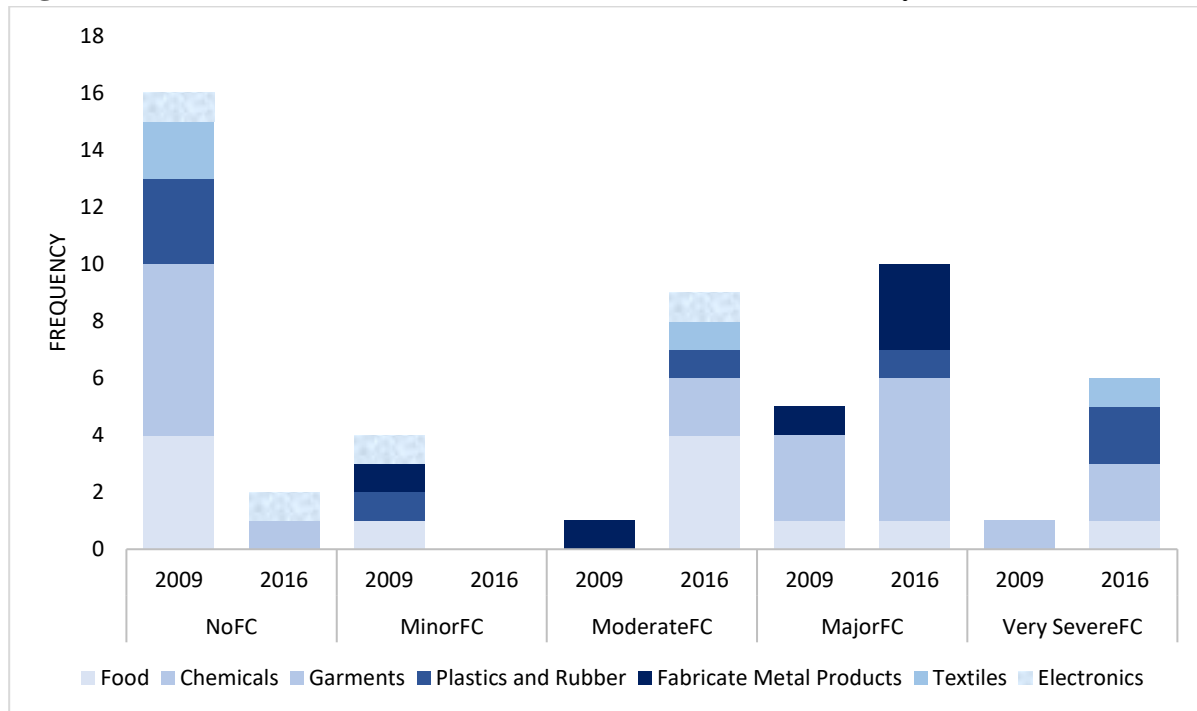


The results show that a significant number of firms were not financially constrained in 2009 but in 2016, there seem to be a significant shift of events as more firms are financially constrained, experiencing mostly moderate, major and very severe access to finance obstacle. In summary, most firms in 2016 indicated that they were facing financial constraints. Of the total firms that were faced with financial constraints, 48.9% of firms indicated that credit constraints were severe (see figure 8), while 46% indicated that the constrained were more moderate. Interestingly, more firms experienced more credit constraints in 2016 than in 2009. This observation is consistent with the fact there was a general decline in firm growth from 2009 to 2016.

### 6.3 Access to finance by sector

In addition, the analysis looks at industry in the manufacturing sector over time cross-tabulated with key independent variables pertinent to this study, which are indicators of access to finance. Figure 7 presents a graphical distribution of financial constraints by sector.

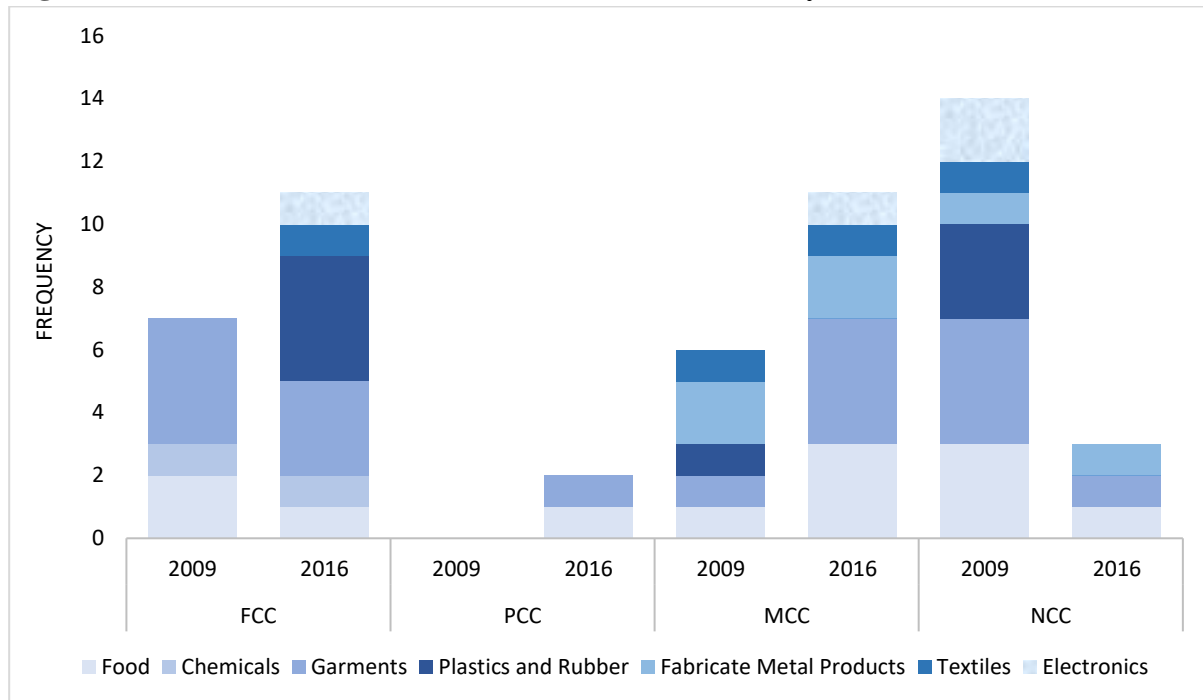
**Figure 7: Distribution of firms' access to finance obstacle status by sector**



The results provide the following key insights. Firstly, firms in the four sectors namely, garments, textiles, food and plastics and rubber moved from a no financial constrained status in 2009 to being faced with major and very severe financial constraints in 2016. Secondly, chemicals manufacturing firms have always been faced with major and very severe financial constraints in both years under review. This is consistent with the earlier observation of chemicals manufacturers experiencing, on average, a most significant decline in firm growth. Lastly, manufacturers of fabricate metal products and electronics were faced with minor to moderate financial constraints in 2009 while in 2016, the same firms were faced with major financial constraints.

Figure 8 illustrates the relationship between manufacturing sectors and a more objective measure of access to finance, credit constrained status, CCS.

**Figure 8: Distribution of firms' credit constrained status by sector**



The results further confirm observations from Figure 6 and figure 7. Firstly, firms manufacturing chemicals have always been credit constrained. Secondly, more firms regardless of the sector, went from a none credit constrained status in 2009 to a credit constrained status in 2016. In summary, there is no significant variation of access to finance indicators across manufacturing sectors, the variation is more significant between the years.

#### 6.4 Firm growth and control variables

Finally, the study presents the descriptive analysis that looks at the cross-relationships between firm growth and access to finance. We calculated correlation coefficients between firm growth and the control variables to draw insights on the interactions between different business environment factors. Table 2 displays correlation coefficients of firm growth with the remaining top four of five highest ranked constraints of the business environment.

**Table 2: Firm growth and business environment constraints, by firm**

Firm Growth	Informal Sector	Tax Rates	Political Instability	Corruption
2009	0,05	0,21	-0,10	-0,17
2016	0,04	0,00	0,36	0,00

The results show that practices of the informal sector have no correlation with firm growth in both years. Tax rates indicate a weak positive relationship with firm growth in 2009 but no correlation in 2016. Political instability and corruption show a negative and weak relationship with firm growth in 2009, but in 2016 there seem to be a surprising positive although moderate relationship between firm growth and political instability. Corruption in 2016 shows no relationship with firm growth.

We then examine the relationship between firm growth and firm characteristics over time. Table 3 presents a summary of the correlation coefficients of firm growth with firm characteristics, business regulatory framework and bribery. On firm growth and firm characteristics, it is interesting to observe that firm growth shows a weak relationship with firm size in both years.

**Table 3: Correlations of Firm growth and specified variables**

<b>Firm Growth</b>	<b>Firm Size</b>	<b>Foreign</b>	<b>Age</b>	<b>TREG1</b>	<b>FREG2</b>	<b>Bribery</b>
2009	0,14	0,02	-0,13	0,50	0,42	-0,32
2016	-0,11	-0,11	0,27	-0,10	-0,28	0,00

The results further reveal a positive but weak relationship between firm age and firm growth in 2016 and a negative very weak relationship in 2009. Lastly, firm ownership (Foreign) shows no relationship with firm growth in 2009 and a negative very weak relationship in 2016.

The results of the relationship between firm growth and business regulations show that in 2009 the percentage of senior management time spent dealing with government regulations (TREG1) and the frequency of inspections or requirements for meeting by tax officials (FREG2), both indicate a strong positive relationship with firm growth. However, the same relationship with the same firms is negative and very weak in 2016. Lastly, the relationship between firm growth and bribery indicate a negative and weak relationship in 2009 and shows no relationship in 2016. Bribery is captured by the percentage of total annual sales paid in informal payments (bribes).

Overall, the descriptive analysis reveals the following key insights from the data. Firstly, firm performance is declining over time. Secondly, firm growth and access to finance do not reveal any variation across sectors. Thirdly, firm growth shows very weak relation with business environment constraints, business regulatory conditions and firm characteristics. Fourthly, more of manufacturing firms in 2016 are faced with severe financial constraints relative to 2009. This piece of evidence is consistent with the fact that firm growth is declining over time. Lastly, the analysis suggests that smaller and medium-sized firms face the largest financial constraints which is consistent with several earlier discussed papers (for example by Beck, 2007; Agwu and Emeti, 2014). This relationship between access to finance and firm size indicate that firm growth and access to finance are both endogenous variables which may imply a potential problem of simultaneity bias. If this is the case, then OLS assumption of exogeneity is violated and this problem may lead to biased and inconsistent OLS estimates, if left unaddressed. The standard way to control simultaneity bias is with the use of instrumental variables which is explored in more detail in the section below.

## **7. Empirical results**

To better identify the relationship between firm growth and access to finance, we apply econometric analysis which allow us to control for other factors. We do this by first using pooled OLS regressions to estimate the effect of access to finance on firm growth. We go a step further to identify the causal relationship between firm growth and finance, accounting for possible endogeneity, by use of instrumental variable method.

### **7.1 Basic analysis**

Table 4 present the results from the pooled OLS estimation approach. The results show that only three variables, namely; moderate financial constraint (MODERATEFC), very severe financial constraint (VERYSEVEREFC) and full credit constrained (FCC) are statistically significant. This implies that insufficient financial resources are a serious constraint on growth of manufacturing firms in Lesotho. It can further be observed that firms that are credit constrained, either moderate or severe, are less likely to grow than firms that are not credit constrained, with the magnitude of the coefficients of credit constrained status indicators increasing from moderate to severe credit constrained status. This result is consistent with studies by Pissarides (1999), Koech (2009), Aterido et al. (2011) and Seker and Correa (2010) which found that firms which are financially constrained have a lower growth potential than firms that are not financially constrained. Model 2 specifically presents financial constraint dummy variable which captured two extreme cases where access to financial resources is either a constraint or it is not. The results suggest that financial constraints have an overall negative relationship with firm growth. Which further confirms the negative relationship between firms that are financially constrained and firm growth. Lastly, it can be observed that all the other variables are not statistically significant. This provides evidence that finance matters the most to manufacturing firm growth in Lesotho.

**Table 4: Effect of access to finance on firm growth**

Firm Growth	(1)	(2)	(3)	(4)	(5)	(6)
MINORFC	0.039 (0.051)			0.078 (0.071)		
MODERATEFC	-0.126** (0.062)			-0.072 (0.093)		
MAJORFC	0.000 (0.062)			0.042 (0.082)		
VERYSEVEREFC	-0.111** (0.047)			-0.080 (0.091)		
FCD		-0.051 (0.040)			0.012 (0.070)	
FCC			-0.158** (0.059)			-0.122** (0.060)
PCC			-0.057 (0.089)			-0.019 (0.098)
MCC			-0.050 (0.061)			-0.002 (0.058)
TAXRATES				0.032 (0.053)	-0.005 (0.056)	
IS				0.016 (0.072)	-0.013 (0.070)	
PI				0.035 (0.070)	0.064 (0.071)	
CORRUPTION				-0.064 (0.065)	-0.082 (0.064)	
SMALL				0.091 (0.083)	0.109 (0.071)	0.072 (0.067)
MEDIUM				0.063 (0.071)	0.084 (0.073)	0.061 (0.065)
FOREIGN				0.023 (0.062)	0.014 (0.070)	0.055 (0.067)
AGE				-0.001 (0.003)	0.000 (0.003)	-0.001 (0.003)
TREG1				0.001 (0.002)	0.001 (0.002)	0.000 (0.001)
FREG2				0.021 (0.014)	0.024 (0.015)	0.016 (0.014)
BRIBERY				0.006 (0.007)	0.005 (0.008)	0.003 (0.007)
SUBSECTOR				-0.007 (0.011)	-0.004 (0.011)	-0.010 (0.012)
Constant	0.117*** (0.028)	0.117*** (0.027)	0.155*** (0.052)	-0.027 (0.107)	-0.027 (0.115)	0.072 (0.108)
Observations	49	49	49	49	49	49
R-squared	0.15	0.02	0.18	0.33	0.23	0.29
Adj. R-squared	0.07	0.00	0.12	-0.01	-0.05	0.08

Notes: Columns 1, 2 and 3 of Table 6 present the results of the basic model. Columns 4 – 6 present the less restricted models where we include control variables. Robust standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4 also provide interesting insights when running unrestricted linear regression models (column 4-6). Thus, when adjusting for control variables in the basic model (column 1-3), the effect of access to finance on firm growth is large but weak. This implies that firm growth is a function of access to finance, which in turn is a function of other variable(s), in this case, firm size as descriptive analysis earlier revealed. Additionally, even though firm size is statistically insignificant, the magnitude of the coefficients is relatively high. This could be due to potential endogeneity problem in our results, resulting from simultaneous causality. A critical assumption of OLS is that the explanatory variables are uncorrelated with the error term. When endogenous variables depend on each other, this assumption is violated and the OLS estimates are biased and inconsistent. Estimating parameters from a simultaneous equation model requires advanced methods, of which the most popular today is instrumental variable estimation.

From pooled OLS regression results, we can draw the following conclusions, firstly, that insufficient financial resources are a serious constraint to growth of manufacturing firms in Lesotho. Secondly, there is a negative and statistically significant relationship between credit constraints and firm growth. Thirdly, the results identify access to finance as a key determinant of firm growth and lastly, the effect of firm size on firm growth is high but statistically insignificant. In the next section, we further interrogate the relationships, accounting for potential endogeneity which could result into biased estimates if not addressed.

## **7.2 Further analysis: Instrumental Variable (IV) approach**

In this section, we present the regression results using instrumental variable estimation to test for the possible problems of endogeneity in the econometric analysis contained in section 7.1, which may bias the results. Besides the possible endogeneity resulting from simultaneous causality, the main drawback of the WBES dataset used in this study, is that, it is a self-reported data which possess a high probability that some managers may always complain even if they are not facing severe constraints (Carlin et al., 2006). Thus, the responses might reflect idiosyncratic differences in the degree of optimism or pessimism of managers responding to the survey (Aterido et al., 2011). In addition, some inefficient firms may overstate the constraints that they face (Beck et al., 2005), while answers may be influenced by the experience and performance of the firm (Aterido et al., 2011). Furthermore, this raises the possibility that endogeneity could be present, thereby leading to estimation results that are bias. This is because firm growth and access to finance are likely to be interrelated, and perhaps similarly affected by individual characteristics. Thus, it could be difficult to extract causality between firm growth and access to finance. It is against this backdrop that instrumental variable estimation is used to address the potential endogeneity bias.

Theory stipulates that for an instrumental variable to be valid, it must satisfy the relevance and exogeneity assumptions. This implies that it must be correlated with the endogenous variable but at the same time be exogenous, that is uncorrelated with the error term. Following Beck et al. (2007), the study uses measures of the outreach of financial sector in terms of access to commercial banks' physical outlets and the use of the banking services as instrumental variables for access to finance. Although these instruments are not precise measurement of access to finance, they are good proxy indicators of measuring accessibility of financial resources (Ganbold, 2008). It is expected that

financial sector outreach and the use of banking services will both influence access to finance but be orthogonal to firm growth. The data used is obtained from International Monetary Fund (IMF) financial access survey dataset and the instrumental variables used for financial constraints and credit constrained status are the number of automated teller machines (ATMs) per 100 000 adults and loan accounts with commercial banks per 1 000 adults, respectively. Table 5 presents the results of the instrumental variable estimation.

**Table 5: Effect of access to finance on firm growth, instrumental variable estimation**

<b>Dependent Variable: Firm Growth</b>	(1)	(2)	(3)	(4)
FC	-0.133 (0.082)		-0.073** (0.029)	
CCS		0.166** (0.078)		0.175** (0.082)
TAXRATES	0.138 (0.107)			
IS	0.083 (0.101)			
PI	0.071 (0.082)			
CORRUPTION	-0.093 (0.083)			
SMALL	-0.002 (0.106)	0.068 (0.095)		
MEDIUM	0.082 (0.070)	0.079 (0.088)		
FOREIGN	0.078 (0.089)	0.170 (0.130)		
AGE	0.001 (0.003)	0.000 (0.004)		
TREG1	0.006* (0.003)	0.000 (0.001)		
FREG2	0.003 (0.022)	-0.003 (0.018)		
BRIBERY	-0.000 (0.011)	-0.004 (0.005)		
SUBSECTOR	0.013 (0.016)	-0.015 (0.017)		
Constant	0.168 (0.195)	-0.365 (0.224)	0.291*** (0.098)	-0.365* (0.208)
Observations	49	49	49	49
Robust Score	[0.010]	[0.043]	[0.082]	[0.014]
Robust Regression	[0.001]	[0.030]	[0.085]	[0.014]
First stage R2	0.547	0.260	0.356	0.088
First stage p-value	[0.080]	[0.059]	[0.000]	[0.041]

Models 1 and 2 are both unrestricted models that have been adjusted for control variables. Models 3 and 4 are basic models where Firm Growth is a function of access to finance. Model 1 and 3 measure subjective access to finance and Models 2 and 4 measure objective access to finance. Figures in () are robust standard errors and figures in [] are p values. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



The results reveal the following, firstly, Wooldridge's score<sup>3</sup> and the regression-based test suggest that indeed financial constraints and credit constrained status are endogenous. Secondly, the p-values of the first-stage regressions<sup>4</sup> in the basic model suggest that the instruments are strong and valid. However, the fact that the dataset had only 49 observations could be contributing to some discrepancies observed in some of the test results (p-values of the first-stage regressions in column 1 and 2), as a result continuing to treat access to finance as endogenous is valid because even if it was exogenous, the instrumental variable estimation is still consistent. Thirdly, financial constraints (as instrumented with the number of ATMs per 100 000 adults) are negatively related to firm growth and this relationship is statistically significant. This result is consistent with earlier findings (section 7.1) that firms that are financially constrained have poorer growth. Lastly, credit constrained status (as instrumented by loan accounts with commercial banks per 1 000 adults) has a positive and statistically significant relationship with firm growth and this is also consistent with previous findings that firms having better access to financial resources are more likely to experience faster growth. Thus, results of the instrumental variable estimation confirm previous findings.

Overall, instrumental variable estimation confirms that access to finance has a direct effect on manufacturing firm growth in Lesotho. It also confirms that the relationship between firm growth and credit is negative and statistically significant. Lastly, it confirms that firms with better access to financial resources have a higher chance of growth.

## **8. Conclusion and policy implications**

The importance of access to credit on firm growth, has captured the attention of many scholars in recent years. This study set out to investigate the relationship between firm growth and access to finance. It adds to the body of knowledge by using panel data regressions on the most current WBES dataset to examine the direct effect of access to finance on firm growth. Firm growth is captured by employment growth and used as the dependent variable. Whilst variables measuring financial constraints and access to credit are used as key independent variables and further instrumented by measures of the outreach of financial sector in terms of access to commercial banks' physical outlets and the use of banking services. Furthermore, to avoid problems associated with omitted variable bias, additional control variables are included. Our results provide three salient insights into the growth of manufacturing firms in Lesotho. Firstly, the analysis shows that Lesotho's manufacturing firm performance has generally been declining in the recent past. Secondly, the results reveal that manufacturing firms that are credit constrained have poorer growth relative to non-credit constrained firms. Thus, the study provides empirical support for the hypothesis that there is a negative and significant relationship between financial constraints and firm growth. This, therefore,

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<sup>3</sup> Wooldridge's (1995) robust score and robust regression-based tests are used to determine whether endogenous regressors in the model are in fact exogenous. After running instrumental variable regressions with robust VCE, Wooldridge (1995) robust test and robust regression based test are reported. If the test statistic is significant, then the variables being tested must be treated as endogenous.

<sup>4</sup> First-stage regressions are used to test for strength and validity of the instrumental variables. If test statistics are significant, then instruments are strong and valid.

means that firms that are not credit constrained will experience faster growth. This evidence is consistent with most findings in empirical literature, which found that better access to financial resources significantly increases growth of firms. Again, the study provides a strong statistical support for the hypothesis that there is a positive and significant relationship between access to credit and firm growth. The study provides evidence that access to financial resources is currently the single most important determinant of manufacturing firm growth in Lesotho. The implication of this is that the removal of financial barriers will benefit small to medium-sized firms, which embody much of Lesotho economy's latent dynamism.

Finally, the results show that small and medium-sized firms, predominately local owned, have a higher probability of being financially constrained. Thus, this provides interesting evidence that supports failure to reject our hypothesis that the effect of firm size on access to finance is positive and statistically significant. This is also consistent with empirical findings in the literature which found that in less developed countries where MSMEs are dominating and financial markets still under-developed, external financing is accorded based on a proven track record experience. The GoL or larger firms are the only entities that more likely to obtain credit. Even though the GoL has made efforts to ease accessibility to financial resources through initiatives such as equity contribution and partial credit guarantee scheme, the impact is not yet significant. The implication of this is that, the government should make further efforts to strengthen their relationship with commercial banks to improve financial markets and make access to credit easier. Another most effective way of easing credit accessibility is by establishment of a development bank as opposed to having only commercial banks whose role is solely to make profit and not to support establishment and development of private sector. Additionally, strengthening of development financial institutions (DFIs) such as BEDCO and the LNDC is crucial as DFIs typically promote strategic sectors of the economy such as manufacturing and provide credit to firms whose financial needs are not sufficiently served by the commercial banking system. By easing preconditions to credit, firms can easily move from small to medium or large firms and eventually contribute significantly to the country's economic development and growth. This will also enable entry of new firms. Higher entry of firms results in a more competitive market whereby the less efficient firms will exit the market and more efficient ones will be forced to be innovative to survive and grow.

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## APPENDIX

**TABLE A1: Definition of variables**

VARIABLE	DEFINITION AND METHOD OF MEASUREMENT
<b>Dependent Variable</b> Firm growth	Employment growth
<b>Independent Variable</b> Access to finance constraints (FC)  Participation in financial markets	Access to finance constraint ranked by firms on a scale of 1–5 (1 being no obstacle and 5 being a severe obstacle).  Credit constrained status;
<b>Control Variables</b> <ol style="list-style-type: none"> <li>1. Other Constraints</li> <li>2. Firm characteristics</li> <li>3. Bribery</li> <li>4. Business regulatory conditions</li> </ol>	A matrix of the remaining top 5 of the highest ranked constraints of the business environment: political instability, corruption; practices of competitors in the informal sector; tax rates;  Size (Small, Medium, Large); Ownership structure (that is, a firm is either foreign or locally owned); Age (number of years the firm has been in business)  Total annual sales paid in informal payments  Time spent in dealing with government regulations; Frequency of inspections or requirements for meeting by tax officials

**Table A2: Summary of Firm Growth**

Firm ID	Firm Growth		Mean	Growth rate
	2009	2016		
1	0,07	0,23	0,15	2,11
2	-0,17	0,00	-0,09	-1,00
3	0,23	0,00	0,12	-1,00
4	0,02	0,00	0,01	-1,00
5	0,25	-0,37	-0,06	-2,49
6	0,42	-0,11	0,15	-1,27
7	0,24	0,00	0,12	-1,00
8	0,23	0,00	0,12	-1,00
9	0,14	0,11	0,12	-0,17
10	0,00	0,00	0,00	0,00
11	0,68	0,02	0,35	-0,97
12	0,00	0,09	0,05	0,00
13	0,00	-0,03	-0,02	0,00
14	0,00	0,20	0,10	0,00
15	0,00	0,00	0,00	0,00
16	0,31	0,20	0,25	-0,34
17	0,03	0,02	0,02	-0,41
18	0,00	0,00	0,00	0,00
19	0,14	0,14	0,14	0,00
20	0,29	0,00	0,15	-1,00
21	0,00	0,00	0,00	0,00
22	0,09	0,09	0,09	0,07
23	0,07	0,00	0,04	-1,00
24	0,00	0,00	0,00	0,00
25	0,17	-0,06	0,06	-1,33
26	0,06	0,00	0,03	-1,00
27	0,07	0,10	0,09	0,39

Notes: Growth rate = (Firm Growth 2016 – Firm Growth 2009) / Firm Growth 2009. Firm Growth =  $(\ln S_t - \ln S_{t-3}) / 3$ . Firm growth is measured in terms of employment growth.