

UNIVERSITY OF NAIROBI

SCHOOL OF ECONOMICS

DEMAND FOR FORMAL CREDIT BY SMALL AND MEDIUM SIZE ENTERPRISES IN NAIROBI

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DECLARATION

This research paper is my original work and has not been presented for a degree award in any other University.

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APPROVAL

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DEDICATION

This work is dedicated to my Mother Mary N.M Naliaka and My Late Father Matthews Joel Wamalwa, for their unending support and believes in me during my time in school.

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LIST OF ABBREVIATIONS AND ACRONYMS

AIC	Akaike Information Criteria
BIC	Bayesian Information Criteria
df	Degrees of freedom
CBS	Central bureau of Statistics
F	Fisher's Statistic
ICEG	International Center for Economic Growth
ILO	International Labour Organisation
GOK	Government of Kenya
MSEs	Micro and Small scale enterprises
Ms	Mean square error
OLS	Ordinary Least Square
SMEs	Small scale and Medium Size enterprises
Ss	Sum of squares
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organisation

Abstract

This study examines demand for formal credit by Small and Medium size enterprises in Nairobi municipality, Kenya. The study was undertaken at a time when financial sector had undergone tremendous growth in the recent years resulting into reduction of the proportion of population excluded in the financial sector. However, there is a consensus in the literature that small firms face financing challenges. Proximate form of finance is debt finance, but terms and conditions of credit are too stringent making credit unattractive for small firms. Over reliance on retained earnings impedes growth of these firms that play a crucial role in Kenyan economy since this source of finance for investment is inadequate for substantial capital accumulation in a short time. Demand for credit in this study is measured by application of credit and amount of credit applied.

The study uses cross sectional data collected from Nairobi area in August 2010 using structured questionnaire. Heckman sample selection model was employed to correct for non randomness in entrepreneurs decision to seek credit and amount of loan given. Tobit model was also used to investigate extent of satisfaction of demand for credit to take into account heavy tails in success rate. Analysis of variance was utilized on variables on nominal and interval scale. Besides quantitative techniques, qualitative methods like focused group discussion and key informant interviews, were used.

Empirical evidence suggests that firms finance their projects using retained earnings prior to debt. Despite there being no gender discrimination in the financial sector, female entrepreneurs are less likely to use debt finance due to self discrimination in seeking credit. Finally, growth oriented firms are more likely to seek debt finance.

CHAPTER I

Introduction

Private small and medium sized enterprises (SMEs) typically account for more than 95% of all firms outside the primary agriculture sector, constitute a major source of employment and generate significant domestic and export earnings in the Organisation of Economic Cooperation and Development (OECD), transition and developing countries. Major challenge for SMEs in Kenya is inadequate finance despite existence of sophisticated financial sector and awareness of available credit instruments by entrepreneurs (Fafchamps *et al.*, 1999). Use of formal credit by SMEs improves their productivity and growth thereby contributing significantly to economic growth and development.

Financial markets are riddled with information asymmetry that influences the cost and availability of credit to firms in Kenya. Financial market imperfections influence firms' investment behavior by altering demand for credit and general financing patterns. Hence, firms make decision to use formal credit according to cost and availability of credit since this influences value of the firm to owners. Extent of information asymmetry determines whether an entrepreneur will use credit or not (Myers and Majluf, 1984). Demand for formal credit is determined by firm, credit and environmental characteristics of the enterprise (Coleman, 2000). This paper investigates factors that influence small scale and medium size enterprises demand for formal credit.

1.1.1 Defining Small Scale and Medium Size Enterprises

There is no generally-accepted definition of a small business because classifying businesses as "large-scale" or "small scale" is subjective and amounts to qualitative judgment. Cooley *et al.* (1997) argues that definition of Small scale and medium size enterprise depends on the objectives of the study and the economy. Hence, definition adopted should not only enable achievement of the objectives of the study, but also correspond to the economy. Consequently, definition of Small scale and Medium Size enterprises (SMEs) has to vary from one study to another and generally over the economies. In Britain, a small-scale business is defined as an industry with annual sales of 2 million pounds or less and with less than 200 paid employees. Many developed countries perceive small scale and micro-enterprise sector to be a mixture of the self-employed and enterprises with less than 10 employees. Generally, in developed countries, Small scale and Medium size enterprises consists of firms with employees between 10 and 500 (Cooley *et al.*, 1997). In developing countries, Small Scale and Medium size enterprises are firms with less than 100

employees (United Nations Industrial Development Organisation-UNIDO 1997; Daniels 1999). Size of enterprises in developed countries is larger as compared to those in developing countries.

In Kenya, enterprise size is defined in terms of the number of employees and sales. In this light firms are categorized as either micro, small scale, medium size or large scale. Micro-enterprises are firms with less than 10 workers, small enterprises have from 11 to 50 workers, while medium enterprises have from 51 to 100 workers (Government of Kenya (GOK), 2006). For the purposes of this study Small Scale and Medium Size Enterprises (SMEs) are enterprises with less than 100 employees with annual revenues less than 50 million Kenyan shillings. This classification concurs with generic name for SMEs, according to UNIDO (1997) and Daniels (1999), to refer to small-scale enterprises.

1.1.2 Historical perspectives of SMEs

Many SMEs in Kenya originated from Indian laborers who stayed behind and became entrepreneurs on completion of the construction of Mombasa – Lake Victoria railway. At this time enterprises were mainly small shops along the roads and around railway stations selling merchandise. Overtime enterprises diversified with entry of indigenous Kenyan that saw them provide services, but manufacturing was small and rudimentary. Many SMEs in services and manufacturing sector adopted Indian technologies to develop their products (Bigsten *et al*, 2004). Before independence many enterprises were Indian owned while Kenyan Africans provided labour either in rural areas or in urban white owned firms.

The initial growth of the sector came about after Kenya attained independence and subsequent adoption of Africanisation policies to allow Kenyan Africans to establish business Ronge *et al* (2002). At independence, Kenyan economy was dominated by white and Kenyans of Indian origin. This resulted in income and wealth inequality that prompted the government to adopt policies intended to increase participation of indigenous Kenyan in the economy. In 1972, International Labour Organisation (ILO) report noted with great concern about unequal distribution of income and economic power. One of the remedies of inequality was to encourage people especially civil servant to set up and operate business since they had capital.

Government of Kenya in subsequent economic development plans recognized that informal sector has a large capacity to create employment with small amount of investment. For instance Sessional Paper No. 2 of 1992 on Small Enterprises and Jua Kali Development develops a policy framework for this sector to enable it overcome challenges and to contribute effectively in the economy. Rural-urban migration has further contributed to the growth of SMEs as it provides greater employment and income with little or no investment (G.O.K, 1992).

1.3 Characteristics of SMEs

Majority of SMEs operate informally, engaging in trade, services, manufacturing and construction sectors. Service sector accounts for 13% of firms which include professional and non professional services. Construction sector constitute 1% and are firms in the construction industry. Trade is made up of 74% of the firms that sell goods. Service sector is the highest income earner among SMEs. Income from the trade sub-sector is ranked lowest, but it is vital to the livelihoods of many poor even though net income is barely enough for saving (Central Bureau of Statistics of Kenya- CBS, 1999).

Ownership is predominantly sole proprietorship to about 44.51% and partnership are 17.47%. co-operative or corporate business account for 37.25% and other 0.77% (world bank,2007). Of the total SME employment, 99% of SMEs employment is contributed by small enterprises, the medium size firms are small because industrial polices favor the larger enterprises in terms of credit access (Kahuthu, 2005).

Mechanization and use of new technologies is the key to improvement in productivity of SMEs. But, 93.1% of the SMEs do not use machines. Those that use, use outdated machines, and technology is low, despite being highly labour intensive (CBS, 1999). This impairs their productivity and level of output.

SMEs have low labour costs as they utilize family manpower, the young, unskilled and inexperienced people who want to acquire skills and will not mind low or no wage (Fafchamps, 1999). While this reduces cost of production, lack of skills and knowledge only augment slow growth of SMEs.

Lenders evaluate creditworthiness of enterprises using business records. According to investment climate survey on enterprises 2007, 86.69% of SMEs do not have complete set of accounting records, thus rendering themselves unattractive to credit facilities. This explains why only 30.7% of the SMEs access credit from commercial banks. This amounts to insufficient funding given that internal sources are meager. Therefore lack of capital is a major constraint faced by SMEs. In deed 16.69% of the SMEs consider cost and availability of credit not being a problem but 83.31% perceive accessibility to credit to be a major obstacle. (World Bank, 2007).

There is high closure rate among small enterprises with many of them starting and collapsing after 3 years of operating and those that survive, exhibit stunted growth. Moreover, SMEs in Kenya have a tendency of growing horizontally as opposed to vertical. Horizontal growth is emergence of new enterprises, while vertical growth is graduation of small enterprises into medium through to large scale enterprises (Moyi,

2005). Horizontal expansion is attributed to lack of entry barriers and little capital while vertical growth is mainly due to lack of capital. Liquidity risk is positively related to firm size and because terms of credit increase the financial risk of doing business, entrepreneurs unable to self-insure against large risks associated with debt finance may prefer to remain small and to diversify their activities by starting a new firm instead of expanding the one they currently operate (Fafchamps *et al.*, 1999).

1.1.4 Role of SMEs

The role of SMEs in contributing to poverty reduction and the general achievement of Millennium Development Goals (MDGs) is immense. A dynamic and growing SMEs sector can contribute to the attainment of income distribution, employment creation and poverty reduction since small enterprises are labour intensive, exploit local resources and require less skills and output is cheaper. This sub sector produces goods and services that meet sectoral basic needs that are unmet via larger economy that goes along way in improving people's welfare. The resultant interlinkages fostered by this business, provide a seedbed of industrialisation (World Bank, 2004; Cook and Nixon, 2005).

At macro economic level, private and small and medium sized enterprises (SMEs) typically account for more than 95% of all firms outside the primary agriculture sector, constitute a major source of employment and generate significant domestic and export earnings in OECD, transition and developing countries. Patricof *et al* (2005) SMEs in high income countries contribute more than 50% of GDP but in medium and low income countries SMEs contribution is 16% and less than 10% respectively. Women entrepreneurship tends to be concentrated in old established businesses like services and retail that are highly competitive, providing essential commodities, generating income, thus very vital in poverty reduction in women populace which is considered less economically empowered (Groot, 2001).

The quantitative importance of SMEs in sub-Saharan Africa is widely recognized as being significantly greater than is implied by official statistics. Independent survey results from a range of countries suggest that perhaps up to 30% of the working age population is employed in this type of activity (Liedholm and Mead, 1999). In Ghana, SMEs employ a large number of workers, offer modest incomes, and provide training for many apprentices and family helpers in an economy characterized by high unemployment (Mensah, Tribe and Weiss, 2007).

In Kenya, according to 1999 baseline survey on SME sub sector employed a total of 6 million workers and the number of people employed in this sub sector has doubled since 1999 baseline survey on micro and small scale enterprises (GOK, 2000). In 2006 SME sub sector employed 6.8 million people double those

employed in large enterprises (GOK, 2007). Therefore, the answer to employment creation for an increasing population of Kenya lies in the SMEs growth. In deed the Economic Recovery Strategy for Wealth and Employment Creation of 2002 targeted creating 500000 new jobs annually between 2003 and 2007. This target was almost met whereby 458900 jobs were created, 90% of which were from SMEs. In terms of GDP contribution, SMEs account for about 19% GDP (Liedholm, 2001). As compared to other developing countries SMEs contribution is dismal. Peru, a lower middle income economy, SMEs generate 75.9% of country's Gross Domestic Product (GDP) and account for 42.1% of employment as compared with a lower figure of 19% for Kenya (Gitonga, 2008).

1. 1.5 Financing SMEs

The prioritization of poverty reduction has increased interest in the contribution that financial development can make to poverty reduction. Adequate financing of SMEs plays a crucial dual role in poverty reduction. On one hand, finance is a key element for SMEs to succeed in their drive to build productive capacity, to adopt technology that enables enterprises to produce competitive good, job creation that contributes to poverty alleviation and achievement of Millennium Development Goals (MDGs) in developing countries. On the other hand, efficient SMEs bank financing creates micro-economic incentives affecting demand and supply of formal credit that hastens development of financial sector that is essential for general economic growth (United Nations Conference on Trade and Development-UNCTAD, 2002).

Stiglitz (1998) argues that market failure is a fundamental cause of poverty, and financial market failures, which mainly arise from market imperfections, asymmetric information and the high fixed costs of small-scale lending, limit the access of the poor to formal finance, thus pushing the poor to the informal financial sector or to the extreme case of financial exclusion. In addition, improving access to financial services enables economic agents to build up productive assets that enhance their productivity and potential for sustainable livelihoods (World Bank, 2001).

Despite the fact that financing SMEs is important in poverty reduction, little effort has been made to address their financing challenges. Survey of funding sources for businesses, by the Investment Climate Surveys in 2002–2003 in 40 developing countries in Europe, Asia, Africa and Latin America, has found that larger firms generally have more access to bank credit than small firms, whereas the latter rely heavily on internal funds and retained earnings (Cull *et al*, 2004). In response to failure of the market to provide small firms with adequate credit, significant resources have been channeled into financing of SMEs sector in developing countries. Beck *et al*, (2005) estimated that the World Bank Group had approved more than \$10 billion in SMEs support programmes 1999-2004.

In Sub-Saharan Africa (SSA), SMEs do not have a reprieve in terms of financing even with financial liberalization. Financial liberalization ought to result to financial innovations that lead to meeting demand for formal credit. However, financial markets for SMEs have market imperfections and asymmetric information that has hindered adequate financing of small firms that are informationally intensive (Steel 1994; Steel *et al.*, 1997). In particular, Beck *et al.* (2008) pointed out that bank financing to SMEs in Sub Saharan Africa is less significant, more costly to firms and risky to banks and generally more short-term than in other developing countries.

1.1.8 Demand for and supply of credit for enterprises in Kenya.

Kenya's financial sector has grown steadily from 1990s as indicated by the growth of the share of the financial sector in GDP. Increased financial deepening has corresponded with increase in the number of banks and non banking financial institutions. Consequently, proportion of people excluded from the financial sector has declined (Central Bank of Kenya, 2009). However, gains in the financial sector overtime have not led to significant flow of credit to small enterprises. A vast majority of firms finance their projects from own savings and informal sources (Kiiru 1991). 1993 base line survey for micro and small scale enterprises showed that 9% of SMEs accessed credit of which 4% of this credit is obtained from financial institutions and credit 69.1% came from informal savings and 26.9% from credit associations (ROSCAS), friends and relatives. The situation has not improved significantly since 1999 baseline survey shows that 10.8% of SMES accessed credit of these 3.4% received credit from formal sources (CBS, 1999).

Table 1: Per cent age proportion of sources of credit to SMEs

Source	1993	1995	1999	2007
None	85	89.2	89.9	67.08
Formal credit institutions NGOs	4	3.4	5.7	5.60
Co-operatives	-	-	1.2	0.18
NGOs	-	-	2.8	
Commercial banks	-	-1.5		23.47
Government	-	-		3.68
Informal institutions	5	7.4	0.2	
ROSCAs	-	5	4.7	
Family and Friends	-	2	2.5	
Money Lenders	-	0.1	1.5	
Trade Credit	-	-	0.6	
Total	-	100	100	100

Source: National Baseline survey 1999 (CBS, Krep and ICEG) and World Bank 2007

From Table 1, credit from formal sources increased overtime, but proportion of firms that do not use credit is large despite larger number of organization that support programmes for enterprise finance. Commercial banks that have higher lending capacity do not lend enterprises instead they are lent.

Demand for credit by SMEs is effective demand estimated by establishing loans made and those rejected due to inability of entrepreneurs to comply with requirement. Successful loan application depicts effective demand on one hand and on the other hand credit rationing. According to enterprise survey of 2006 a small proportion of 29.6% of SMEs applied for lines of credit or loan while 70.4% did not apply for any credit facility, indicating a small effective demand for credit. Even though demand for credit is low successful credit applicants have small amounts of loans approved.

Table 2: Amount of credit approved

Amount of Credit approved	Female	Male	Total	Overall %
0-10000	169	278	447	69.09
10001-50000	5	3	8	1.24
50001-100000	2	8	10	1.55
100001-500000	18	22	40	6.18
500001-1000000	9	7	16	2.47
1000001-5000000	27	44	71	10.97
5000001-10000000	11	16	27	4.17
10000001-50000000	6	17	23	3.55
50000001-100000000	0	3	3	0.46
100000001 and above	0	2	2	0.31
Total	247	400	647	100.00

Source: World Bank 2007

Table 2 shows that majority of loans approved by financial institutions are between 0-10000 which is inadequate for firms to undertake substantial investment. In addition, despite smaller number of women owned enterprises seeking loans approval compared to male entrepreneurs, amount approved for many women is smaller. According to Regional Enterprise development study in 1999, despite financial sophistication, the major draw backs to demand for credit in Kenyan firms is the short repayment period and high cost (Fafchamps *et al.*, 1999).

Patterns of growth

Patterns of growth almost correspond to patterns of demand and supply of credit. Bulk of surviving SMEs has same current size as when they started. The larger the size, the greater the risk of dropping in size over

the years. 32.18% of the firm reduced number of employees by an average of 1%, and 58.18% of firms had an average growth rate of 1 employees for the 2002-2006 period. Firms that increased number of employees between 3 and 10 were 1%. The smaller the size at the 2002 the lower the rate of increase in number of employees. However, larger firms experience small rates of growth (World Bank, 2007).

Table 3: Sales growth rates of firms that access credit and those that had no access to credit.

Growth rate(2002-2006)	Have a line of credit or loan		Total
	Yes	No	
-1-0.0	28	45	72
0.1-1	107	175	282
1.1-2	15	45	60
3.1-4	3	7	10
4.1-5	0	1	1
5.01-6	2	2	4
6.1-9	1	1	2
9.1-10	6	9	15
Total	162	285	447

Source: World Bank enterprise survey 2007

Table 3 shows that firms without lines of credit or loan have lower growth rate especially growth rate between -1 and 1. Survival rates correspond to funding patterns exhibited by enterprises whereby firms that are unattractive for debt finance are more likely to collapse due to liquidity crisis (Orser *et al.* 2006). Situation is aggravated according to gender pattern. Women enterprises are small and face greater likelihood of closure. In Nairobi and Mombasa, 32.7% of enterprises sited shortage of operating funds as the reason for closures, out of which men enterprises were 43.4%, women 32.4% and jointly owned 39.5% (KNBS, 2008). This is consistent with low demand for credit among the group.

1.2 Statement of the problem

SMEs are important in economic growth and development in developing countries like Kenya since they offer employment opportunities to 6.8 million people and contribute 19% of GDP (G O K, 2007), produce goods and services that serve needs of the low and middle income groups; goods meet the specific local tastes, thereby improving the living standards of the very poor (Fafchamps, 1999).

Due to the noble role they play in development, government, financial institutions and NGOs have created packages to finance setting up and expansion of these enterprises. However, these enterprises have not taken off and those that have taken off have not increased their scale of operation to large scale firms despite

availability of finance from government, commercial banks, NGOs and microfinance¹ Liedholm (2001). Those that survive grow at a slow rate and this is attributed to limited financial capital (Omolo and Omiti, 2005). This compromises the ability of the SMEs in contributing to growth and development of the economy through generating employment, other income earning opportunities and industrialization.

Supply side constraints to credit in rural areas have been addressed in studies like (Schmidt and Kropp, 1987; Atieno 2001). However, demand side factors in Nairobi area have never been considered. While it is apparent that supply of formal credit is demand driven, efforts have not been made to know factors that influence SMEs' financing decisions that lead to demand for formal credit. For instance, Fafchamps, *et al.* (1999) and Green *et al.* (2002) only investigate demand for formal credit in all firms and micro and small size firms in Kenya respectively.

CBK (2009) Kenya has witnessed unprecedented financial sector development as evidenced by increase in the ratio of broad money to Gross Domestic Product (financial sector deepening), proliferation of financial institutions and intensive financial innovation. Financial sector development and liberalization has not improved demand for formal credit by SMEs. Report on Investment climate survey of Kenya indicated that 60% of enterprises do not want credit (World Bank, 2004). Financiers stipulate terms of credit that elevate cost of formal credit thereby making formal credit inappropriate to SMEs thus reducing demand for credit (Schmidt and Kropp, 1987). This compels SMEs to resort to retained profit and personal savings as source of finance which are inadequate (Atieno, 2001).

The net effect is inadequate finance for SMEs that impairs their growth and hampers the transition of enterprises from small scale to medium size and finally to large scale firms (Oketch, 2000). Impaired growth of these labor intensive enterprises does not only result to low income and living standards but also slow rate of industrialization that impedes realization of Kenya's vision 2030². This study will enhance our knowledge on the characteristics of SMEs that influence their demand for and reliance on formal credit as source of capital that will not only enable the financiers to tailor credit services to meet specific needs of SMEs but also reduce cost as perceived by enterprises.

¹ Sessional paper No. 2 of 2005 on development of Micro and Small Scale Enterprises for Wealth creation and Employment acknowledges that these enterprises are under funded, cost of credit high due to information asymmetry. Access to finance is sited as a major impediment to the growth of these enterprises.

² Vision 2030 envisages Kenya to be an industrialized country with high income and welfare by 2030

1.3 Objectives

Overall objective is to identify factors that influence demand for credit by SMEs in Nairobi.

Specific objectives;

- To examine characteristics of SMEs that influences their decision to demand formal credit.
- To estimate the extent of formal credit finance in SMEs.
- To make policy recommendations.

1.4 Research questions

- 1) What are characteristics of SMEs that influence their decision to use formal credit?
- 2) To what extent do characteristics of SMEs influence their reliance on formal credit?

1.5 Significance of the study

This study investigates factors that influence demand for credit by SMEs in Nairobi province taking into account sample selection bias. SMEs can either raise capital from existing owner(s) and retained profit or (formal credit) debt finance. In identifying characteristics of firms that influence their decision to choose a particular source of finance, financial institutions will understand these factors and they will design lending policies and screening mechanism that are favourable to SMEs. In addition, the screening process adopted by financial institution will not amount to credit rationing, thus reducing cost and increasing supply of credit, thereby increasing demand for credit. Moreover, financiers will create packages that are SME specific thus overcoming information and need asymmetry between stake holders. These will go a long way in enabling financiers to achieve their objectives as well as enabling the growth of SMEs and the financial sector which are vital for economic growth and development.

Choosing between own savings and retained profits against formal credit by SMEs depends on the respective costs and benefits. Understanding these factors will help SMEs to mitigate information asymmetry that elevates the cost and availability of debt finance, thus demand for credit. Resultant effective demand for credit is likely to be met, that will lead to expansion of enterprises. Ultimately, SMEs will play their rightful role in growth and development.

Sessional paper No. 2 of 2005 on development of Micro and Small Scale Enterprises for Wealth and Employment Creation for Poverty Reduction sites access to credit as a major challenge for this sector's growth. Knowing factors that influence demand for credit will enable policy makers to design policies that reduce cost of credit. Information asymmetry leads to market failure taking the form of either

underinvestment or overinvestment. The study will enable policy makers to design policies that allow government to be a strategic party in provision of credit to SMEs where market for credit to SMES has failed thus encouraging their growth.

This study to the best my knowledge has never been done before in Kenya. The study examines factors for demand for loan by SMEs in Nairobi province, taking into account sample selection and endogeneity biases. Abor and Biekpe (2007) note that many studies on finance have focused on financing decisions by large firms all over the world, seldomly, and small firms are studied. In Kenya, Fafchamps *et al.* (1999) examines demand for credit financing of all firms while Green *et al.* (2002) investigated micro and small scale enterprises. Hence, this study will augment our knowledge on determinants of choice of source of finance, demand for credit and hence capital structure of SMEs in Nairobi. Furthermore, economics of finance literature on the determinants formal credit demand and capital structure of SMEs in Kenya will be enriched.

1.6 Scope and limitation

This paper investigates the factors that influence demand for credit by small scale and medium size enterprises in Nairobi Province. Internal finance is capital obtained within an enterprise and it includes retained earnings and additional capital from existing owners. Formal credit is external finance obtained from agents who are not owners for instance loan. Enterprises with less than 100 employees with annual revenues less than 50 million Kenyan shillings are investigated.

The drive for seeking debt finance depends on characteristics of the firm. An enterprise makes financing decision considering the cost and benefits of each source. From the enterprise point of view, factors that influence the cost and availability of credit are investigated. From supply side, the level of information asymmetry influence cost and availability of finance, thereby determining whether formal credit is demanded as well as the amount to apply and obtained. These study, investigates aspects of the SMEs that alter information asymmetry, thus influencing demand for formal credit through cost and availability.

1.7 Hypotheses

This study focuses on three primary hypotheses which are outlined in this section. Our first hypothesis pertains to the pecking order theory of capital structure. In particular, we are interested in knowing whether entrepreneurial firms do in fact prefer to finance projects with their own profits prior to seeking formal credit. Traditional pecking order theory (Myers and Majluf, 1984) is consistent with this prediction, since

entrepreneurs have information that lenders do not have, and therefore the information asymmetry faced by lenders makes credit more costly.

Hypothesis 1 Pecking order and decision to seek formal credit: A more profitable firm is less likely to seek debt finance.

Our second central hypothesis considers the decision to seek finance as a function of entrepreneurial firm as well as investor characteristics. The costs of seeking and obtaining credit are higher where entrepreneurial firms exhibit greater informational asymmetries. Among younger and innovative firms for which these costs are more pronounced, firms will only be willing to incur these costs if they have significant growth objectives.

Hypothesis 2 SME Growth objectives and demand for formal credit: SMEs that have growth as the most significant objective are, all else being equal, less likely to seek credit.

Our third hypothesis relates to gender and its influence on the decision to seek credit. Women owned enterprises are less likely to use credit. This can be attributed to unjustified discrimination or characteristics of firms started by females that are systematically different relative to firms started by males. Hence, information asymmetries faced by lenders systematically differs across firms started by males and females, thereby causing systematic differences in the costs and benefits of seeking credit by female versus male led firms.

Hypothesis 3 Gender: There are no differences between female and male owned/managed firms in seeking and obtaining formal credit.

1.8 Outline of the rest of the study

The rest of the study is organized as follows: Chapter II gives the theoretical and empirical review of literature on the determinants of demand for debt finance for SMEs and the direction of relationship between debt finance and explanatory factors. Chapter III outlines the methodology to be adopted in investigating the relationship between formal credit finance and internal characteristics of an entrepreneurial firm, definition and justification of variables together with the estimations to be conducted. Chapter IV presents results and discussion of empirical findings. Finally Chapter V draws conclusions and makes policy recommendations based on findings in chapter IV.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the theoretical and empirical evidence so as to get an insight on the determinants of credit demand and thus how SMEs are financed in relation to the existing body of theoretical and empirical literature.

In order to explain enterprise demand for credit we explore effect of financial market on enterprise investment behavior. Financial structure of an enterprise shows how a firm is financed. There is a divergence in the theoretical postulates pertaining to the relationship between capital structure and its determinants. On one hand we have assertions of irrelevance of capital structure to a firm's value due to assumption of perfect market (Modigliani and Miller 1958 and 1963; Jensen and Meckling 1976). This gives rise to static trade off theory. On the other hand, Myers (1984) and Myers and Majluf (1984) assert that, capital structure affects firm's value. The issue is further exacerbated by the widely diverging empirical findings.

2.2 Theoretical literature

There are two strands of theoretical literature. One strand emphasizes existence of perfect information and competitive market and the other espouses imperfect information that gives rise to significant financial contracting and agency costs with the potential to influence the riskiness and size of SMEs' future cash-flows.

Models of optimal financial structure explain the decision that leads to a balance between retained earnings and credit finance that maximizes the value of a firm. Modigliani and Miller (1958 and 1963) provided initial explanation of optimal financial structure. Their model asserts that, under perfect information and complete market, how the firm is financed does not have effect upon its value. What determines firm's value is the size and riskiness of the cash-flows arising from its investment and operating activities. As these cash flows are independent of the financing decision, with the exception of tax effects, debt will therefore be irrelevant in determining firm's value.

This model implies that a firm can acquire additional amount of credit capital at no additional cost, hence, it is indifferent between owner or retained savings and credit finance. Due to constant marginal cost of debt finance, a firm can acquire the desired credit. However, Modigliani and Miller (1958 and 1963) model is based on perfect market, thus fails to capture financing decision of firms. Different types of debt finance as well as their levels and assets of a firm have associated costs and risks. The risk characteristics of different types of debt and the nature of the firm's assets, the increasing financial distress costs and agency-induced value losses at high debt levels create firm-specific optimal debt level and capital structure (Grinblatt and Titman, 1998).

Post Modigliani and Miller (1958 and 1963) models of optimal capital structure relax assumption of perfect information and constant marginal cost of debt finance. These models modify their propositions to reflect increasing agency costs and bankruptcy or distress costs at higher debt levels, and are referred to as (static) 'trade-off' models. For instance, Jensen and Meckling (1976) model suggest that the optimal capital structure for any particular firm will reflect the balance (at the margin) between the benefits of debt and the increasing agency and financial distress costs associated with high debt levels.

The second strand assumes imperfect information; emphasize the effect of structure of capital on incentives and behaviour of the decision makers that determine the income stream and thus the value of the firm to owners. Myers (1984) and Myers and Majluf (1984) developed a 'pecking order' theory which was derived by assuming a commonality of interests between current owners and managers (insiders) but asymmetric information and therefore heterogeneous expectations between insiders and lenders. In this model, managers act in their best interest. They argue that, due to information asymmetries, lenders know less about the firms' prospects than the owner-manager. The owner-managers will attempt to maximize their value, not the value of lenders.

Thus, if the firm has good investment prospects, the owner-manager will not want to use debt finance because some of the benefits of the investment projects will be the preferred option, followed by raising debt finance for any additional funding needs, since this ensures that the increased value from the future investment projects accrue only to the existing owners. On the other hand, poor prospects and performance will encourage owner-manager to go for credit as this will benefit owners.

Pecking order hypothesis assumes that lenders are not able to evaluate firms. When lenders have superior information as compared to an entrepreneurial firm with regard to growth and profitability prospects

pecking order is reversed (Garmaise, 2000). Where lenders have superior knowledge about the viability of the project, debt finance will be readily available to add value to projects that have bright growth and profitability prospects. Unviable project will never be debt funded and will rely on entrepreneurial firm funds.

The pecking order hypothesis presupposes nonexistence of supply side constraint to credit supply, thereby indicating that entrepreneurial firm's demand for debt finance is always met. Supply side of credit is constrained by the information asymmetries and other market imperfections that lead to shortage and increase in the cost of credit. Stiglitz and Weiss (1981) lenders are always unable to discern quality of borrowers and to control their actions due to imperfect and costly information.

In bid to sort borrowers and to prevent moral hazards, lenders will formulate terms of loan contract to induce borrowers to take actions that are in the best interest of the lender and to attract low risk borrowers. The result is high cost of credit that leads to alteration of demand for credit. The inability of potential lenders to reliably distinguish between good and bad credit risks and the 'optimistic' bias typically associated with owner-manager assessments of their projects exposes them to the danger of 'over-investment', that is, investing in firms which subsequently default or otherwise generate a negative net present value return to the lender (De Meza and Webb, 1990). Lenders' fear of possible overinvestment raises the cost of credit in sectors where it is difficult to distinguish between good and bad credit risks. Akerlof (1970) credit markets may collapse altogether in the absence of credible commitments or signaling mechanisms eventually. In the case where SME owner-managers are unable to convincingly signal their quality to potential new lenders, systematic credit rationing occurs, whereby some firms with positive net present value projects are unable to obtain credit, may result.

Enterprises strive to overcome information problems in order to obtain credit by offering credible commitment to adherence to terms of credit and signaling their quality by pledging collateral (Akerlof 1970). Pledging collateral helps a firm to signal quality of the investment to the lender Stiglitz and Weiss (1986), collateral attenuate moral hazard by reducing the incentives to switch into riskier projects or to reduce effort (Boot, *et al.*, 1991).

2.2.1 Gender and credit finance

Women entrepreneurship exhibit characteristics that reduce demand for credit, thus rely on internal finance (Orser, *et al.*, 2006). Several theoretical strands have emerged to explain these characteristics. Role investment theory (Lobel, 1991) presupposes that family decision making leads to spousal partners trading-

off their respective roles within the family whereby roles are gender defined. According to this theory, women tend to invest in roles within the household (parenting, homemaking, etc.), while men invest their time in the paid workforce. This leads to differences in role specification and specialization. In the context of small business, this implies gender differences in commercial activities investment and hence, managerial experience, gender differences in social networks, business relationships and time allocations to business development. "Masculine" and "feminine" roles manifest through different levels of risk tolerance across genders. Traditionally, men specialized or invested in financial roles which are risky and require greater risk tolerance. Financial decisions, according to role investment theory, are usually considered to fall into this category (Stan, 2005), thus men take risks and are more likely to go for riskier types of finance; formal credit.

Second strand asserts that individuals maintain an "ideology" or set of ideas constructed in, and by society. These ideologies help individuals make sense of society and position themselves within a social construct (Crowley and Himmelweit 1992). Socialization is learned behavior that occurs in childhood and throughout life. Gender differences in the socialization of men and women permeate all social institutions such as family, schools, and culture. As a result, girls and boys grow up to assume socially differentiated roles, role expectations that spill into one's business activities. The socialization process of women influences their business management styles, aspiration and expectations. But these socialized set of ideas are incompatible with profitability and growth of women enterprises Brenner Tomkiewicz, and Schein (1989). Implication is that women are less likely to seek growth of their firm and its crucial ingredient- debt finance.

Thirdly, Peitchinis (1989) and Bergmann's (1986) theory of occupational crowding explains concentration of women enterprises in secondary sectors that are highly competitive unorganized, crowded, unstable and unsubordinated. According to occupational crowding theory women are marginalized from mainstream economic activity, which compels them to crowd in the secondary sector. The secondary sector has low returns and lower growth. Firms in this sector are small, risk and less likely to grow as well as generating returns that are unattractive for credit finance.

Finally, discrimination may reflect gender stereotypes and role encapsulation for women (Ely, 1995). In the context of business ownership and entrepreneurship, language, social, and cultural barriers, have impeded women from participating in the economy. Discrimination manifests in SMEs financing like lower approval rates or differences in terms of financing and the degree of difficulty presented in the application process (Campbell, 1988).

2.3 Empirical literature

Studies on financing decision by SMEs have taken three approaches. One approach is investigating demand for credit as additional capital. This approach has used debt ratios as dependent variable in regression analysis. On the other hand, some studies approached demand for credit over a period of time. Empirical literature on determinants of demand for debt finance exists in Kenya, Africa and the rest of the world. We begin by looking at studies in the rest of the world, Africa and finally in Kenya.

The decision to use internal or debt finance is a strategy of finance for SMEs that shapes their capital structure and this decision is driven by financial policy which is influenced by characteristics of an enterprise. Lowe *et al* (1998) investigate strategy and financial policy in the small firms in South East England. The dependent variables in their logistic models are leverage which is the ratio of debt to total capital (debt plus equity) and log gearing (the log ratio of debt to equity). Explanatory variables are financial and strategy variables. Financial variables are log of average turn over (size), average turn over growth rate (growth), profit rate and square of profit rate. Variables for Pecking order hypothesis are dummies describing the importance and ease of access to debt finance and ratio of non-executive to executive directors. After correcting for sample selection bias, profit, turnover, and average growth had a positive sign in the best model but insignificant. They conclude that these variables do not influence the decision to obtain debt. With respect to pecking order hypothesis, importance of access to debt finance is positive, while ease of access to finance and the ratio of non-executive to executive directors are negative. The pecking order variables are strongly significant hence; there is strong evidence for the support for the hypothesis.

Important factor in accessing credit finance for SMEs is level of information asymmetry between the lender and the firm. Extent to which a firm reduces information asymmetry influence the cost and availability of finance. Petersen and Rajan (1994) examines how ties between a firm and creditors influence the cost and availability of credit in the USA. They use 1988-1989 survey data from National Survey of Small business Finances collected from a sample of 3404 firms existing in 1987. In their model that investigates how cost of finance is influenced by the relationship between the lender and firm; opacity and cost of credit, they use an OLS model. In their OLS model they regress loan rate controlled for cost of capital as well as loan and firm specific characteristics that influence the rate on log of book value debt book assets, sales growth and reputation indicators of age and length of relationship between lender and the firm. Book value is inverse and significant while both debt book assets and sales growth positive and negative respectively but insignificant. Evidence is found that age influences loan rate negatively.

Another way in which information asymmetry influences formal credit finance is through the availability of credit. Petersen and Rajan (1994) investigate effect of relationship between the firm and lender on availability of credit using a one sided Tobit model in which debt to asset ratio is explained by book value of asset, profit to assets ratio, age and length of relationship. Results show that size and profits although positively and negatively respectively associated with credit, do not influence availability of credit. However, age is significantly negatively associated with credit in SMEs at 10%. The use of debt to asset ratio as an dependent variable create simultaneous equation bias since changes in debt can be attributed to both demand or supply side factors. This model ignored endogeneity that leads to biased estimate and unreliable statistical inferences.

Barbosa and Moraes (1993) in bid to identify the determinants of financial leverage in small firms in Brazilian cities using cross sectional and time series data on small manufacturing firms of food, clothing and furniture. Their ordinary least square model included business risk, asset composition, age of the firm, operational cycle and profitability. Results support hypotheses that size, growth, operational cycle and entrepreneur's risk tolerance are positively and business risk, asset composition, profitability is negatively associated with financial leverage. Additionally, there is no support for a hypothesized relationship with enterprise age. But, there model excludes gender and education of the owner or manager. In addition, the OLS model does not consider simultaneity bias between size and credit and also sample selection bias. A more serious problem with respect to simultaneity bias is the use of financial leverage as a measure of credit. Eriksson *et al* (2008) argue that, validity of this approach is undermined by firm's debt ratios are simultaneously determined by the firm's demand and supply of credit.

Huyghebaert, *et al.* (2001) investigate demand for debt finance by entrepreneurial firms using data on 152 true start-ups in Belgian manufacturing founded in 1992. They use logit model to estimates the probability of borrowing solely from the bank at start-up. The dependent variable assumes 1 if entrepreneurial firm solely rises bank debt in the start-up year and zero otherwise. Explanatory variables are age- personal wealth, control rents are measured by a dummy variable that is set to one when the company name contains the name of the entrepreneur and zero otherwise. Control rents measure how an entrepreneur values control of the firm. Equity contribution is measured by the logarithm of issued equity, industry profitability is measured by ratio of income to total assets averaged across all firms in the industry in 1991, the liquidation value of firm assets is measured by the percentage of total assets that consist of tangibles, industry failure risk is measured by the bankruptcy rate of earlier start-ups. They find that Control rents are inversely and significantly related to debt finance; probability of financing exclusively with bank debt is lower for

entrepreneurs who highly value control rights. Liquidation value of assets is inversely and significantly related to debt. Age (personal wealth) is insignificant, industry profitability and failure rate are negative and do not affect the debt mix. The same conclusion is obtained from using sales and the number of employees as the scaling variable in the test for robustness. Robust test on industry failure rate using Volatility of cash flows in the industry confirms insignificant relation between the industry failure rate and debt mix. They conclude that entrepreneurs who contract debt to finance their business venture not only consider the price of the different sources of credit but also lose of control.

Coleman (2001) use data drawn from the 1993 National Survey of Small Business Finances of 4,000 privately owned small businesses in the U.S.A. to examine the determinant of financing strategies of very small firms. In the multivariate analysis, ratio of total debt to total assets as a measure of total firm leverage and ratio of acquired loans to total assets as firm's willingness and ability to use formal rather than informal sources of capital as dependent variables in the OLS models. Explanatory variables include firm age, log of sales-size, collateral profitability, legal form and characteristics of firm owner like gender with female owned firm assuming 1, education level. When the ratio of total debt to total assets was the dependent variable, sales, education, legal form, profitability and collateral are positive. While age and gender are negative. All the variables are significant except age and gender. When ratio of acquired loans to total assets is used, sales, age and gender are inversely associated but education and legal form profitability and collateral have a positive coefficient. Sales, age, profitability, collateral are significant but gender education and legal form are insignificant.

Gellatly *et al* (2003) their study attempts to learn more about how successful small- and medium-sized enterprises (SMEs) are financed in Canada. They examined whether growth and knowledge-intensity are significant predictors of financial structure. The analysis is based on survey data from an elite business population—successful entrants that have survived their first decade of operation. Hypotheses are tested with survey data from a stratified random sample of 2,775 Canadian firms. They ran three Regressions with explanatory variables being size of the firm (number of employees) and industrial characteristics (goods or services sector) and growth objectives. First regression is a Probit model which investigates the probability of having a debt equity ratio greater than one. Second and third regressions are based on continuous debt ratios, and are estimated via least-squares. There reference group consists of slower-growing firms with less than 10 employees, low growth projections, and that operate in low-knowledge service industries. Their study finds evidence that industry membership does not affect propensity to seek debt finance. Growth affects capital structure whereby growth oriented firms use debt. Size is insignificant determinant in the use of debt.

Zhao *et al* (2005) using a sample of 39 SMEs in Chengdu city from 2003-2004 to investigate SMEs' ability to borrow from banks. Explanatory variables included are total asset, asset to debt ratio, net profit and credit score of the firm that lies between 0 and 27. The dependent variable in multiple regression model is total bank loan to SMEs while in the logit model, the dependent variable is binary assuming one if SME got a loan and zero otherwise. They find firm's size, profit, assets and growth objectives as the most important determinant of the ability to obtain bank loan. Explanatory variables are positively related to loan. These models does not take into account sample selection bias issues, because a part from self selection, sample is biased towards more successful SMEs.

Watson and Wilson (2002) in their empirical test of pecking order hypothesis in SMEs they use data from 655 firms from UK in 1994. They estimate two equations. The first equation estimates actual change in debt finance as explained by expected change in total asset and unexpected change in total assets. The changes in debt are expressed as a proportion of total assets. The second regression equation consists of actual growth rate as dependent variable and independent variables relative changes in each category of finance used. All equations are estimated using OLS. The pattern of coefficient was found to be consistent with pecking order model predictions and this was found to be particularly strong in relation to closely held firms where information asymmetries and a commonality of interest between owners and managers. In addition, pecking order is identified among different types of debt.

Cosh and Cumming (2005) investigate determinants of internal versus loan financing decisions among early stage of 1900 privately held UK firms from 1996-1997. They estimate logit and Heckit model. The logit model was used to investigate factors that influence a firm's decision to apply for loan. The model had a binary dependent variable taking one if a firm sought bank loan and zero otherwise. Log of profit, log of capital expenditures, profession of directors, gender of manager, growth objectives, objective of establishment level of competition, log turn over log of capital expenditures/profit and innovation as explanatory variables. Turn over, capital expenditures, and growth objectives of the firm are were found to be positively associated with desire to seek formal credit finance while gender of managers is negatively related. The variables are statistically significant at 5%.

With respect to gender, men are more likely to go for bank finance as compared to women. Hence, a remarkable difference exists in the likelihood of choosing between internal and debt financing among female and male founder and managed firms, but these differences are largely attributable to growth orientation. They conclude that, women owned SMEs are perceived to be more risk averse than men owned

SMEs. Profit is insignificant, thus supporting pecking order hypothesis. However profitable firms acquire a larger proportion of bank loan amount sought whenever they demand. On reputation, banks are less likely to finance completely new startups. Correcting for non-randomness in a firm's decision to seek formal credit finance using two stage Heckit model, their findings remain the same.

Systemic and industrial factors tend to confound outcomes on studies with regard to financing strategies of women enterprises. Orser *et al* (2006) examines gender differences among Canadian SMEs owners seeking debt financing controlling for size of the firm and industry. They use data on 2844 firms collected in 2002 survey of financing decisions of SMEs by Statistics Canada, controlling for systemic and industrial factors to isolate effect of gender on finance decisions. In their logistic regression the dependent variable was whether (=1) or not (=0) a respondent had applied for a loan. Explanatory variables were size, sector and gender. The study found that women-owned firms are smaller, less likely to grow than counterpart firms owned by men, and are disproportionately represented among firms in retail and service sectors. Consequently, on average, businesses owned by women are less prone to need or to seek debt capital hence they are less likely to grow. The study also found that size and sector did indeed account for gender differences in applications for commercial loans.

Eriksson, *et al.* (2008) in a survey of private companies in Eastern Finland on impact of gender on the usage of bank loan, controlling for firm specific attributes. In there logistic regression model with bank loan as a dependent variable and explanatory variables being return on assets ratio-measure of profitability, age, size and gender. Profitability and size have a positive effect on bank loan, while age and gender have negative sign. Evidence is found that women owned SMEs are more likely to engage in service industry, but there are no significant differences in the structural factors (size and profitability) between women owned SMEs and men owned SMEs. However, funding patterns vary across gender with women less likely to go for debt finance. The model does not include education level of the manager or owner, growth objectives and form of business. Sample selection bias is ignored.

Studies on drivers for financing decisions in entrepreneurial firms have focused on quantitative aspects and only touching on gender by extension. Credit seeking behavior of enterprises embodies personal and behavioral characteristics of an entrepreneur as regards to risk perception of credit and previous experiences with credit (Briozzo and Viger 2009). Briozzo and Viger (2009) investigate demand side factors for SME financing decisions using data on 265 firms from Argentina city of Bahía Blanca in 2006. Their study considers personal and behavioral aspects of the capital structure decision; focusing on qualitative characteristics that influence credit seeking behaviour by firms. They use a probit model with dependent

variable 1 for firms that use debt and 0 otherwise. Independent variables include personal, firm and industrial characteristics. Age of the owner and firm is measured as years, size is binary taking 1 for micro sized firm, industrial characteristic is assigned 1 for industrial firms, and growth is proxied by variation in sales. Evidence is found of age being inversely related but insignificant. However, size and reinvested funds are positive and significant while limited liability firms are more likely to use debt. Moreover, all variable jointly influence probability to seek debt finance. They conclude that owner's risk and uncertainty aversion and credit rationing influence SMEs' debt financing decision.

2.3.1 Studies from Africa

Abor and Biekpe (2007) in their study of the determinants of capital structure decisions of small and medium size enterprises (SMEs) in Ghana, estimate the relationship between the firm level characteristics and capital structure measured by long-term debt and short-term debt ratios. The sample of 160 SMEs was drawn from the Association of Ghana Industries' database and that of the National Board for Small Scale Industries. The data used in their empirical study was derived from the financial statements of these SMEs during a six-year period, 1998-2003. Information on age on the firm was collected directly from the firms. Explanatory variables were age, size, profitability, growth and asset structure. Their Prais-Winsten regression model results suggest that firm's age, size, asset structure, growth have a positive relationship while profitability is inversely related thus, supporting pecking order hypothesis. All explanatory have a significant effect on capital structure of Ghanaian SMEs. Short-term debt is found to represent an important financing source for SMEs in Ghana.

Abor (2008) on the study of determinants of capital structure among Ghanaian firms in 2005 using panel data approach, with two equations for short and long term gearing ratios as dependent variable. Explanatory variables for include size- proxied by log of assets, age as years of being in business, ratio of fixed assets to total asset, earnings before tax and interest/total assets, growth rate in sales, dividend payable as a proportion of operating income, absolute coefficient of variations in profits and a vector of heterodox dummy factors of education, gender, legal form, industry location and export. The SMEs' sample was selected from the Association of Ghana Industries' database of firms and that of the National Board for Small-Scale Industries and was made up of 153 firms having fewer than 100 employees each. Information on the heterodox factors was obtained through a questionnaire survey.

Evidence is found in support of age influencing long term debt positively, firm size and growth have a positive relationship in short term debt model. Profitability coefficient is negative thus supporting pecking

order hypothesis. level of education is only inversely significant in the short-term debt model. But Gender coefficient is positive and significant in long term debt ratio but insignificant in short term debt ratio, indicating that male-owned SMEs are significantly more likely to employ more long-term debt than female-owned SMEs.

Fafchamps (1999) in the study of ethnicity and credit in African manufacturing in Harare-Zimbabwe and Nairobi use 1994 and 1993 survey data respectively on 60 manufacturing enterprises in both countries. In the multivariate analysis of the determinants of bank credit and overdraft use, and applying probit model on the pooled data in which the dependent variable equal one if the firm has ever used overdraft or one if the firm has used a bank loan. Explanatory variables include firm characteristics like size, cash flows, sector of the firm, legal status, available information measured by networking effects and gender. Endogeneity of size is controlled by instrumenting size with predicted values of size. After controlling for firm size, results indicate that Size and gender are insignificant factors influencing loan or overdraft obtained. However, networking is significant providing evidence that reduction of information asymmetry increases chances of obtaining formal credit.

2.3.2 Studies in Kenya

Empirical literature on the determinants demand for credit finance in Kenya is not abundant. Proximate studies have been carried out under the auspices of World Bank's Regional Program on Enterprise Development African region. Fafchamps *et al.* (1999) utilizing 1993 regional programme for enterprise development data in their investigation of determinants of demand for formal credit for investment, they use a probit model with dependent variable being whether a firm has applied for a loan or not. Explanatory variables are size proxied by workers, ethnicity of the manager and age of the firm. Probit results of 37 firms indicated that age and size of the firm do not influence ability to borrow for investment while ethnicity of the manager has a negative influence.

Enterprises demand credit to settle liquidity problems. Fafchamps *et al.* (1999) considers this category of demand by investigating determinants of demand for over draft in 36 firms, they use a probit model with dependent variable being whether a firm has applied for overdraft or not. Explanatory variables are size proxied by workers, ethnicity and age of the firm. Results indicated that age of the firm positively influences demand for overdraft while ethnicity is negatively related to overdraft but, size is insignificant. Fafchamps *et al.* (1999) investigation on demand for credit includes all firms. In spite off over representation of small and medium size firms in the sample, estimated models omitted variables like growth orientation, collateral, gender, profit and education level which are important drivers of demand for credit.

Green *et al.* (2002) employ data on 2000 enterprises from the 1999 baseline survey of micro and small-scale enterprises in Kenya. The baseline survey was based on the Central Bureau of Statistics' National Sample Survey and Evaluation Programme (NASSEP) III sampling frame. Main objective was to investigate financing behaviour of small firms. They study factors that lead small firms to borrow and the success rate of loan application. Demand function of debt is binary assuming 1 if main capital is debt and 0 if main capital is own or family funds. Explanatory variables are net income from business, educational level, legal form collateral and gender. Results estimate of debt demand function indicate that, owners with training and those that perceive their business to be performing are less likely to demand loan as initial capital. All other explanatory variables for initial capital are insignificant. With respect to additional capital, training and net income influences positively probability of demand for credit. The rest of the independent variables are insignificant. Success rate equation is estimated using two sided tobit model. They find that, success rate is inversely related to working owner aged between 5-17 years, positively related to permanency of business structure. However, net income and size, despite having a negative influence like rest of the remaining variables, do not explain loan application success rate.

Green *et al.* (2002) study is an improvement of Fafchamps *et al.* (1999) by including important determinants of demand for formal credit in MSEs. This study excludes Medium size firms and estimated model omitted gender and growth objectives. However, Probit and tobit models employed in studies of Fafchamps *et al.* (1999) and Green *et al.* (2002) do not take into account self selection in seeking credit and endogeneity between size and formal credit. Enterprises that use credit are likely to increase in size, but size increases chances of getting credit. Hence, sample selection bias and bi directional relationship between size and credit is not taken into account, thus undermining the empirical evidence.

2.4 Literature Overview

Conflicting findings can be discerned from various studies on the determinants of demand for credit by SMEs. For instance Barbosa and Moraes (1993) Lowe, Jordan and Taylor (1998) Cosh and Cumming (2005) Zhao, Wu and Chen (2005) Abor and Biekpe (2007) find profit being inversely related to debt finance thereby lending support for the pecking order hypothesis. Contrarily evidence is adduced by Eriksson, *et al.* (2008). Opacity of the firm reduces with increase in its age, thus cost of acquiring formal credit reduces. Empirical evidence shows no consensus. Petersen and Rajan (1994) and Eriksson, *et al.* (2008) find inverse relationship.

But Abor and Biekpe (2007) find a positive relationship while Barbosa and Moraes (1993) find age to be insignificant. At least consensus is found with respect to growth objectives. All studies show that growth leads to higher likelihood of demanding formal credit. Studies that included gender in their models obtained opposing results. Whilst Eriksson *et al.* (2008) find gender significant; Fafchamps *et al.* (1999) finds insignificant results. Evidence on the use of assets as a signal of creditworthiness is also confounding. Many studies establish positive relationship. But Barbosa and Moraes (1993) obtain negative association.

This study makes three contributions. Firstly it is an update of Fafchamps *et al.* (1999), Green, Kimuyu, Manos and Murinde (2002), by using most recent primary data on SMEs that captures the structural changes in the context of urban Kenyan economy. Secondly, determinants of demand for formal credit finance and their direction of relationship is unknown. This study establishes the determinants of debt finance and existing direction of relationship between credit and characteristics of SMEs in Nairobi which have never been done. Finally, the study is an improvement on these studies by not only correcting for sample selection bias but also endogeneity, which undermines validity and generalisability of results.

CHAPTER III

METHODOLOGY

Introduction

This chapter explores conceptual framework and underlying theoretical model as well as hypotheses underpinning the study. The chapter also includes the types of data and their sources, sampling procedures methods of data collection and data analysis methods. The collection of data to address the objectives of this study was done through field work.

3.0 Conceptual framework

Enterprises in demanding credit for investment, consider effect of interest and principal payment on cash flows overtime and possible loss of control in the event of the firm failing to meet its credit obligation. Credit increases income flows from the firm due to increased productive capacity. Financing decision reflects a careful evaluation of the cost and benefits of credit against own savings. Due to financial risk of credit, entrepreneurs perceive credit to be more expensive than owners saving and retained profit. Hence, credit is demanded when retained earnings and personal savings are insufficient (Myers 1984, Myers and Majluf, 1984). Willingness to tolerate financial risk of credit depends on firm and personal characteristics.

At firm level, young firms have to rely on insider funds and retained earning because lenders are unwilling to lend them (Berger and Udell, 1998). As the firm grows, information asymmetry reduces and it can acquire affordable credit. Firms with professional management and strong growth orientation diversify financing sources, have stronger incentive to take financial risk and will demand credit. On the supply side, lenders can not discern the quality of borrowers and will formulate terms of credit to distinguish between low and high quality borrowers in the course of which enterprise's demand for credit is not fulfilled (Stiglitz and Weiss 1981, 1986). In response to screening of enterprises by lenders, firms signal their quality through **age** and pledging collateral that increases availability of credit.

Individuals exhibit attitude towards credit that influences demand for credit through risk aversion. Individuals with negative attitude towards credit will never apply for credit irrespective of enterprise profitability and will rely on retained earnings.

Reliance on retained earnings for investment effectively postpones investing today since accumulation of funds will be required. Credit enables an enterprise to invest beyond its current resources that hastens rate of capital stock accumulation. Financing decision is an intertemporal decision regarding expected required

capital stock, financial cost of debt and net cash flows of a firm, after evaluating marginal benefits and marginal costs of formal credit and reinvested funds.

3.1 Theoretical model

Theoretical model borrows from perfect market model of Modigliani and Miller (1958 and 1963) and Myers (1984) and Myers and Majluf (1984), financing decisions influence the value of the firm by reducing benefits accruing to owners in the form of interest, principal payment and control. However, by investing, a firm augments its productive capacity that increase future income flows, thus increasing value of the firm. Optimal condition presupposes equality of marginal cost and marginal benefits of borrowing. Therefore, analysis of debt demand begins with an expression for the value of the firm. The net return to the owners of firm at time t comprises of current net cash inflows and capital appreciation. In equilibrium, for entrepreneurial firm, this return must equal their required net profit, R_t . This is given by

$$\frac{(EV_{t+1} - V_t) + E_t d_{t+1}}{V_t} = R_t \dots\dots\dots 1$$

Where V_t is the value of firm at time t ; d_{t+1} is the net cash flows of the firm at time t_{+1} ; and E_t is the expectation conditional on information known at time t . This specification implies that today's earnings are paid out at the beginning of next period. The term in parentheses, represents the capital gain component of the return. Solving equation 1 for V_t forward yields a firm's value

$$V_0 = E_0 \sum_{t=0}^{\infty} \left[\prod_{j=0}^{t-1} \beta_j \right] d_t \dots\dots\dots 2$$

Where $\beta_j = \frac{1}{1 + R_t}$ and the firm maximizes its value (minimize cost of finance) subject to three constraints; capital stock, net cash flow and debt

$$K_t = I_t + (1 - \delta)K_{t-1} \dots\dots\dots 3$$

K_t capital stock of the firm δ rate of depreciation I_t investment at time t . Cash inflows of the firm consist of sales revenue and borrowings. Cash outflow includes payments to factors of production and investment expenditure.

$$d_t = [F(K_t, L_t) - wL_t - \varphi(I_t, K_{t-1}) - i_t B_{t-1}] + B_t - \rho_t I_t \dots\dots\dots 4$$

K_t capital, $F(K_t, L_t)$ real revenue function assumed to be concave, w vector of real variable factor price i_t nominal interest rate, B_t real value of outstanding debt ρ effective real price of capital goods at time t , and $\varphi(I_t, K_{t-1})$ real cost of adjusting capital goods. Net cash inflows from the firm are nonnegative $d_t \geq 0$ and associated langrage multiplier is λ_t . Borrowing constraint is $B_t \leq B_t^*$; letting its langrage to be γ_t , B_t^* is the maximum debt set for the firm. Lender sets this amount depending on the assessment of the firm. Substituting equation 4 into equation 2 and using 3 to eliminate I_t . first order condition for the firm's maximization³ problem for K_t is.

$$\beta_t E_t \left[\left(\frac{1 + \lambda_{t+1}}{1 + \lambda_t} \right) (F_k(K_t, L_{t+1}) - \varphi_k(I_{t+1}, K_t) + (1-d)[\varphi(I_{t+1}, K_t) + \rho_{t+1}]) \right] = \varphi(I_t, K_{t-1}) + \rho_t \dots\dots\dots 5$$

Right hand side of Equation 5 shows marginal installation and purchasing cost of investing today. Left hand side represent cost of postponing investment until tomorrow, comprising of foregone marginal change in production and second part marginal change in installation costs due to change in capital stock. The cost of waiting includes the expected discounted value of marginal purchasing and installation costs of investing tomorrow. Along optimal path of capital accumulation, firm must be indifferent between investing today and transferring those resources to the future. Costs of these two choices must equal. The first order condition for maximization problem of debt demand is:

$$(1 + \lambda_t) - \beta_t (1 + i) E_t (1 + \lambda_{t+1}) - \gamma_t = 0 \dots\dots\dots 6$$

Equation 6 says that, firms equate discounted marginal value of payments to the owner overtime. With borrowing constraint, a wedge has been introduced between the shadow value of today's residual profits and tomorrow's. If the non-negativity constraint on net cash flows is not binding today, but is expected to bind tomorrow, the firm can save, thereby transferring current resources to the next period, where they are more needed. In this case the debt constraint will not bind and the firm will equate marginal utility of net cash flows over time. If, on the other hand, the shadow value of net cash flows is higher today than it is expected

$$V_0 = E_0 \sum_0^{\infty} \left[\prod_{j=0}^{t-1} \beta_j \right] [F(K_t, L_t) - wL_t - \varphi(I_t, K_t) - iB_{t-1}] + B_t - \rho I_t$$

$$I_t = K_t - (1 - \delta)K_{t-1}$$

to be tomorrow the firm will borrow in order to maximize its value. Therefore, the term γ_1 corresponds to an increase in the present value of the firm if the debt constraint were to be relaxed by one unit.

3.2 Descriptive statistical methods

Descriptive statistical techniques especially diagrammatic data representations are vital in understanding the phenomena and comparing aspects of this study (Gupta and Gupta, 2006). Diagrammatic representation are simpler and easily understood since they require visual inspection to gain insights about the matter under investigation. In this study, diagrammatic representations have been used to facilitate comparison and to have a rough estimate of the phenomena preliminarily. The diagrams used include, bar charts and tables. A bar chart plots frequencies against categories; the height of the bar gives the frequency of the category. Measures of central tendency and measures of dispersion show compactness of a variable (Gujarati 2007). In regressing one variable on another the probability density function of a variable is assumed normal. In discerning normality we examine kurtosis and skewness. Normal distribution has skewness of zero and kurtosis of three Gujarati (2007).

Correlation matrix shows the strength and direction of variables. This matrix is important not only for showing correlation but also multicollinearity in the explanatory variables. Pearson correlation coefficient of over 0.8 between explanatory variable is considered multicollinear that makes estimates inefficient and inconsistent (Gujarati 2007). This is a likely problem among the explanatory variables in our case.

F statistics is a ratio of two chi square distribution divided by there respective degrees of freedom. F statistic is essential in analyzing variations in samples. The null hypothesis for F test is equality of means in all samples. Equality of means in sub samples implies variances between samples are small, hence the sample under investigation is uniform in spite of existence of sub samples (Brown and Forsythe, 1974). Uniform sample has a small F statistic with large p value. Properties of F distribution are employed in this study to investigate significance of differences in debt demand and firm profile. The statistic is also computed for number of applications rejected between male and female entrepreneurs to detected possible gender discrimination by financial institutions.

3.3 Regression

Descriptive statistical techniques especially are vital in understanding the phenomena and comparing aspects of this study but do not give causal relationship between variables. Regression gives causal relationship and enables rigorous hypothesis testing to ascertain causality between variables as it yields

parameter estimates (Gujarat, 2002). Central to regression analysis is model specification; specifying the dependent and independent variables.

3.4 Model specification

Our first objective is to investigate characteristics of SMEs that influence decision to seek formal credit. Small firms decide to raise investment funds either from retained earnings or credit. The decision variable is binary; assuming 1 for a firm that applied for credit and 0 for those that did not apply. Decision to apply for credit is expressed algebraically in the context of binary choice model as:

$$\begin{aligned} \Pr[y_i = 1] &= \Pr[h(x_i, \beta) + \varepsilon_i \geq 0] \\ &= \Pr[\varepsilon_i < h(x_i, \beta)] \dots\dots\dots 7 \\ &= \Phi\left[\frac{h(x_i, \beta)}{\sigma}\right] \end{aligned}$$

Where $\Phi[\bullet]$ is the normal cumulative density function. We assume that $\varepsilon_i \sim N(0,1)$. This equation is important because it enables us to investigate characteristics of firms that applied for credit and those that did not apply. Corresponding log likelihood function for a probit model is given by:

$$LnL(y, x\beta) = \sum_{y_i=1} \ln \Phi(x' \beta) + \sum_{y_i=0} \ln [1 - \Phi(x' \beta)] \dots\dots\dots 8$$

This function is estimated by maximum likelihood in stata.

3.4.1 Marginal effect in probit model

Estimate of probit model yields probit index as coefficients and not average partial effects. Therefore, we compute marginal effects given by $\frac{\partial \Pr[y_i = 1]}{\partial x_i} = \phi(x_i' \beta) \beta_i$ which have a lot of economic relevance. Where $\phi(\bullet)$ is the normal probability density function.

Extent of debt finance in SMEs

Firms make decision to seek credit and the amount to apply for simultaneously based on their characteristics. In this case, amount applied is only observed only if the decision to apply for credit is made in the first instance. There exist two dependent variable; the decision whether or not to obtain credit and the amount of credit to obtain. Algebraically decision to obtain credit can be expressed as:

$$y_1 = \begin{cases} 1 & \text{if } y_1^* > 0 \\ 0 & \text{if } y_1^* \leq 0 \end{cases} \dots\dots\dots 9$$

y_1^* is unobserved continuous random variable and y_1 is binary assuming 1 if a decision is made to apply for credit and zero otherwise and is a realization of y_1^* . Amount of credit equation is given by:

$$y_2 = \begin{cases} y_2^* & \text{if } y_1^* > 0 \\ - & \text{if } y_1^* \leq 0 \end{cases} \dots\dots\dots 10$$

y_2 is the actual amount demanded and y_2^* describes observed amount only when y_1^* is positive. Hence,

observed distribution of y_2 is truncated. Corresponding linear equations are $y_1^* = x_1' \beta_1 + \varepsilon_1$ where x_1 is a

$$y_2^* = x_2' \beta_2 + \varepsilon_2$$

vector of exogenous variable for decision to apply for credit that includes own savings, reputation, form of business and personal characteristics x_2 vector of variables that determine amount of credit to apply and ε_1 and ε_2 are error terms and y_2 is a function of x_1 and x_2 .

Dependent variable is discontinuous, with empty patches whenever credit is not obtained. The dependent variable is the basis of self selection that leads to incidental truncation in seeking credit (Woodridge, 2002). This problem emanates from two decisions that are made simultaneously; whether to use internal funds or credit funds and how much of credit to obtain.

Classical linear regression model requires that explanatory variables and error term are independently and identically distributed to obtain best linear and unbiased estimates (Gujarat, 2007). However, in this model dependent variable is non random that leads to self selection in obtaining credit and errors are correlated due interdependence of the two equations (Maddala, 1994). OLS model fitted suffers from misspecification errors: first because dependent variable is truncated and fitted regression line is based on the existing values only. Secondly inverse mills ration is omitted in OLS estimation. Hence estimating this equation by OLS yields inefficient, biased and inconsistent estimates due to interdependence of the equations, self selection and omission of inverse mills ratio which is an explanatory variable (Woodridge, 2002).

Maximum likelihood method yields consistent, unbiased and efficient estimates of β_2 if the error terms are independent (have a joint normal distribution and homoscedastic)⁴, since conditional mean is:

$$E[y_2 | x_1, y_1^* > 0] = x_2' \beta_2 \dots\dots\dots 11$$

But requirement of maximum likelihood that errors ϵ_1 and ϵ_2 have a joint normal distribution and homoscedastic do not hold as ϵ_1 and ϵ_2 are correlated. So that conditional mean in the Tobit 2 model is given by:

$$E[y_2 | x_1, y_1^* > 0] = x_2' \beta_2 + E[\epsilon_2 | \epsilon_1 > -x_1' \beta_1] \dots\dots\dots 12$$

Hence maximum likelihood estimates are inconsistent that affect generalization on the population. Heckman (1976, 1979) notes that errors in linear equation models are correlated and to obtain consistent estimate; sample selection has to be considered. This problem is addressed by using Heckman two step model that takes into account the first step non-randomness in the decision to seek debt finance⁵.

Heckman two-step estimation methods overcome this problem and estimates are consistent and efficient. The root cause of failure of OLS is the existence of two dependent variables; the decision whether or not to obtain credit and the amount of formal credit sought. This can expressed in terms of Type II Tobit model.

Bivariate model in our case we use a latent variable y_1^* and the outcome variable (amount of debt finance) y_2 which is observed when $y_1^* > 0$ otherwise y_2 does not take any meaningful value. Heckman (1976; 1979) to correct for sample selection bias, we estimate a probit model of all values of the discrete variable y_1 on x_1 since the $prob[y_1^* > 0] = \Phi(x_1' \beta_1)$, we obtain β_1 which is substituted in the inverse mills ratio⁶. The second step is to estimate the OLS model $y_2 = x_2' \beta_2 + \sigma_{12} \lambda(x_1' \beta_1) + v$ using positive values of y_2 . Two step Heckman model incorporates the discontinuities in the dependent variable and correlation of errors in the two equations giving consistent and efficient estimates.

⁴ Maddala (1994) chap 6
⁵ Green (2002) pg 784

⁶ Inverse mills ratio is given by $\lambda(x_1' \beta_1) = \frac{\phi(x_1' \beta_1)}{\Phi(x_1' \beta_1)}$

Extend of demand for formal credit satisfaction

Amount of credit applied is the financing gap of a firm; therefore satisfaction of this demand depends on the amount of loan given. Our final model analyses extend of satisfaction of demand for credit by using success ratio. Success ratio equation as much as it is a screening equation since loan given is determined by firm characteristics, resultant financing gap if credit given is not equal amount applied shows un met demand (Freixas and Rochet, 1998).

Ratio of amount of loan given to amount of loan applied has observations with zero for firms that applied for a loan and were not given and 1 where amount of loan applied equal amount of loan given. Success ratio has values clustering around zero and one, hence values are not normally distributed. Two limit Tobit Censored-regression model is useful for analyzing data in which some observations on the dependent variable, corresponding to known values of the independent variable, are clustered at some particular value (Greene 2002; Maddala 1994).

Two extreme limits set in the data presuppose use of left and right censored Tobit model. The censored model on both of the lower and upper limits can be defined as

$$y_i = \begin{cases} R_i, & \text{if } y_i^* \geq R_i \\ y_i^*, & \text{if } L_i < y_i^* < R_i \\ L_i, & \text{if } y_i^* \leq L_i \end{cases} \dots\dots\dots 13$$

Where R_i and L_i are right and left censored values. Associated log-likelihood function can be written as:

$$l = \sum_{i \in \{L_i < y_i < R_i\}} \ln \left[\phi \left(\frac{y_i - x_i \beta}{\sigma} \right) / \sigma \right] + \sum_{i \in \{y_i = R_i\}} \ln \left[\Phi \left(-\frac{R_i - x_i \beta}{\sigma} \right) \right] + \sum_{i \in \{y_i = L_i\}} \ln \left[\Phi \left(\frac{L_i - x_i \beta}{\sigma} \right) \right] \dots\dots\dots 14$$

Where $\Phi(\bullet)$ is cumulative density function of the standard normal distribution, $\phi(\bullet)$ probability density function of the standard normal distribution σ standard deviation and x_i vector of firm characteristics β parameter to be estimated. This approach was adopted by Green *et al* (2002) in analysis of success rate in MSEs.

3.5 Definition and Measurement of variables

Dependent variable

Amount of formal credit Sought and actually received is crucial in identifying demand and supply side determinants of debt finance Cosh and Cumming (2005). This is because firms apply for loans depending on

characteristics and rate of success is influenced by risk perception of the enterprise by the lender. Proportion of approval of loan explicitly shows the extent of credit rationing depending on SME internal characteristics, while amount applied depicts demand for loan. In our case we follow Cosh and Cumming (2005) by taking amount of credit sought and actually received by the business in the 2008-2009 period from all sources measured in thousands of 2009 Kshs.

Profitability

Rajan and Zingales (1995) state that profitability for small firms may proxy for the amount of retained earnings for investment. The very small firms that assess profits as the most important of all sources of funding would most likely be the most profitable of them all. Pre-tax profits before deduction of interest, tax, and directors', partners' or proprietors' emoluments measured in thousands of 2009 Kshs is a measure of internally generated funds following (Cosh and Cumming, 2005).

Size

Size is a measure of a signal for creditworthiness. Aggarwal (1981) affirms that sales are the most common measure of size. Besides him, Titman and Wessels (1988) made use of this variable to obtain their measures of size. Contrary to Aggarwal's (1981) assertion, assets and not sales have been the most common measure to study the effects of size on loan. Thus, Archer and Faerber (1966), Titman and Wessels (1988), use assets as a measure of size. In our case, employment level is chosen to measure size in this study. Total assets would not be good choice because they are more likely to generate spurious results in a multiple regression analysis than number of employees (Barbosa and Moraes, 1993). This is very possible because total assets are used in the computation of another measure; asset structure. But, the main reason for the option made is that employment level is the only variable basis whose measure works as expected in the regression analyses (Barbosa and Moraes 1993).

Assets

This is a measure of collateral for a firm. Rajan and Zingales (1995) use time-series-average of asset value in their cross-sectional regression taking a three-year average for majority of the enterprises. Cosh and Cumming (2005) use year end asset value. In our case we follow Cosh and Cumming (2005) in the valuation of asset value and take the natural log of asset of SMEs.

Age

Archer and Faerber (1966) expressed age of the firm in terms of years since formation as reported at the time of application of loan. Leeth and Scott (1989) worked with the number of years the firm had been in business. Johnson (1997) defined age as the number of years since first incorporation. Age is measured directly in this study according to Leeth and Scott (1989). The corresponding data would be collected through interviews by means of asking the entrepreneur when the firm was founded and calculating the number of years until when the research fieldwork took place. The logarithm to the base ten of age will be taken to show better results.

Academic Qualification of managers/owner

A discrete variable assuming 0 no education 1 for primary education 2 secondary 3 tertiary level.

Gender

The gender of the firm's Chief Executive/Senior Partner/Proprietor (1=male, 2=female). Eriksson *et al.* (2008), Cosh and Cumming (2005), Orser, Riding and Manley (2006) used gender in their model to investigate the effect of gender on likelihood of using formal credit.

Interest rate

Cost of credit at the time of obtaining a loan and it represents price of capital paid by the borrower which is received as a premium by the lender Amonoo, Acquah and Asmah (2003). In our study interest rate is the loan rate on loan form at the time of applying for a loan in the spirit of (Amonoo *et al.*, 2003).

Growth Objectives

Cosh and Cumming (2005) used firm's planned growth objectives in the immediate preceding period of the study to two year in the following period. The objectives of growth were ranked as (1=become smaller, 2=stay the same size, 3=grow moderately, 4 -grow substantially over the 2007 - 2008 period. In our case we adopt the same method to measure growth objectives of the firm.

Form of business

Cosh and Cumming (2005) used legal form as a control variable. Form of business influences the likelihood of using formal credit. Partnerships and limited companies have a diversified portfolio that enables them to

acquire credit at a lower cost. This is attributed to two reasons. First these forms of business raise capital with ease internally that enables them to accumulate assets. Secondly, individual assets can be used for business purposes. The larger asset base and better management makes these firms competitive to formal credit finance. Cosh and Cumming (2005) denotes form of business as a binary variable assuming 1 if Limited Company, partnership 1, sole proprietors 1 and 0 otherwise.

Expected signs

Size positively associated with credit. Taub (1975) and Titman and Wessels (1988) larger firms are more diversified and hence have lower variance of earnings, making them able to tolerate higher debt ratios. They are able to tolerate higher credit also because firms with larger assets have greater resources to fall back on in case of a variation in earnings that makes meeting interest payments difficult.

Growth objective is expected to be positively related to credit. Cosh and Cumming (2005) younger firms with a strong growth orientation, are eager to acquire credit to augment their capacity scale of operation. Financial markets are marred by information asymmetry that predisposes lenders to adverse selection and moral hazard problems leading to credit rationing. Demanders of credit signal that they are creditworthy by providing collateral. Therefore, the higher the value of assets the higher the propensity to obtain credit Zhao *et al.* (2005). On the other hand, large asset base generates higher returns that are used to finance expansion that reduces demand for credit. Hence, no apriori expected sign.

Education level positively associated with credit Fafchamps (1999). The more educated the owner or a manager is the more he/she is aware of existence of sources of credit and associated terms. Profitability is a proxy for reinvested funds. Myers and Majluf (1984), profit is negatively related to formal credit finance. According to Titman and Wessels (1988) a firm with a high profit, *ceteris paribus*, would maintain a relatively lower debt because of its ability to finance itself from own savings. The preference for raising capital first from retained earnings may be due to high cost of to the costs of credit that arise because of asymmetric information or transaction costs (Titman and Wessels, 1988).

Male entrepreneurs are more likely to go for formal credit as compared to women. Cosh and Cumming (2005), entrepreneurial firms started by females face greater hurdles in seeking credit. On one hand, this could be discrimination. On other hand, there might be characteristics of firms started by females that are systematically different relative to firms started by males. Hence, information asymmetries faced by lenders

might systematically differ across firms started by males and females, thereby causing systematic differences in the costs and benefits of seeking formal credit by female versus male led firms.

Sole proprietors are the least seekers of formal credit followed by partnership and limited company (Cosh and Cumming, 2005). Additionally, there is no aprior expected sign for enterprise age. Petersen and Rajan (1994) and find inverse relationship. Petersen and Rajan (1994) speculate that young firms are credit financed while old firms finance via retained earnings or older enterprises become more traditional and consequently more averse to financial risk of debt. However, life cycle model of capital structure presupposes a direct relationship.

3.6 Post estimation tests

A host of post estimation test will be conducted to test various restrictions. t test is used for testing hypotheses about the coefficients, it is the simplest method for a single restriction, using the standard errors from the information matrix. Using the normal distribution of the estimator, we would use the standard normal table rather than the t table for critical points. For more involved restrictions, it is possible to use the Wald test. For a set of restrictions $R\beta = q$, the statistic is for testing the hypothesis that a subset of the coefficients, say the last M , are zero, the Wald statistic computed is compared with critical Wald at a given level of significance. If the computed value is greater than the critical value then the restriction is not valid. This test is useful when evaluating importance of a subset of variables the influence choice of source of capital.

Goodness of fit in the binary response model is revealed by McFadden's (1974) likelihood ratio index. It lies between zero and one. A perfect fit give McFadden's R^2 of close to one and an imperfect fit when all slope coefficient are zero McFadden's R^2 is zero.

However, McFadden's R^2 is not a good measure of model fitness since mostly McFadden's R^2 is usually lower in binary response models implying weak explanatory power of the model. A better measure of goodness of fit in the context of binary response model is the receiver operating characteristic curve (ROC). ROC is a plot of the sensitivity, or true positive rate, against false positive rate ($1 - \text{specificity}$ or $1 - \text{true negative rate}$). Point away from the diagonal to the left suggest that most of predicted probability by the model are true, point on the diagonal mean that true positive rate equal false negative rate while those to the right of diagonal imply the model's false positive predicted probability rate are greater than true predicted positive probability rate. Area under the ROC curve gives the proportion of true positive predictions of the model. Models that fit the data well will have ROC curve far left a way from the diagonal, consequently

area under ROC curve will be large. Therefore, given two models, better model can be selected basing on size of area under the ROC curve.

3.7 Specification tests

These tests are carried out to detect misspecification of the model like omission of relevant variable, inclusion of an irrelevant variable or wrong functional form. Misspecification errors have far reaching consequences. First, omission of a relevant variable makes the coefficients of the included variable to be inconsistent. Secondly, the effect of the omitted variable will be subsumed in the error term that will make the underlying regression to be heteroscedastic and maximum likelihood estimators will be inconsistent and variance covariance matrix will be inappropriate; inefficient parameter. Specification tests are based on residuals and normality of residuals tells us that model is well specified (Gujarat, 2007. pg 529). Hausman test is handy here to decide on the better model. The null for Hausman test in the specification test, is that the specified model is the correct model (no misspecification) and the alternative model is the alternative hypothesis. Likelihood ratio test is important in deciding variables to include in the model as it computes information criteria, the basis of which we select a model with least information criteria. Hence likelihood ratio test facilitates dropping of irrelevant variables from the model to obtain parsimonious results.

3.8 Study area

3.8.0 Geography of the Area

Study of Nairobi Geography gives an idea about the location, climate, topographical condition and the vegetation of the region. The average altitude of the city of Nairobi is approximately 1798 meters above the sea level. The geographical coordinates of Nairobi city are 1°18' South and 36°45' East. Nairobi enjoys cool and pleasant weather conditions throughout the year. This cool tropical climate that prevails in most of the time of the year owes it to the fairly high altitude of the city. The Ngong Hills in Nairobi has four peaks. The two main topographical features in Nairobi include the Nairobi River and the Ngong mountains.

Under the Koppen climate classification, Nairobi has a Subtropical Highland climate. The altitude makes for some chilly evenings, temperature ranges between 10 °C and 24 °C. There are two rainy seasons but rainfall can be moderate. The cloudiest part of the year is just after the first rainy season, when, until September, conditions are usually overcast with drizzle. As Nairobi is situated close to the equator, the differences between seasons and timings of sunrise and sunset varies little throughout the year, due to Nairobi's close proximity to the equator.

3.8.1 Demographic characteristics

Nairobi demography provides information about the population, ethnic groups, languages, literates and religious communities in the city. Nairobi has the largest population in eastern Africa and is the fourth biggest African city with a population of 3 million in the urban area and 4 million people in metro areas. Nairobi's growth rate is estimated to be 6.9% and is expected to exceed 5 million in the year 2015.

Nairobi is the capital city of Kenya which is 684KM² with a population of about 4.5million with higher population of women comprising of 50.2% and male 49.8% (KNBS, 2007). Mean household size is 4.3 for the poor and 3.7 for non poor and the overall average household size was 3.8 (KNBS, 2008).

3.8.2 Economic activities

Agriculture is the least practiced economic activity whereby 1.1% Of the population is engaged in it while Kisumu has the highest proportion of 52.8%. These correspond to low land size holding in Nairobi.

SMEs engage in manufacturing, construction, services and trade. Employment by SMEs sector in 2006 was 1702300 and a modest growth was experienced in Nairobi due to expansion of the formal sector (GOK, 2006). More than 60% of the employment in the SME is from whole sale and retail trade, hotels and restaurant (GOK, 2002). Rural urban migration has accelerated the need to create employment opportunities in Nairobi. The formal sector is not expanding fast to absorb the ever increasing labour force (Gitonga, 2008). In bid to provide self employment, individuals and government has encouraged development of SMEs in name of Jua Kali sector (GOK, 2002). These sector require little capital and skills.

The Kenyan government tends to favor small-scale and large manufacturing enterprises in Nairobi, as is else where in the country, making them the main recipients of government support because they have potential for growth and employment creation, yet unlike other branches of the informal sector, these enterprises require certain skills making entry difficult for the poor (Mitullah, 1991). Furthermore, City council of Nairobi has adopted selective licensing to regulate these enterprises (King, 1996).

3.8.3 Financial services

Nairobi area has a variety of finance for SMEs like Non Governmental Organization, commercial and development banks and Governmental agencies, with all commercial banks having branches in this area (KNBS, 2008). However, use of financial services by small businesses is constrained by lack of information on availability and cost of borrowing, preference of not borrowing, short repayment period and costly procedure of vetting that increases cost of credit (Central bank, 2009). Access to credit Nairobi is 28% as

compared to Mombasa 29.3% and Kisumu 57.5%. Percentage distribution of people who received credit from commercial banks in Nairobi 4.6% Mombasa 9.9% and Kisumu 11.6%. From neighbors Nairobi 32.2% Mombasa 58.3 and Kisumu 74%. Cost of credit is highest in Nairobi at 10% compared to 4.7% Mombasa and Kisumu 4.6% but Nairobi has the least proportion of population denied credit at 4.4% Kisumu 13.1% and 16% (KNBS, 2008).

3.8.4 Poverty levels

According to Kenya integrated household budget survey, the overall (absolute) poverty line for urban area is Kshs 2913. Poverty by socio-economic characteristics considers poverty and total (age) dependency ratio. Total dependency ratio is the proportion of the population (0-14 and 65 and above) that is dependent. According to Kenya Integrated Household Budget Survey 2005/2006, Nairobi's dependency ratio for poor is 71.3 % and non poor 48.1% the total dependency ratio is 52.7, while Age dependency ratio of 54.4% and mean household size of 3.8. This implies that out of 100 people, about 54 of them are dependent on labour. Percentage distribution of population by incidence of sickness in the last weeks to the survey was 25.3% compared to other urban areas it has the highest. Percentage proportion of sick and injured by type of sickness is 37.7% (KNBS, 2007). Child nutrition is a crucial indicator of poverty levels. Proportion of stunted children in Nairobi is the highest at 27.8%, as compared to Mombasa of 18.9% and Kisumu 18.6% (KNBS, 2008).

.Main reasons for selecting Nairobi as area of study are as follows:

- It is a densely populated urban area, with a large proportion of people in poverty.
- Large proportions of people derive their livelihood directly and indirectly from non-farm activities.
- It is an urban area with highest number of SMEs and financial institutions that makes it easy to raise sample size for generalisations.
- There are no barriers to communication and transport.
- Limited resources could not allow covering a large geographical area.

3.9 Data

Primary data was collected using a structured questionnaire. The questionnaire elicited a range of information relevant to the performance and the running of the enterprises. Pertinent information gathered which applies to this study are factors that influence the choice of source of finance by an enterprise: profitability, assets, gender of the owner or manager, level of education of the owner or manager, size of the firm and age of the firm.

3.9.1 Sampling Frame

Cooper and Schindler (2001), define a sampling frame as a list of all elements from which the sample is actually drawn and is closely related to the population. Equally, sampling frame is a complete list of all the cases in the population from which the sample is drawn. Pervez and Kjell (2002), underscore the importance of a sampling frame in guiding the researcher to come up with a target group of respondents. The sampling frame was enterprises licensed by city council of Nairobi licensing department for 2010-2011 period. The list of licensed firms is fairly complete with 45500 firms out of which 25498 are SMEs. The study employed physical identification of SMEs where only firms with greater than 6 but less than 100 employees were interviewed. The prime target interviewee was the owner or the manager.

3.9.2 Sample Size

A sample is a finite part of a statistical population whose properties are studied to give information about the whole population (Merriam-Webster, 2003). Thietart *et al.* (2001), defines a sample as the set of elements within a population from which data is collected to represent that population. In this study stratified random sampling technique will be used to select SMEs. The area is stratified into districts and districts further divided into divisions from which random sample of enterprises with employees ranging between 5 and 100 with sales less than 50 million Kshs was obtained. Divisions in Nairobi area are shown in appendix 1. The study targeted sample size of 176 firms in 8 division of Nairobi due to limited resources. Existence of finite population with known number of firms in divisions facilitates selecting items in a sample with probability proportionate to size of occurrence of firms in the respective divisions. Samples selected in groups with selection probability proportionate to size of firms in that group reduces considerably the sampling variances of unbiased sample estimates over those obtained when sampling with equal probabilities throughout (Horvitz and Thompson, 1952). Proportionate sampling was done in 8 divisions using the formula:

$$n_i = N(p_i/P)$$

Where n_i is the sample size of division i , N overall sample, p_i number of SMEs firms in division i , and $P = 25498$ is population of SMEs in Nairobi area. Sampling formula embodies proportionate probabilities through (p_i/P) . Proportionate distribution of sub-samples in divisions is Nairobi central 63, Pumwani 17, Embakasi 21, Westlands 20, Makadara 25, Dagoreti 8, Kasarani 12, Kibera 10⁷.

⁷ Names of divisions might have changed after the map was drawn

The study purposively allocated a quota for the four major sector of the economy in each division, at least 1 construction, but for overall sample. manufacturing 20, service 25 and trade 15. Randomisation of the sample was more likely to make construction firms under represented.

3.9.3 Data Collection Method

This study utilized primary data collected using structured questionnaire see appendix II. The questionnaire was designed to elucidate profitability of the business, education level of the owner or manager, total assets of the firm, age of the firm, amount of loan applied, amount of loan received and the choice of the entrepreneur with respect to source of finance. The respondents comprises of owners or chief executive officers of Small and Medium Enterprises. Trained research assistants together with the researcher visited selected Small and Medium enterprises in Nairobi area. Having attained necessary consent, we contacted the chief executive officers or owners of the selected SMEs in order to familiarize them with the questionnaires and get an opportunity to ask further questions. The questions asked provided complementary information to that given on the questionnaire. Part A of the questionnaire gathered information concerning the general background information of the small and medium enterprises. Part B elicited data on the sources of finance, and Part C collected information concerning factors influencing decision to apply for loan by SMEs.

3.9.4 Research Procedures

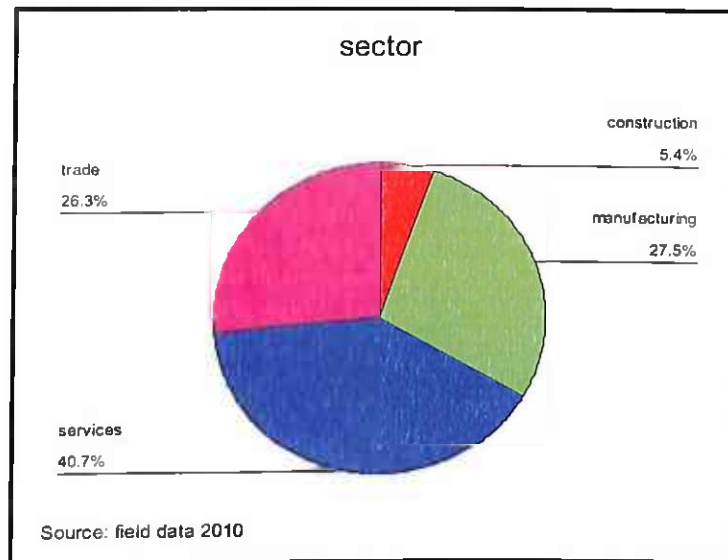
The questionnaires was prepared in advance and first tested on a pilot sample of 10 firms. The data gathered was used to test appropriateness of the questionnaire. The questionnaires were revised as appropriate before being used to collect data. This enabled the researcher to validate the instrument before the final data collection was done. The questionnaire (together with the letter of introduction) was addressed to the business owner or to the chief executive officer.

3.10 Data Analysis Method

Data from the field data was coded for subsequent analysis. Observations with outliers and missing information were dropped in data cleaning process. The analyses generated summary statistics for background variables as well as tests the emerging relationships between variables in order to meet the research objectives.

The managers' perception on growth objectives is converted into ranks in the overall data set for statistical analysis. The study used the likert scale for measurements of respondents' perception on growth. Continuous variables are measured on ratio scale. The softwares used were SPSS and stata 10.

Figure 1: pie chart for sectorial Distribution



Trade constituted 44 firms comprising of shops, hard wares and supermarkets. Construction SMEs were 9 firms.

Level of education influence distribution of entrepreneurs. Highly educated entrepreneurs participate in business that require high skills.

Table 7: Distribution of firms across sector by education level

Education level	Sectors				Total
	construction	manufacturing	Services	Trade	
masters	1	0	2	0	3
Secondary	1	6	14	19	40
University e g B.A BSC	7	10	13	1	31
Vocational training T	0	30	39	24	93
Total	9	46	68	44	167

The study established that the level of formal education among the respondents was high in the service sector followed by the manufacturing sector. Many firms in these sectors are knowledge intensive like consultancy and legal firms. However the construction sector was found to have the least respondent with formal education. Respondents with vocational training constituted the highest proportion of respondents across the sectors see Table 7 and Figure 3.

Figure 2: Bar chart for sector and education level

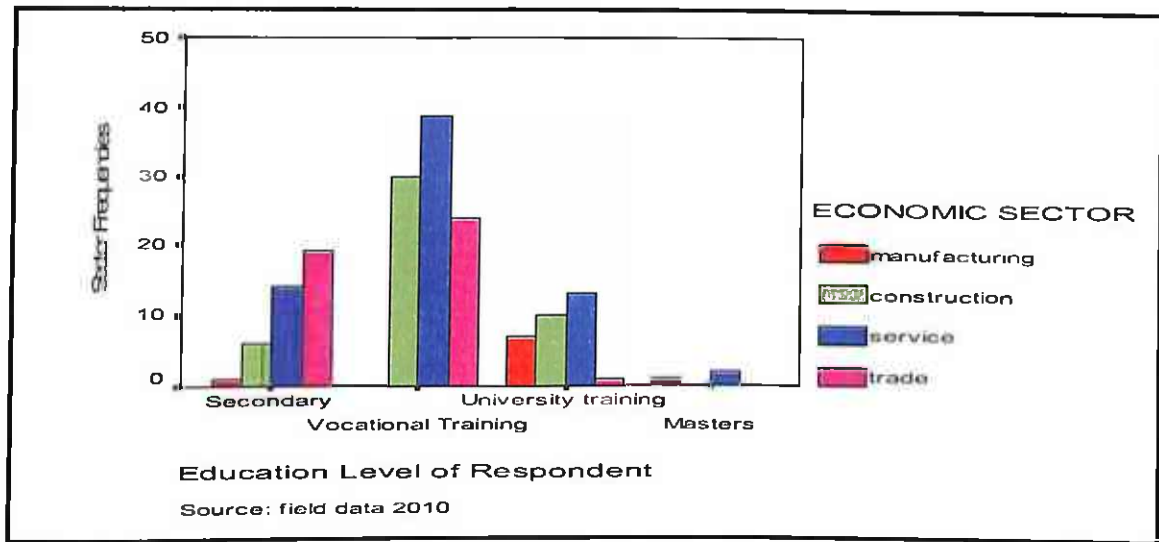


Table 8 displays ages of the firm and of the respondent as well as number of employees. In spite of many Firms being young, they are managed and owned adults.

Table 8: Age and number of employees of firms

Variables	Obs	Mean	Std. Dev	Var.	Skewness	kurtosis	Min	Max
Age of firm	167	8.28	4.82	23.28	1.11	4.48	1	28
Age of respondent	167	39.34	5.65	31.90	1.87961	12.77	27	74
Employees	167	26.79	20.50	420.35	1.19	3.59	5	90

Distribution of age the firm and owner/manager is skewed⁸ towards left indicated by skewness of 1.1 and 1.8 respectively, implying majority of firms have ages that are below the mean. The sample has many small size firms as the number of employees has a positive skew.

In order to establish source of capital used to finance business assets, respondents were asked to state principal source of funds they used to finance business assets. Responses are in Table 9 last column. Major source of capital for SMEs in Nairobi comes from personal savings followed by Commercial banks while government is the least provider of principal capital. This shows that many firms rely on personal saving in financing business assets.

Principal source finance for existing business assets depicts financing options available across group. Table 9 tabulates principal source of capital by gender.

⁸ $skew = \frac{Mean - mode}{standard\ Dev.}$

Table 9: Principal capital source by Gender

Principal source of capital	Male	Female	Total	Percent
NGOs	2	1	3	1.8
commercial bank	44	10	54	32.34
Government agency	1	-	1	0.6
Partners contribution	3	-	3	1.8
Personal savings	62	23	85	50.90
Relatives	13	8	21	12.57
Total	125	42	167	100

Notably, male entrepreneurs used all the sources, but government agency did not provide capital to female entrepreneurs to finance existing business asset. In addition 23 out of 42 female proprietors used personal savings. This is indicative of how few available options of financing utilized by women.

Demand for credit and firm characteristics

Firms finance their projects using debt or retained earnings. To establish demand for formal credit by firms to finance most recent capital expenditure, respondents were asked whether they applied for a loan for the last two years from financial institutions.

Figure 3: Pie chart for firms that applied for loan

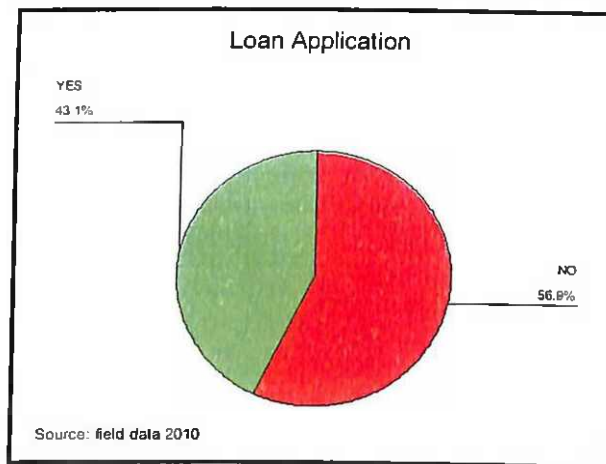


Figure 3 shows that many firms did not apply. In deed, 95 firms applied and 72 firms did not apply.

Existence of an enterprise as a separate entity from the owner reduces risk of defaulting in the credit market since life of a business institutionalized and larger asset base compared to sole proprietorship. Consequently, existence of separate entity is a signal of good quality of the firm. Table 10 show legal for and loan application.

Table 10: legal form of the firm and loan application

legal form of the business	Did not apply (%)	Applied (%)	Total=100
Limited company	54.9	45.1	100
Partnership	53.66	46.34	100
Sole	60	40	100
Total	56.89	43.11	100

From Table10, a larger proportion of limited companies and partnership firms applied for credit relative to sole proprietors in the category of firm that applied for credit.

Table 11 shows proportions of education level attained by the entrepreneur relative to loan application.

Table 11: Highest level of education and loan application

Level of education	Did not apply (%)	Applied (%)	Total (%)
Masters	33.33	66.67	100
Secondary	70.00	30.00	100
university training eg BA, BSC	64.52	35.48	100
vocational training TTC, MTC , Diploma	49.46	50.54	100

We conclude from Table 11 that, smaller proportion of secondary school proprietor applied for credit if compared to owners with higher levels of education.

A sectorial loan application decision is shown in figure 5.

Figure 4 : Loan application by sector

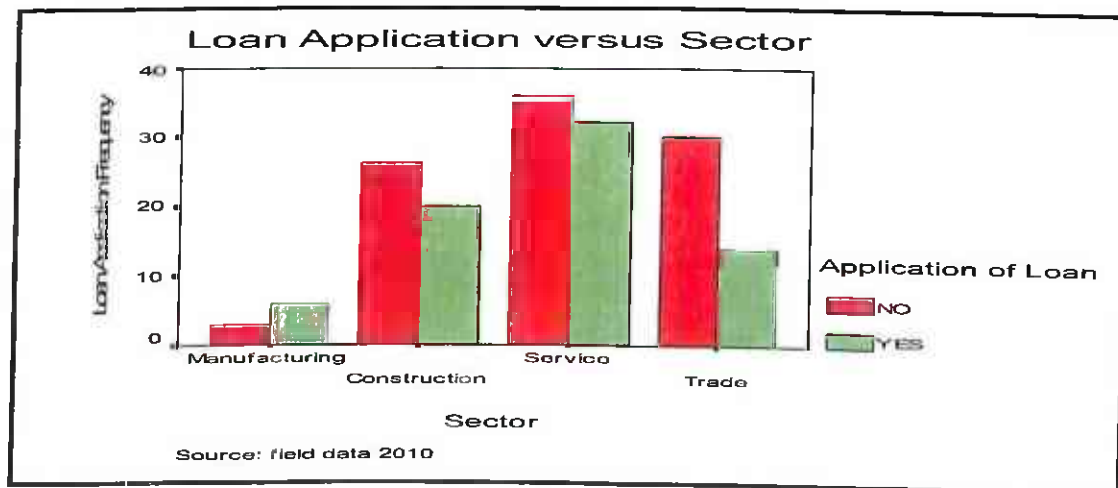
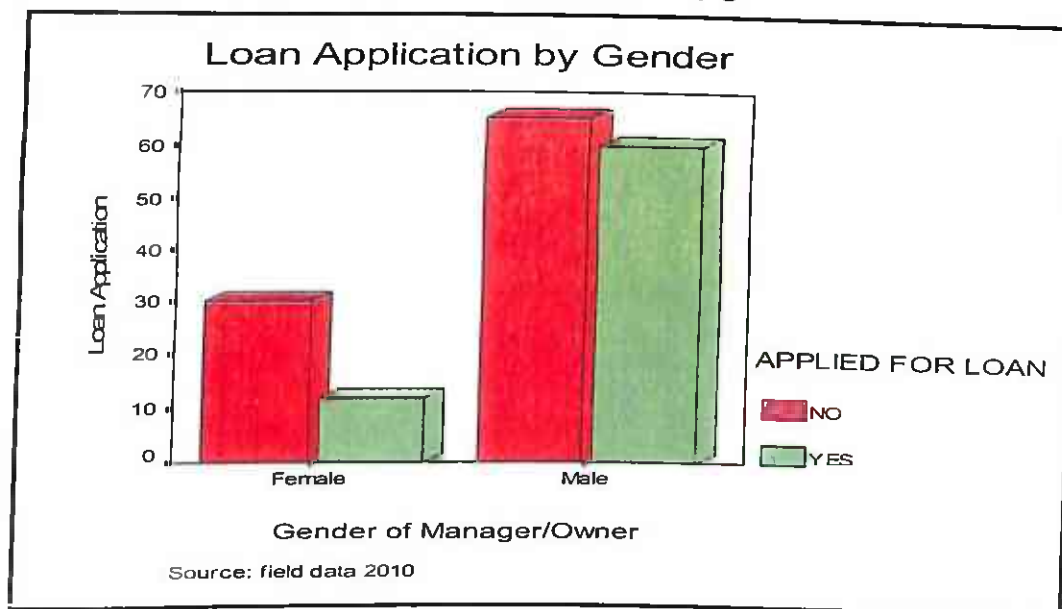


Figure 4 indicates that service sector had the highest frequency for applicant followed by construction and trade. On the other hand, the same order of frequency is maintained for firms that did not apply for credit.

Bar chart below shows responses of loan application for the last two years by gender. The question captures cross gender preferences in obtaining funds to finance business projects. Figure 5 shows gender and loan application decision.

Figure 5: Loan Application by gender



Many female entrepreneurs did not apply for loan for the last two year indicative of unwillingness to incur debt. Of the total entrepreneurs who applied for credit 16.67% of female entrepreneurs applied while male were 83.33%.

Next we describe characteristics of continuous variables using measures of central tendency and dispersion in Table 12. Mean amount of loan applied is 3152083, but maximum and minimum amounts are 20000 and 10000000. On average amount of loan given 2454861 which is 71.84152% of the loan applied and minimum amount given is zero depicting total rationing. This suggests that demand for credit is not satisfied as the amount given is supply-side determined depending on quality of the borrowed inferred by lenders. This is emphasized by large range of 15% in the lending interest rate with a minimum of 10% and a maximum of 25%. Positive skew of interest rate suggest that many firms had interest rate lower than the mean. Here, interest rate has a dual purpose of maximizing profit for the lender and selecting quality of borrowers. It also suggest that cost of borrowing by small firms is higher in Kenya than in developed countries by about 5.6% a finding consistent with Beck *et al* (2008) study.

Table 12: Descriptive statistics

Variables	Obs	Mean	Std. Dev	Variance	Skewness	Kurtosis	Min	Max
Applied	72	3152083	2784188	7.75e+12*	1.148284	3.474686	20000	1.00e+07
Given	72	2454861	2543386	6.47e+12	1.326386	3.735548	0	1.00e+07
Profit	167	5975498	9042167	8.18e+13	4.255579	30.58767	45000	8.00e+07
Assets	167	5267869	8669429	7.52e+13	5.317906	39.91466	45000	8.00e+07
Growth	167	1.634731	.6618638	.4380636	.5590097	2.305608	1	3
Gender	167	.748503	.4351784	.1893803	-1.145509	2.31219	0	1
Employees	167	26.79042	20.50237	420.3474	1.191245	3.594907	5	90
Interest	66	16.18939	2.773175	7.690501	1.589097	7.280636	10	25
Success rate	72	.7184152	.3013098	.0907876	-1.057958	3.343008	0	1

e is exponent i.e. $7.75e+12^* = 7.75 \times 10^{12}$

However, skew of success rate is negative, implying that the mode is greater than the mean, therefore many firms that applied for credit, acquired more than 71.8% of the loan applied for.

4.2 Analysis of variance

Descriptive statistical methods provide summary of loan application and firm characteristics, it does not give variation between groups and within group in demand for debt. Firms exhibit differences in characteristics that influence demand for debt finance. Analysis of variance is essential in determining whether variation in demand for credit is due to chance or caused by factors inherent in the firm. Fischers statistics facilitates investigating variation between groups- legal forms, sector, gender and growth and within group. A significant Fst. Implies that variation between groups are greater than variation within group. Hence, differences in the dependent variable are due to inter group variations. On the other, hand a small Fst. with large p value shows that the means within group are equal and variation in the sub groups are due to chance. Analysis of variance between firm characteristics and loan application are given in Table 13.

Risk tolerance of debt finance differ a cross gender of managers/owners that influence credit seeking by entrepreneurs. F statistic in analysis of variance of gender against loan application is 4.92 with p value of 0.0279. We reject the null that, means between genders are the same at 5%. We conclude that there is a difference in application of credit between male and female since, variation between male and female in application of credit exceed variation within the gender group. Debt is riskier than retained earning and proprietors who apply for debt finance have higher risk tolerance. Therefore, cross gender differences in application of credit is caused by differences in risk tolerance between male and female entrepreneurs (Stan, 2005). Growth of firms inhibits ambition and aspirations of owners/managers that lead to differences not only in growth orientation but also financing decisions.

Table 13: Firm profile and application of credit

Variable	Source of Variations	Ss	df	Ms	F	Prob>F
Gender	Between gender	1.1866553	1	1.1866553	4.92	0.0279
	Within gender	39.771429	165	.24103896		
	Total	40.958084	166	.24673544		
Growth	Between growth	10.748179	2	5.3740897	29.17	0.0000
	Within growth	30.209904	164	.18420673		
	Total	40.958084	166	.24673544		
Sector	Between Sector	1.167105	3	.389035	1.59	0.1930
	Within Sector	9.790979	163	.24411643		
	Total	40.958084	166	.24673544		
Education	Between educational levels	1.5473311	3	.51577705	2.13	0.0980
	Within educational level	39.410753	163	.24178376		
	Total	40.958084	166	.24673544		
Legal form	Between legal forms	1355109	2	.06775545	0.27	0.7620
	Within legal forms	40.822573	164	.24891813		
	Total	40.958084	166	.24673544		

Growth orientation of firms is categorized as stay the same, grow moderately and grow substantially. Computed F statistic is 29.17 with p value of 0.0000. We reject the null that means between the three growths orientations are the same with regard to application of credit. Thus, application of credit varies with growth objectives of the firm (Berger and Udell, 1995).

In this study, firms from manufacturing, construction, services and trade and merchandise were included. Liquidity problems and a demand for investment funds differ across sector with manufacturing being more susceptible to liquidity problems hence greater tendency to demand credit (Cooley *et al.* 1997). Analysis of variance provide evidence that there is no differences in loan application among firms from different sectors at 10% as F computed has a high p value of 0.193. Application of credit varies with not only level of awareness of existence of various financial packages from financial institutions but also the ability to present a plausible loan application that depend on the level of education and training (Green *et al.*, 2002). F computed with respect to education and loan application is 2.13 with probability of 0.098. We reject the null that there are no differences in application of credit by entrepreneurs with different levels of education attained by entrepreneurs. In as much as information asymmetry reduces appreciably from sole

proprietorship through partnership to limited companies, application of credit is not different among the legal forms of business as F computed of 0.27 has a high p value of 0.762.

Campbell (1988) discrimination against women in financial market manifests in terms of stringent terms and conditions of credit that not only harden loan application process but also lead to higher rejection rates in loan applications. ANOVA for number application submitted and gender in Table 14 suggest that there is differences between male and female regarding number of loan application forms submitted.

Table 14: ANOVA applications submitted and gender

Variable	Source	Ss	df	Ms	F	Prob > F
Gender	Between gender	3.9040543	1	3.9040543	9.11	0.0036
	Within gender	29.560734	69	.42841644		
	Total	33.464789	70	.47806841		

Actual gender discrimination in formal credit market is depicted by number of loan applications rejected between male and female. We find no gender discrimination in the formal credit sector; F computed has a higher p value of 0.1988 Table 15. We conclude that, male and female entrepreneurs face similar terms and condition in the credit market.

Table 15: ANOVA of Number of applications rejected and gender

Variable	Source	Ss	df	Ms	F	Prob > F
Gender	Between gender	.40821256	1	.40821256	1.73	0.1988
	Within gender	7.0917874	30	.23639291		
	Total	7.5	31	.24193548		

This paper seeks to identify factors that influence demand for credit. Although demand for credit is depicted by application of loan, actual amount of credit applied for is determined by characteristics of a firm. Moreover, amount applied is contingent on the decision to apply for credit in the first place. In this section we investigate whether there is differences amount of loan applied depending on internal characteristics of a firm. Amount of loan applied is significantly different between different legal forms at 5% because F statistic of 9.65 has a low p value of 0.0002. F computed for gender and growth objectives are 0.29 and 1.45 and respective p values are 0.5888 and 0.2405 which are insignificant at 10%. Hence, there are no differences in gender and growth in the mount of credit sought by firms see Table 16.

Table 16: Amount of loan applied Analysis of Variance

Variable	Source of Variations	Ss	df	Ms	F	Prob>F
Gender	Between gender	2.309e+12	1	2.309e+12*	0.29	0.5888
	Within gender	5.481e+14	70	7.829e+12		
	Total	5.504e+14	71	7.752e+12		
Growth	Between growth	2.227e+13	2	1.114e+13	1.45	0.2405
	Within growth	5.281e+14	69	7.654e+12		
	Total	5.504e+14	71	7.752e+12		
Legal form	Between legal forms	1.203e+14	2	6.014e+13	9.65	0.0002
	Within legal forms	4.301e+14	69	6.233e+12		
	Total	5.504e+14	71	7.752e+12		

*e is exponent ie $7.752e+12 = 7.752 \times 10^{12}$

ANOVA for success rate and gender has F value of 1.29 with p value of 0.2595, indicating that there is no gender discrimination in approval rates by financial institution.

4.3 Correlation coefficients

Correlation coefficient is essential in determining strength and direction of relation between variables. When firms are confronted with financing decision, they evaluate borrowing against retained earnings. In order to discern demand for formal credit firms were asked whether they applied for loan for the past two years 2008-2009. This question was captured as dummy variable taking 1 if a firm applied for credit for this period and 0 otherwise. The response variable is measured on the nominal scale, and spearman correlation coefficient gives appropriate magnitude of strength and direction of relationship between the variables.

Table 17 shows correlations for loan application and significance of correlation at 1% and 10%.

Table 17: Spearman correlation matrix

Spearman's rho	Apply	Growth	Profit	Assets	employees	Employee sq	Gender
Apply	1.000	.498(**)	.086	.114	.132	0.1280(*)	0.1702*
growth	.498(**)	1.000	.395(**)	.331(**)	.366(**)	0.1410(*)	0.1652*
Profit	.086	.395(**)	1.000	.630(**)	.502(**)	0.5131(**)	0.2661*
Assets	.114	.331(**)	.630(**)	1.000	.619(**)	0.6308(**)	0.2236*
Employees	.132	.366(**)	.502(**)	.619(**)	1.000	0.9999(**)	0.0842
Employees sq	0.128(*)	0.1410(*)	0.513(**)	0.631(**)	0.9999(**)	1.000	0.0829
Gender(male=1)	0.1702*	0.1652*	0.2661*	0.2236*	0.0842	0.0829	1.000

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.1 level (2-tailed).

Spearman's correlation coefficients between apply and growth is 0.498, while that of apply and log of number of employees is 0.1280. Gender is positively correlated with apply at 0.1702. The coefficients are significant at 5% and 10% respectively. Therefore, growth and number of employees are positively related to application of credit. Correlation coefficients between apply and asset, growth, employees and profit are positive though low, suggest that applying for loan is positively correlated with this variables.

Pearson correlation coefficients

Table 18 gives the Pearson correlation matrix and significance levels of continuous variables.

Table 18: Pearson correlation coefficients

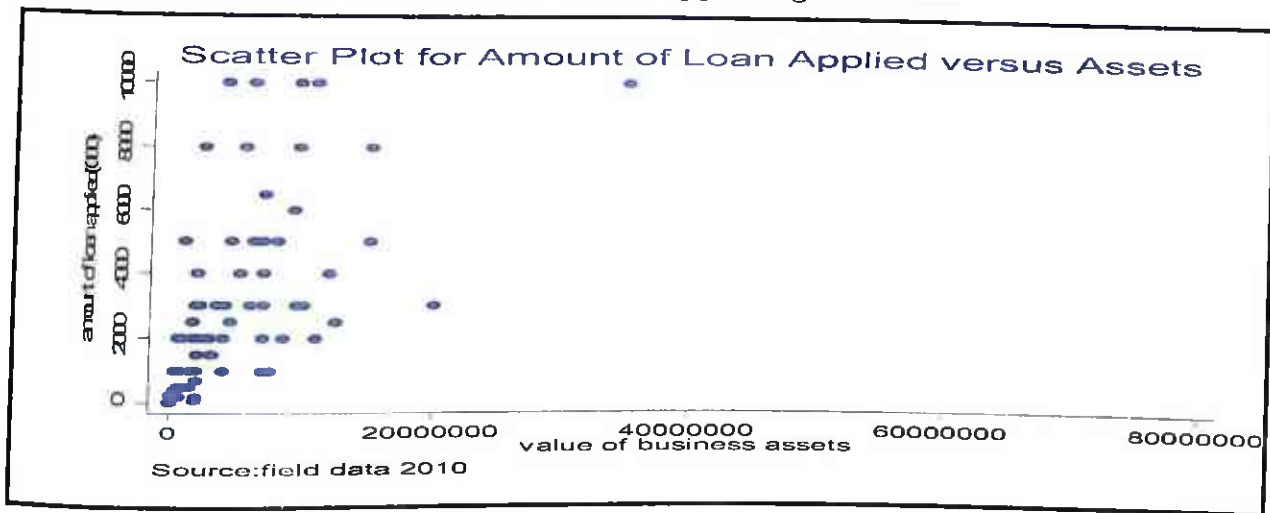
		applied	Given	Profit	Asset	gender	emplo	Employ sq	interest	succ
Applied	corr.coeff	1	.935(***)	.455(***)	.550(***)	.065	.346(***)	.427(***)	-.231(*)	.230
	N	72	72	72	72	72	72	72	66	72
Given	corr.coeff	.935(***)	1	.464(***)	.606(***)	.069	.353(***)	.398(***)	-.229	.447(***)
	N	72	72	72	72	72	72	72	66	72
Profit	corr.coeff	.455(***)	.464(***)	1	.642(***)	.191(**)	.412(***)	.402(***)	-.092	.233(**)
	N	72	72	167	167	167	167	167	66	72
Asset	Corr.coeff	.550(***)	.606(***)	.642(***)	1	.179(**)	.312(***)	.338(***)	-.119	.323(***)
	N	72	72	167	167	167	167	167	66	72
Gender	corr.coeff	.065	.069	.191(**)	.179(**)	1	.096	.087	.149	.135
	N	72	72	167	167	167	167	167	66	72
Emplo	corr.coeff	.346(***)	.353(***)	.412(***)	.312(***)	.096	1	.934(***)	-.025	.194
	N	72	72	167	167	167	167	167	66	72
Employ sq	corr.coeff	.427(***)	.398(***)	.402(***)	.338(***)	.087	.934(***)	1	-.058	.181
	N	72	72	167	167	167	167	167	66	72
Interest	corr.coeff	-.231(*)	-.229(*)	-.092	-.119	.149	-.025	-.058	1	-.067
	N	66	66	66	66	66	66	66	66	66
Succ	corr.coeff	.230	.447(***)	.233(**)	.323(***)	.135	.194	.181	-.067	1
	N	72	72	72	72	72	72	72	66	72

*** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.1 level (2-tailed). ** Correlation is significant at the 0.05 level (2-tailed).

From the matrix, all correlation coefficients of explanatory variable are below 0.8. Hence there is no multi collinearity. Correlation between amount applied and profit is 0.455. This implies that the higher the profit the more amount of loan an enterprise is likely to apply. The positive correlation is significant at 5%.

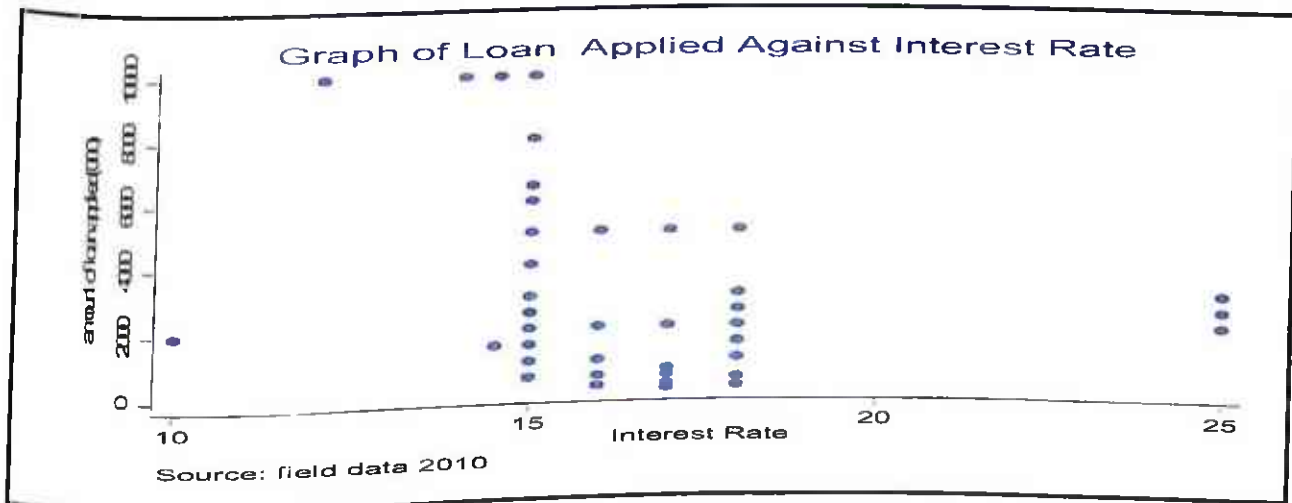
Positive significant Correlation coefficients on asset, number of employees and the log of employees are 0.55, 0.346 and 0.427 respectively. These coefficients show that the higher the value of business asset and, number of employees, the higher the amount of loan a business applies. Visual inspection of figure 6 suggests positive relationship between loan applied and value of business assets.

Figure 6: Scatter diagram for amount of loan applied against assets



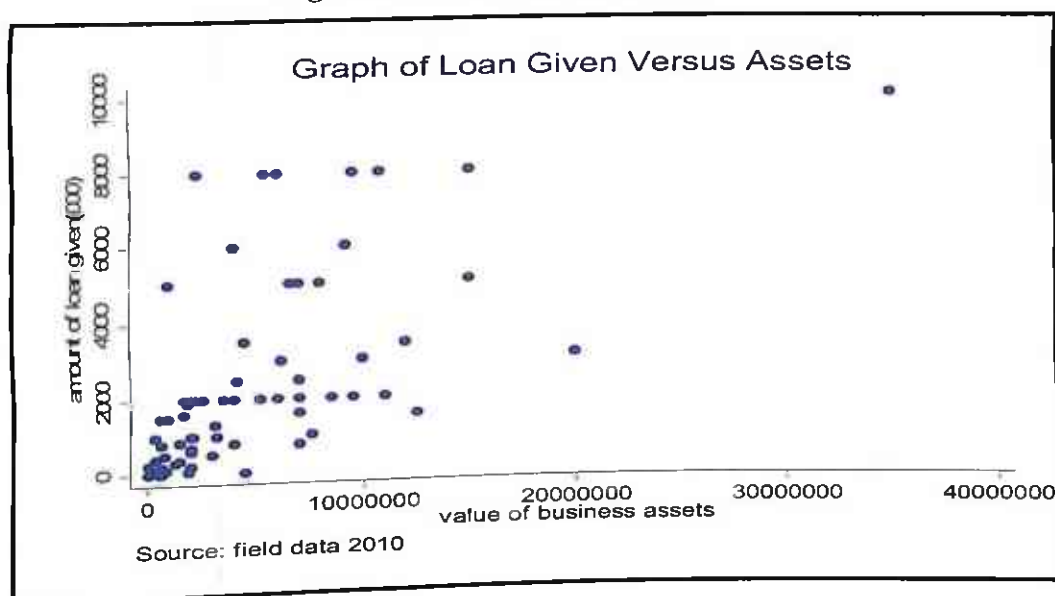
In this matrix gender assumes a value of 1 if manager or owner is male. Correlation coefficient on gender is weakly positive of 0.065. This weak correlation is not significant at 10%. The rate of interest is inversely correlated, with a lower coefficient of -0.231 that is significant at 10%. The higher the interest rate the lower the amount of loan applied see Figure 7.

Figure 7: amount of loan applied against interest rate



Amount of loan given is the actual loan awarded by a financial institution after the vetting process. Pearson correlation coefficients with respect to amount of loan given are in column four. All correlation coefficient are significant at 10% except on gender which has a coefficient of 0.069. Correlation between asset and loan given is the highest (0.606); this is evident from the scatter plot of loan given and business (Figure 8). Interest rate has a higher significant coefficient of -0.229 as compared to amount applied. Thus a higher interest rate is imposed on smaller loans given, but lower interest rate is charged on large amounts of loans.

Figure 8: loan approved against assets



Succ is the Success rate is the ratio of amount of loan given to amount of loan applied. This shows the level of demand satisfaction as well as the extent of rationing. Succ has a maximum value of 1 if amount of loan applied equal to amount of loan given. On the other hand, succ of 0 means no loan was given.

Correlation coefficient on profit at 0.233 and business asset of 0.323 are positive and significant at 10% and 5% respectively. The strong correlations suggest that, the higher the profit and asset level the less the level of loan rationing can occur. Correlation coefficient yields strength and direction of relationship between variable, but does not give causal relationship between variables. Therefore, to establish causality between demand for credit and its drivers, we conduct multiple regressions in the next section.

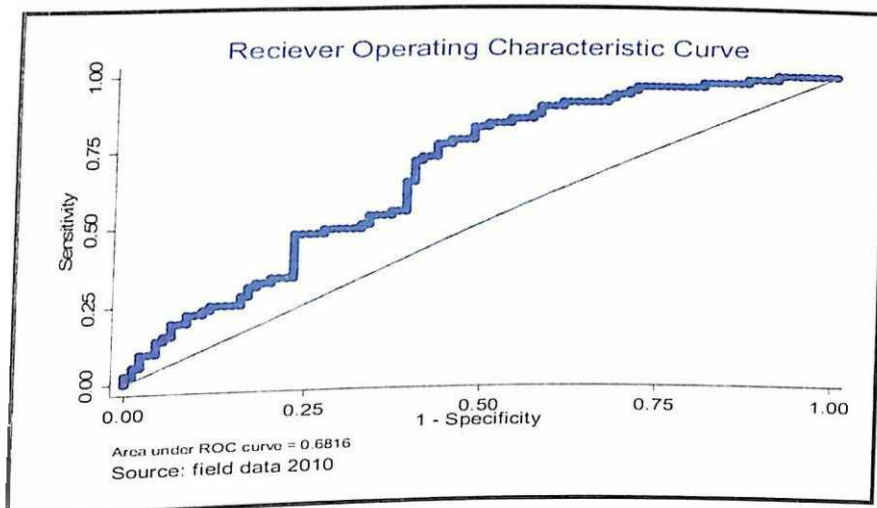
4.4 Multivariate analysis

Which firms applied for credit for the last two years?

We utilize multiple regression model to identify characteristics of a firm that lead it to apply for credit. Multiple regression enables establishment of causality between variables as it yields parameters that can be tested. We use probit regressions in which the left-hand-side variable is dummy variable equal to one if the firm applied credit for the last two years and zero otherwise. (Green 2002, pg. 152) suggests step wise model building procedure moving from general to specific, dropping variables basing on joint significance of variables in the model using likelihood ratio statistic and probability of t ratio. The model was chosen from a competing model in which OLS predict number of employees appeared as squared as well as in levels. Predicted number of employees equation was estimated with dependent variable being employees

and explanatory variables as profit, asset value, gender, growth legal form and dummy for application of credit. This procedure was suggested and used by Fafchamps (1999) to correct for endogeneity between size and demand for credit. We used likelihood ratio test in which the model with least information criteria and higher area under ROC curve was selected (see appendix III and appendix IV for information criteria and ROCs of the two models). Using AIC and ROC we use model 1. Goodness of fit of the model tested using ROC curve where the model predicted correctly 68.16% of the total predictions is shown figure 9.

Figure 9: ROC curve after probit regression



This is a better model compared to a specification with age and log of employees which predicted positively 67.46% correctly see appendix III ROCs of two models. Results of probit regressions index for the better model for ROC curve in figure 9 and in Table 19.

Table 19: Probit Coefficients

Probit regression				Number of obs = 167		
partnership dropped because of collinearity				Wald chi2(8) = 20.26		
Log pseudolikelihood = -104.4482				Prob > chi2 = 0.0094		
				Pseudo R2 = 0.0851		
	Coef.	Rob. Std. Err.	Z	P> z	[95% Conf. Interval]	
Apply						
Asset	-3.91E-09	1.55E-08	-0.25	0.800	-3.42E-08	2.64E-08
Profit	-1.81E-08	1.40E-08	-1.29	0.198	-4.56E-08	9.46E-09
Gender(male=1)	0.523976	0.245434	2.13	0.033	0.042935	1.005017
Growth	0.381011	0.161917	2.35	0.019	0.063659	0.698363
Employees	0.046028	0.019053	2.42	0.016	0.008684	0.083371
Employees SO	-0.00048	0.000227	-2.11	0.034	-0.00092	-3.5E-05
Sole	-0.0193	0.260091	-0.07	0.941	-0.52907	0.490466
Company	-0.08389	0.281956	-0.3	0.766	-0.63652	0.46873
cons	-1.74256	0.436348	-3.99	0.000	-2.59778	-0.88733

Probit index does not have economic significance in interpretation; we compute marginal effects that show change in probability in response to a change in explanatory variable by one unit. Table 20 gives marginal effects output from Stata 10 after probit regression. Asset marginal effects are negative $-1.53E-09$ with p value of 0.8. An increase in asset value by 1 shilling from mean value of $5.3e+06$ reduces probability of applying for credit by $6.87e-10$. The reduction in probability of borrowing is insignificant.

Table 20: marginal effects of probit regression

Marginal effects after probit $y = \text{Pr}(\text{apply})$ (predict) $= .42006765$					[95% C.I.]		X
variable	Dy/dx	Std. Err	z	P> z			
asset	$-1.53e-09$	0.0000	-0.25	0.800	$-1.30e-08$	$1.00e-08$	$5.30e+06$
Profit	$-7.06e-09$	0.0000	-1.28	0.199	$-1.80e-08$	$3.70e-09$	$6.00e+06$
Gender*	0.195836	0.08605	2.28	0.023	0.027186	0.364487	0.748503
Growth	0.14894	0.06351	2.35	0.019	0.024472	0.273408	1.63473
Employees	0.017993	0.00743	2.42	0.015	0.003434	0.032551	26.7784
employeesq	-0.00019	0.00009	-2.12	0.034	-0.00036	$-1.4e-05$	1135.46
sole*	-0.00754	0.10163	-0.07	0.941	-0.20673	0.191639	0.449102
Company*	-0.03267	0.10936	-0.30	0.765	-0.24702	0.181676	0.305389

(*) dy/dx is for discrete change of dummy variable from 0 to 1

With respect to profit, an increase in profit by 1 from mean net income of $6.0e+06$ reduces the probability of applying for credit by $7.06e-09$. This indicates support for pecking order in which firms finance new projects using savings before seeking debt finance. Thus we find evidence for hypothesis 1.

Gender assumed a value of 1 for male proprietors and 0 for female. Marginal effects for gender are 0.195836 with p value of 0.023. Probability of male proprietors borrowing is higher than that of female counterparts by 0.195836. This difference in probability is significant at 5%. Therefore, female entrepreneurs are less likely to seek credit; however this evidence can be explained by differences in loan application due to personal characteristics as shown by ANOVA Table 16 and correlation coefficient Table 18. Evidence does not favor actual sex discrimination, but suggest the presence of apparent sex discrimination with regard to propensity in self discrimination in the decision to seek debt finance as there is no difference in the applications rejected and amount of loan applied ANOVA Table 15 and 16 respectively. Growth marginal effects are 0.14894 with p value of 0.019 thus is significant at 5%. Growth orientation is ranked from 1-3 with 3 being the highest growth orientation for the period 2010-2012. When ranking increases by 1 point, probability to apply for credit tends to increase by 0.14894. Number of employees is a

proxy of reputation of a firm, whereby information asymmetry reduces with increase in number of employees. An increase in employee by one probability of borrowing increases by 0.017993, but a square of employees leads to a smaller significant reduction of probability of applying for credit by 0.00019 at 5%. Firms with higher number of employees signal their good quality in the formal credit market using level of employment. Limited companies are less likely to borrow by 0.03267 compared to partnership and sole proprietorship. Limited companies can access other cheaper forms of external finance like external equity due to reduced information asymmetry; consequently probability of using expensive debt finance is lower. In summary, legal forms of business do not influence demand for credit as evidenced by insignificant coefficients.

Amount of credit applied

This section estimates drivers of amount credit applied a firm in financial institutions in the context of our central hypotheses. In this regression analysis we correct for sample selection bias using Heckman two step procedure. Firms decide whether to apply for credit or not and the amount to apply. Observed formal credit is a manifestation of underlying decision of financing a project using retained earnings or borrowing. Hence, dependent variable (loan applied) is truncated, with missing information on amount of loan applied whenever a firm does not apply for loan in the first place. Resultant regression of amount applied on explanatory variables is biased, and parameters estimated are inefficient, inconsistent and biased.

Heckman two step procedure gives selection parameters in the first step probit model. In our case selection equation establishes factors that influence a firm's decision to apply credit. Application equation, dependent variable is binary taking 1 for firms that applied for loan and zero otherwise. Profit is a proxy for retained earnings, asset collateral, number of employees is an indicator of reputation and growth is the growth objectives of the firm taking 1=stay the same 2=growth moderately and 3= grow substantially gender is the gender of the proprietor. Amount of credit equation has amount of credit applied regressed on asset, profit interest rate and gender. This equation investigates the factors that influence amount of credit applied. Asset is the collateral, profit- retained earnings, and interest is the cost of credit.

Table 21 shows parsimonious result of amount of loan applied basing on Hausman specification test of the model. Hausman statistic was 0.18 with p value of 0.9128. We fail to reject the null of no misspecification. With respect to decision to use retained earnings against credit, assets influence positively the decision to apply for credit. Assets are signal of the quality of the firm, whereby good quality firms distinguish themselves from bad firms by offering collateral to convince the lender that they will abide by terms and

condition of credit. However, the coefficient is insignificant, implying that value of business assets does not influence the decision to apply for credit. Profit inversely affects the decision to apply for credit. Profit coefficient is insignificant. A firm is less likely to apply for credit if it can generate enough funds from its activities. Thus a more profitable firm is less likely to apply for credit because it can raise the funds it requires from its operational activities. Support for pecking order in financing an enterprise exists.

Table 21: Regression of amount of loan applied

Heckman Selection model -- two-step estimates Note: Company dropped due to collinearity					Number of obs (n) = 161 Censored obs = 95 Uncensored obs = 66 Wald chi2(7) = 39.45 Prob > chi2 = 0.0000		
		Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Applied							
	Asset	.200851	0.057256	3.51	0.000	0.088631	0.313071
	Profit	.115485	0.053731	2.15	0.032	0.010174	0.220796
	Gender(male=1)	-711635	854588.3	-0.83	0.405	-2386597	963327.2
	Interest	-170881.5	99607.51	-1.72	0.086	-366109	24345.65
	Constant	6488964	2288681	2.84	0.005	2003231	1.10E+07
Select-Apply							
		1.59e-11	1.62E-08	0.00	0.999	-3.18E-08	3.18E-08
	Asset	-2.03e-08	1.64E-08	-1.23	0.218	-5.25E-08	1.19E-08
	Profit	.5206119	0.261467	1.99	0.046	0.008146	1.033078
	Gender(male=1)	.4637571	0.159614	2.91	0.004	0.150919	0.776595
	Growth	.0472568	0.020749	2.28	0.023	0.006589	0.087925
	Employees	-.0004946	0.000247	-2.00	0.046	-0.00098	-9.75E-06
	Employees sq	-.0124027	0.290319	-0.04	0.966	-0.58142	0.556612
	Sole	.0879614	0.292051	0.30	0.763	-0.48445	0.660371
	Partner	-2.019708	0.528838	-3.82	0.000	-3.05621	-0.9832
	constant	-1907764	1279916	-1.49	0.136	-4416352	600825.3
	Mills -Lambda	-0.72292					
	Rho	2638975.7					
	Sigma	-1907763.5	1279916				
	Lambda						

Gender coefficient is positive and significant at 5%. In this regression, male assumed 1 and female 0. Men Proprietors are more likely to apply for credit as compared to female by 0.5206119 from the mean amount of loan applied by female. Growth objectives are measured on the ordinal scale from 1 to 3, with 1 for firms with least growth orientation and 3 for strong growth objectives. Growth has a significant coefficient at 5% of 0.4637571. On average growth oriented firms are more likely to borrow to augment their productive capacity, reduce cost and increase scale of operation, ultimately increasing in size.

Number of employees' coefficient is positive 0.0472568. An increase in the number of employees by 1 increase the probit index by 0.2921484 and this increase is significant at 10%. Higher number of employees augments reputation of a firm in credit market and is likely to borrow. However, square of employees a significant negative probit index of 0.0004946. Finally, sole proprietor and partnership coefficients are insignificant, hence legal forms of business do not influence joint decision to demand credit.

Amount of loan applied is estimated in the second equation with asset, gender, profit Mills λ and interest rate as explanatory variables. A unit increase in business asset value leads to increase in amount of loan applied by 0.200851 and this increase is significant at 5%. Assets are used as a signal for the quality of the firm. High risk borrowers prefer loan contracts with low collateral and high interest rate (Bester, 1985). Profit is positively and significantly related to amount of credit applied. An increase in profit by 1 unit amount of credit applied increases by 0.115485 this is consistent with pecking order in financing decision. Profitable firms that seek funds to expand scale of operation will use debt prior to external equity as debt is considered cheaper compared to external equity (Myers and Majluf, 1984). Female entrepreneurs are less likely to apply for loan as compared to male by 711635. However, this amount is insignificant at 10%. Interest rate influences amount of loan applied negatively. But, male entrepreneurs applied average higher significant loans of 6488964 (constant) than women. Men take on higher risk is seeking credit. A unit increase in interest reduces amount of loan applied by -170881.5. High interest rate reduces profitability of the project and general riskiness of the business and the only way to increase profitability is to reduce cost of borrowing by borrowing less. Mills $-\lambda$ is the inverse mill ratio that captures incidental truncation in the data. ρ is the correlation between the error term in the selection equation and amount equation. $\rho = -0.72292$, errors are strongly inversely correlated, depicting dependence between the decision equation and the amount of loan equation. Generally the entire variables in the model influence amount of credit as indicated by Wald statistic of 39.39 with a p value 0.000.

Amount of loan given

This regression investigates firm characteristics that influence amount of loan given, corrected for sample selection. The equation is supply side as loan awarded is influenced by enterprise characteristics as inferred and observed by the lender. Regression results of amount of loan given as the dependent variable explained by asset, gender, profit, gender, interest and selection variables are given in Table 22. A unit increase in asset value increases amount of loan given by 0.1945982 this is significant at 5%. Amount of collateral financial institution demands of applicants influences distribution and behaviour of borrowers. The higher the business asset value, the more is the lender convinced that the risky borrowers are reduced by minimizing moral hazard and adverse selection (Bester and Hellwig, 1987).

Table 22: Results for amount of loan given

Heckman Selection model -- two-step estimates Note: Company dropped due to collinearity					Number of obs (n) = 161 Censored obs = 95 Uncensored obs = 66 Wald chi2(7) = 54.57 Prob > chi2 = 0.0000		
		Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]	
Given							
	Asset	.1945982	.0466664	4.17	0.000	.1031337	.2860626
	Profit	.1274624	.043034	2.96	0.003	.0431174	.2118075
	Gender(male=1)	-374410.2	677708.8	-0.55	0.581	-1702695	953874.7
	Interest	-142523.3	84389.27	-1.69	0.091	-307923.2	22876.67
	Constant	4450333	2413167	1.84	0.065	-279387.4	9180054
Select-Apply							
	Asset	1.59e-11	1.62e-08	0.00	0.999	-3.18e-08	3.18e-08
	Profit	-2.03e-08	1.64e-08	-1.23	0.218	-5.25e-08	1.19e-08
	Gender(male=1)	.5206119	.2614672	1.99	0.046	.0081456	1.033078
	Growth	.4637571	.1596143	2.91	0.004	.1509189	.7765953
	Employees	.0472568	.0207492	2.28	0.023	.0065891	.0879245
	Employees sq	-.0004946	.0002474	-2.00	0.046	-.0009794	-9.75e-06
	Sole	-.0124027	.2903188	-0.04	0.966	-.5814171	.5566117
	Partnership	.0879614	.292051	0.30	0.763	-.484448	.6603709
	cons	-2.019708	.5288379	-3.82	0.000	-3.056211	-.9832048
	mills lambda	-592283.4	1031524	-0.57	0.566	-2614033	1429466
	Rho	-0.31034					
	Sigma	1908507.9					
	Lambda	-	1031524				
		592283.37					

Profit coefficient is positive and significant at 5%. If profit increases by one unit, amount of loan given increases by 0.1274624. Among firms that apply for loan, more profitable firms are more likely to be given loans holding other factor constant. Lenders have an optimistic view of the firm that the firm will continue to grow and profitable. In this case lenders have superior information about the firm compared to the owners and would like share in the increased value of the firm with the owners (Garmaise, 2000). Female entrepreneurs are given smaller amount of loan compared to male by 374410.2. However, this amount is insignificant at 10%. On the other hand male entrepreneurs get on average higher significant loans of 4450333 (constant) than women. No wonder male applied more and got higher loans. With respect to interest rate, the high the rate of interest, the lower the amount of loan given. Hence, an increase in interest rate by 1 amount of loan approved decreases by 142523.3. This is credit rationing because, terms of credit are implicit in the rate of interest. Interest rate is elevated for borrowers perceived by the lender to be risky that enables the lender discern the quality of the borrowers and to insure themselves from risky investment

decision of the borrowers. Lenders increase profitability by reducing amount of credit extended to perceived risky borrower and also increasing rate of interest (Stiglitz and Weiss, 1986).

Success rate

Final analysis concentrates on 72 firms that applied for credit. The general empirical set-up is the same as probit and Heckman models, except that the dependent variable is now the success ratio; the ratio of loan given to loan applied. The success ratio has a value of 1 if loan applied is equal to loan given and it full satisfaction of demand for credit while zero is observed when no amount of loan applied was given and this is perfect rationing. Rate of success in the credit market is determine by the lender, depending on the observable and inferred characteristics of borrowers (Freixas and Rochet, 1998). 6 observations on the dependent variables in the sample are equal to zero and 26 equal unity. To take this into account, we estimate a two-limit Tobit model, with the limits set at zero and unity. Explanatory variables are as before except log of asset and profit are taken to improve model fitness. Two limit Tobit regression results for linear log success rate are given in Table 23.

Table 23: Regression result for success rate

Two limit Tobit regression note: sole dropped because of collinearity Log likelihood = -51.863553					Number of obs = 72 LR chi2(7) = 17.60 Prob >chi2 = 0.0293 Pseudo R2 = 0.1802	
Success rate	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
Log(asset)	.1600395	0.049712	3.22	0.002	0.060786	0.259293
Log(profit)	.0467374	0.043708	1.07	0.289	-0.04053	0.134004
gender	.0764825	.1547739	0.49	0.623	-.2326223	0.385587
employees	-.0179066	0.010468	-1.71	0.092	-0.03881	0.002993
employees sq	.0002163	0.000127	1.70	0.094	-3.8E-05	0.000471
partner	.0421771	0.129722	0.33	0.746	-0.21682	0.301176
company	-.0302213	0.131245	-0.23	0.819	-0.29226	0.231817
constant	-2.019332	0.816644	-2.47	0.016	-3.64982	-0.38885
/sigma	.3700549	0.041795			0.28661	0.4535
Observation. Summary: 6 left-censored observations at success rate<=0 40 uncensored observations 26 right-censored observations at success rate>=1						

Hausman test statistic was conducted on formulation with number of employees appearing in level and also squared second model has log of employees as an explanatory variables other explanatory variables are retained as in the preceding regressions. Hausman test statistic for model specification is 2.89 with p= 0.5761. We accept the null that the model is not misspecified. Likelihood ratio statistic is significant at 5%. All the variables in the model jointly influence success ratio. The success ratio equation provides evidence that collateral influences largely the success rate in loan application.

Asset and profit are in log form and coefficients on these variables are semi elasticities. A 1% increase in value of business asset increases success ratio by 0.001600395% and 0.000467374%⁹ respectively. This increase is significant at 5%. Number of employees enters with a negative sign of 0.0179066 while its square is positive of 0.0002163. Reputation of a firm has confliction sign. However, gender, legal form and profitability do not influence success ratio. Value of Business assets is an appropriate signal of the quality of the firm to the lender. In giving a loan, collateral is perceived by the lender as a superior incentive to avert adverse selection and moral hazard on one hand. On other hand, existence of high value collateral increases satisfaction of demand for credit. Greatest advantage with collateral is that it is less costly to enforce loan repayment contract by disposing off pledged asset than instituting formal court proceeding especially in economies with weak contract enforcement institutions Fafchamps *et al*, (1999).

⁹ In linear log function coefficient is divided by 100 to be interpreted as semi elasticities.

CHAPTER V

Introduction

Chapter draws conclusions from empirical findings in chapter four and makes policy recommendation based on conclusions. Major conclusions of the study is that firm have a hierarchy in financing their projects and exhaust retained earnings before seeking credit, growth oriented firm seek credit and female owned/managed firms are less likely to seek credit. Financing institution ration credit using collateral and lending rate whereby risky businesses have to offer more collateral but receive small credit at high interest rate.

5.1 Conclusions

The study examines factors that influence demand for credit by SMEs in Nairobi. The study was motivated by low growth rate of SMEs, which has manifested in low transition rate from small scale through medium size to large scale firms due to adequate funding from financial institution and over reliance on retained earnings. Low demand for credit firms has persisted despite growth and intensive innovation in the financial sector in the new millennium. Our study uses data collected from 176 SMEs firms using a detailed structured questionnaire. Firms in the sample were obtained from 8 zones of Nairobi city council that doubles as divisions. These were Nairobi central, Pumwani, Makadara, Kibera, Dagoreti, Embakasi, Kasarani and Westlands. Descriptive statistics indicate that majority of the firm did not apply for credit for the last two years preceding august 2010.

The study had three main hypotheses;

- Profitable firms are less likely to demand credit..
- There are no differences between female and male owned/managed firms in seeking and obtaining formal credit.
- SMEs that have growth as the most significant objective are less likely to seek credit.

The hypotheses were adopted to investigate factors that influence firms' decision to demand formal credit.

The study further investigated the demand for credit and extent of satisfaction of demand for formal credit using Heckman two step procedure. Econometric models were selected to fit data generating process characterized by first the dependent variable being binary hence use of probit model. Secondly, amount of loan applied and amount of loan given is observed when loan is applied in the first place. Resultant truncation of dependent variable warrants use of sample selection models. Success rate exhibits heavy tails at extreme ends of unity and zero. Such clustering of observations warrants use of Two-limit Tobit model

Major findings of estimated models supported the hypotheses; profitable firms are less likely to demand credit as the business generate sufficient funds and also debt is expensive as compared to retained earning. Female entrepreneurs are less likely to apply for formal credit because they are more risk averse but they is no gender discrimination in the credit market. Finally, firms with strong growth orientation demand have high tendency to demand credit from financial institution.

Evidence is also found that formal credit is collateralized and credit rationing does not only take the form of collateralization but also through high interest rate. Significance of interest rate coefficient indicates importance of cost of credit as one of the factor against use of credit as source of finance for firms. Small firm bare the burden of information asymmetry by receiving small amount of loan at high interest rate. Significance of positive assets coefficient in the success rate regression equation suggests that collateral determines extent of rationing of credit and thus satisfaction of demand for credit.

5.2 Policy recommendation

Many firms do not use formal credit, and some do not even get amount of credit needed. The un satisfied demand for credit have an effect on investment in two ways: directly when firms cannot invest in profitable projects; and indirectly when they refrain from expanding to avoid running into liquidity problems. Differences between firms that use credit in addition to retain earning and those that do not use credit reinforce themselves over time. Because firms with least demand for credit must reduce their profit margins, their ability to generate retained earnings is also decreased, due to loss of competitiveness. Over time they become less and less able to self-finance and self-insure and finally succumb to a liquidity crisis Fafchamps *et al* (1999).

Collateral is used to overcome information asymmetry between the lender and the borrower. Pledged asset are perceived as a sure way by financial institution to induce firms to meet loan contract obligation because a business asset can easily be auctioned to recover the loan. The need for collateral is seen as a source of credit rationing: borrowers who cannot offer collateral do not qualify for a loan. There is need to adopt policies that provide incentives to financial institutions to move a way from asset based loans to business performance loans. This is possible if information asymmetry is reduced in the credit market, through giving of information to the credit reference bureau on the financial health of small firms. This not only reduces cost of credit to firms but also increases profitability of financial institutions (Padilla and Pagano, 1997).

Coordination failure in the credit market in Kenya is due to weak credit reference bureau. Information about bad payers is not shared adequately among lenders. As a result, firms are less able to identify bad payers from good payers and less inclined to give credit. The absence of an information sharing mechanism makes it particularly difficult for new firms to obtain affordable credit. There is therefore a role for policy to help coordinate action and favor the establishment of a critical mass of credit information. This could be achieved if the effort of Kenya Industrial Estate to establish a data base on the credit history of its own customers is coordinated with efforts to develop a credit reference service in Kenya. By pooling their information together, the coordination failure can be overcome.

Reducing information asymmetry is not enough to reduce cost of credit without enforcement of debt contracts. The existence of a legal system helps contract enforcement. But to deter opportunistic breach, penalties must not only be sufficiently severe, the threat of penalty must also be credible.

Legal enforcement, by the nature of the conflict adjudication procedure, entails high costs and delays. Sometimes cost of litigation exceed gains for small transaction. The threat of legal enforcement is therefore rarely credible for small transactions. Policies on legal reforms should reduce cost and time of litigation. Out of court settlements should be encouraged coupled with informal sanctions to firms that do not meet their debt obligation. For instance, with respect to guarantors, use of a reputation mechanism where someone's reputation is used by other members of the group as a signal to ostracize those who have failed to live by their contractual or ethical standards of the group (Kandori, 1992).

When information problems exist and contracts are costly to enforce, incentive problems crop up between borrowers and lenders and borrowers must be evaluated and monitored. To offset such costs, intermediaries charge a premium interest rate on credit. Interest rate charged may be too high such credit is denied all together. Among the firms generally rationed are many small and new firms which are relatively information-intensive and present costly enforcement problems compared to larger, mature borrowers.

Credit rationing is exacerbated when open-market interest rates rise. Even though lenders may not raise the lending rate in lockstep with rates on government securities for fear of attracting lower quality borrowers or inducing risk shifting behavior, resultant "sticky" loan interest rates leads to equilibrium credit rationing. Significant amount of such rationing by banks, disproportionately affect the availability of credit to small businesses. Therefore, policies of macro economic stability are crucial to reduction in interest rate since Treasury bill rate is a bench mark rate that influences lending rate.

There is need to provide directed credit by government to highly profitable firms that are in dire need of credit to increase their competitiveness. Such firms could be highly profitable but have little incentive to apply for credit due to perceived high cost of credit or by nature of their activity; the firm can not obtain affordable credit through market mechanism. In as much as Directed credit is more appropriate, it must rely on innovative contract enforcement mechanisms, whether group lending, credit guarantees schemes for repayment. This will discourage negative incentives that will undermine efficacy of the government to meet credit needs of firms that are unattractive in the financial market.

Limitations of the study

The study used data derived from firms and not financial institutions. This enables a broad perspective on which firms seek credit how much they applied how much they received. The data enables selection effects espoused by Heckman (1976, 1979) to be considered in credit seeking behavior of small firms. Our data set are derived from a snapshot of a cross section of firms in Nairobi area in August 2010. The study was limited to firms in the jurisdiction of City Council of Nairobi with a small sample of 76 firms. A more comprehensive approach would either extend this study to other municipalities and Kenya at large or use a panel approach for SMEs in Kenya. Other forms of external finance can be considered as well.

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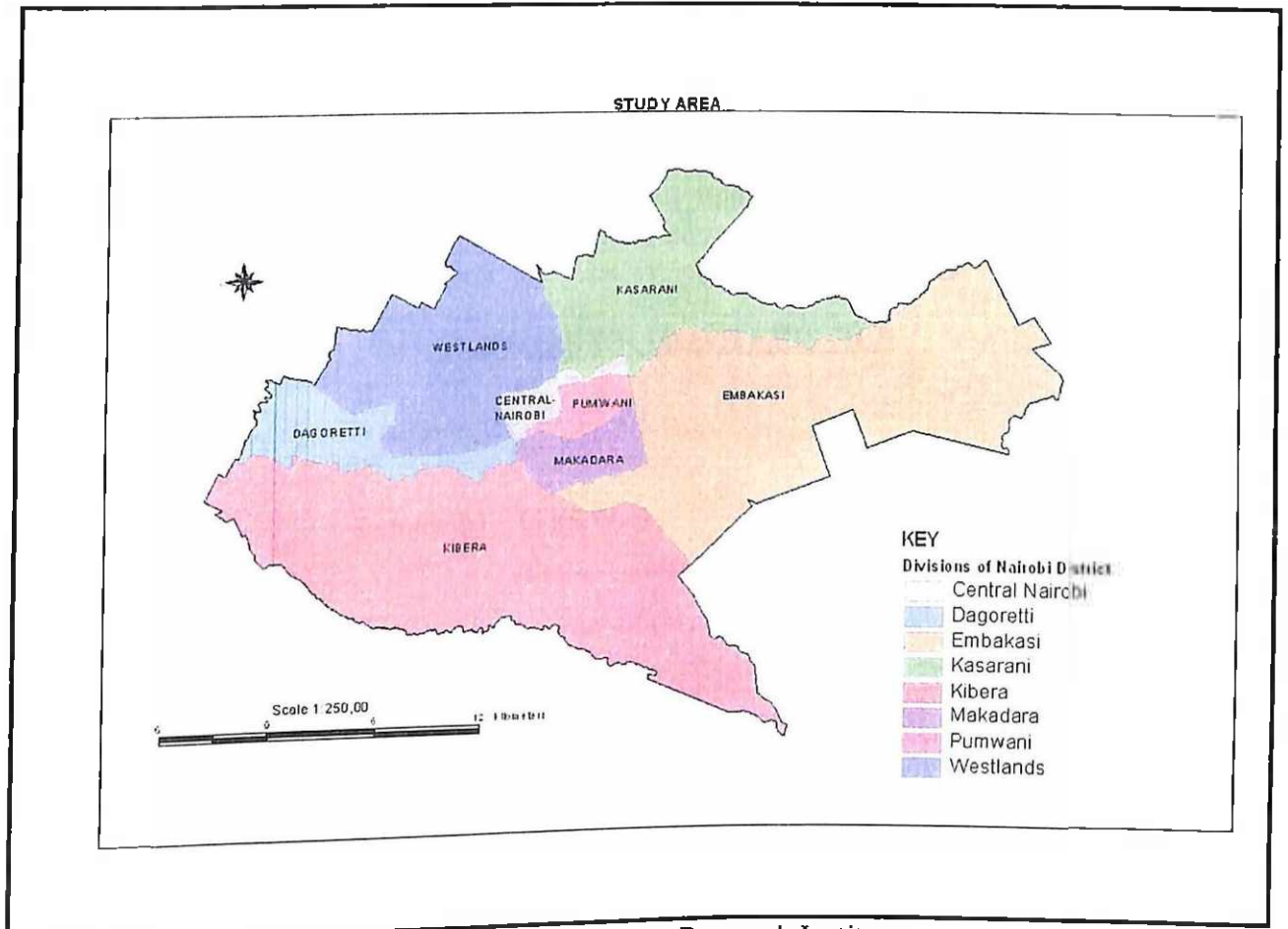
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Figure 10: Map of Nairobi Area



Source: Kenya Agriculture Research Institute

Appendix II

QUESTIONNAIRE : DEMAND FOR FORMAL CREDIT BY SMALL AND MEDIUM SIZE ENTERPRISES IN NAIROBI

This questionnaire is intended to collect data on the above mentioned topic for a research project to be submitted in partial fulfillment of the requirements for the degree of Master of Arts in economics, School of Economics, university of Nairobi, 2010 on the topic Demand for formal credit by Small and Medium Size Enterprises in Nairobi. The study will assess how characteristics of an enterprise influence demand for credit as capital and the extent the demand is satisfied. The study findings are significant to the SMEs as they will not only inform policy makers on the possible policy interventions to ensure adequate financing of SMEs, but also creation of appropriate credit facilities by lenders for enterprises. Any information obtained shall be treated with utmost confidentiality.

SECTION 1: GENERAL FIRM AND PROPRIETORS CHARACTERISTICS

1. Position of the respondent

2. Gender of the proprietor?
 Male [] Female [] (Tick one)

3. What is the highest level of education completed by owner of this firm?
 No education []
 For primary education []
 Secondary []
 Vocational training MTC, TTC, Diploma etc []
 University training e.g BA, BSC []
 Masters []
 Others (specify) []

4. What year were you born?

8. Tick the legal status of your business.
 a) Sole proprietor [] b) Partnership []
 c) Limited company [] d) Others (specify).....

9. Type of activity.
 Manufacturing [] Trade []
 Services [] Construction []

10. When did the business start? (Specify year and month)

11. In the table below state the assets, years owned and respective cost.

Asset	Years owned	Cost
Furniture and fittings		
Machinery and equipments		
Vehicles		
Utensils		
Land		
Buildings		
Electronics		
Others (list)		

12. What is the total value of your personal assets?

.....

13. What is the total value of the business assets?

.....

14. In 2009, how much did your establishment spend on purchases of:

Machinery and equipment.....

Motor vehicles

Land and buildings.....

15. How many employees does your business have.....

16. What was the principal source of funds you used to finance your assets?

Personal savings []

Relatives []

Government agency []

Non governmental organization []

Commercial bank []

Others specify.....

17. Do you use personal assets for business purposes (tick one)

YES []

NO [] → **SKIP TO Q.20**

18. Which asset do you use?
.....

19. State the purpose.....

SECTION III THE PURPOSE OF THIS SECTION IS TO COLLECT DATA ON CREDIT OBTAINED FROM FINANCIAL INSTITUTIONS.

20. Has your firm ever applied for a loan for the last FOUR years? (Tick one)

a) YES []

b) NO [] → *SKIP TO Q.26*

21. How many applications were submitted?.....

22. How much did you apply?

23. How much were you given?

24. What was the rate of interest?

25. What did you provide as collateral

26. If your firm has never applied for a bank loan, why not?

- Inadequate collateral 1
- Don't want to incur debt 2
- Process too difficult 3
- Didn't need one 4
- Didn't think I'd get one 5
- Interest rate too high 6
- Already heavily indebted 7
- Application for bank loan(s) was turned down 8
- OTHER (SPECIFY _____) 9

27. Has your loan application ever been rejected?

Yes 1

No 2 → *SKIP TO Q.30*

28. How many applications were rejected?.....

18. Which asset do you use?
.....

19. State the purpose.....
.....

SECTION III THE PURPOSE OF THIS SECTION IS TO COLLECT DATA ON CREDIT OBTAINED FROM FINANCIAL INSTITUTIONS.

20. Has your firm ever applied for a loan for the last FOUR years? (Tick one)

a) YES []

b) NO [] → **SKIP TO Q.26**

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22. How much did you apply?

23. How much were you given?

24. What was the rate of interest?

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- Didn't think I'd get one 5
- Interest rate too high 6
- Already heavily indebted 7
- Application for bank loan(s) was turned down 8
- OTHER (SPECIFY _____) 9

27. Has your loan application ever been rejected?

Yes 1

No 2 → **SKIP TO Q.30**

28. How many applications were rejected?.....

29. If an application for a loan was rejected, what was the reason given to you when the last application was turned down the last time?

- (a) Lack of collateral
- (b) Incompleteness of application
- (c) Perceived lack of feasibility of project
- (d) Other (specify)

SECTION II SALES AND OPERATION COSTS

30. In the table below state the operational activities and their respective costs incurred in your firm last and previous month.

Activity	Previous month	Last month
a) Rent for machinery and equipment (if owned, please enter value of depreciation using depreciation allowances)		
b) Rent for land or buildings (if owned, please enter value of depreciation)		
c) Transport services (freight outward)		
d) Transport services (freight inward)		
e) Telecommunication costs (telephone, postal)		
f) Water		
g) Promotion and marketing		
h) Electricity and other fuel		
i) Waste disposal		
j) Traveling (for employees)		
k) Salary and wages		
l) Security		
Total		

31. How much is your monthly sales/turnover?

.....

32. a) During last year, in which month(s) were your sales the highest

Month	Amount

b) During last year, in which month(s) were your sales lowest

29. If an application for a loan was rejected, what was the reason given to you when the last application was turned down the last time?

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Month	Amount

33. When does this firm's fiscal year end?

34. Does this firm keep accounts on an annual basis?

YES.....1
NO..... 2

35. What were your sales in each of the following fiscal years?

YEAR	SALES (KShs)
2008	
2007	

36. How much net income (profit) did you earn from this business activity last year?

.....

37. How do you anticipate your business to grow in the 2010 - 2012 period?

Become smaller []

Stay the same size []

Grow moderately []

Grow substantially []

38. Why?.....

.....

.....

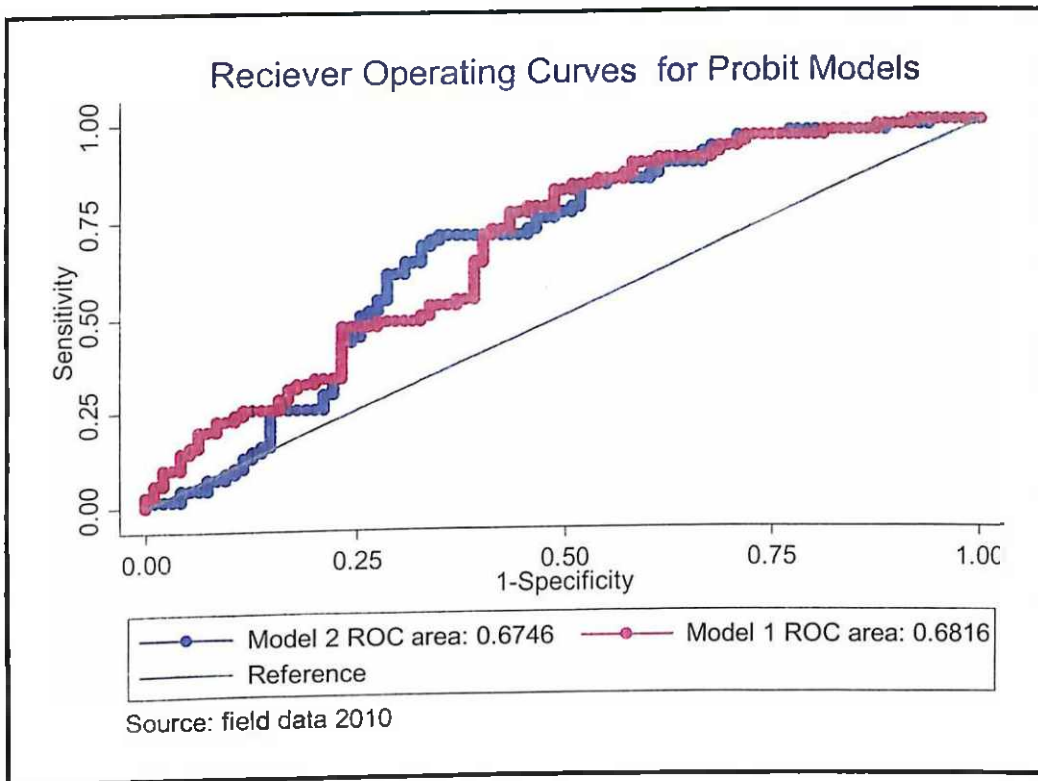
.....

Appendix III

Likelihood-ratio test (Assumption: Model 1 nested in Model 2)			LR chi2(1) = 0.57 Prob > chi2 = 0.4485			
Model	Obs	ll(null)	ll(model)	Df	AIC	BIC
Model 1	167	-114.167	-104.448	9	226.8964	254.9583
Model 2	167	-114.167	-104.161	10	228.3219	259.5018

Appendix IV

Figure 11: Receiver Operating Characteristic Curve for Probit Models



29. If an application for a loan was rejected, what was the reason given to you when the last application was turned down the last time?

- (a) Lack of collateral
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- (c) Perceived lack of feasibility of project
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k) Salary and wages		
l) Security		
Total		

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