

**Gender Based Financing Preferences of SMEs:  
Discouraged Borrowers**

**Richa Singh**

Thesis submitted to the  
Faculty of Graduate and Postdoctoral Studies  
In partial fulfillment of the requirements  
for the MSc. degree in Management

Telfer School of Management  
University of Ottawa

©Richa Singh, Ottawa, Canada, 2014

## **Acknowledgements**

*I would like to extend my sincere gratitude to my supervisor and mentor, Dr. Allan Riding, Deloitte Professor in Management of Growth Enterprise at University of Ottawa. He has been an immense support throughout my thesis and provided me his valuable insights and feedback. I also thank him for providing me access to the data used in this thesis.*

*Last but not the least, I would like to thank my life partner, Abhay Tiwari, for his encouragement, support and patience. I also thank my parents for bestowing their confidence in me.*

## **Abstract**

The literature suggest that many young and small firms are discouraged borrowers, that is, they need finance but do not apply because they fear denial. This research aims to investigate demand-side financing differences between male and female-owned small and medium enterprises in Canada from the perspective of discouraged borrowers using secondary data from the "*Survey on Financing of Small and Medium Enterprises, 2004*" conducted by Statistics Canada.

Women-owned firms are found to be credit constrained according to some studies, but not so in others. To date, however, there remain a lack of studies examining if there is a relationship between gender and discouragement. The study uses multivariate research methods to examine such a relationship while controlling for various firm-specific (age, size, industry, etc.) and owner-specific characteristics (experience). The study finds that majority-female owned firms are more likely to be discouraged borrowers as compared to majority-male owned firms. The study also offers support to arguments that relationship banking is important in reducing the probability of discouragement in both young and established firms.

## Table of Contents

---

1. Introduction:.....	1
2. Review of Previous Work .....	3
2.1. Discouraged Borrowers .....	3
2.2. Gender and Discouragement .....	5
3. Conceptual Development.....	8
3.1. Firm Size and Age: .....	8
3.2. Industry sector .....	9
3.3. Growth Intention of firms.....	10
3.4. Owner Education and experience .....	10
3.5. Lending relationships .....	11
3.6. Gender and Discouragement .....	11
3.7. Summary of Study Propositions:.....	14
4. Research Methodology.....	16
4.1. Data Collection.....	16
4.2. Variables and Methodology.....	16
4.2.1. Dependent Variables .....	18
4.2.2. Independent Variables .....	19
4.2.3. Control Variables.....	20
4.3. Research Method.....	24
4.4. Data Description.....	24
5. Study Findings .....	29
5.1 Model 1: .....	29
5.2 Model 2: .....	33
5.2.1 Broadened Definition of Discouraged Borrowers .....	38

5.3	Summary of Study Findings: .....	43
6.	Discussion on Findings .....	45
6.1	Summary- Findings from Model 1 .....	45
6.2.	Summary- Findings from Model 2 .....	47
6.3	Study Limitations .....	52
6.4	Study Implications.....	53
7.	Conclusion.....	55
8.	References .....	56
9.	Appendix-1: Robustness Check .....	64
10.	Annexure-I .....	68

## Table of Figures & Tables

---

Figure 1: Financing Categories of Small Firms .....	8
Figure 2: Phases of Research Design.....	17
Figure 3: Phase-I Research Design .....	18
Figure 4: Phase-II Research Design.....	19
Table 1: Summary of Study Propositions .....	15
Table 2: Summary of Variables and the Corresponding Questions asked in the Survey.....	22
Table 3: Frequency Distribution of Dependent Variables .....	25
Table 4: Descriptive Statistics Based on 'Discouraged Borrowers' and 'Need For Finance'.....	26
Table 5: Logistic Regression with the probability of Need for finance (Phase I).....	30
Table 6: Logistic regression for young firms and established firms separately (Phase II) .....	32
Table 7: Logistic regression for the probability of being a discouraged firm (Phase I).....	34
Table 8: Discouragement among young and established firms (Phase II).....	37
Table 9: Frequency Distribution of modified 'Discouraged borrowers' .....	39
Table 10: Logistic regression using the modified definition for Discouraged Borrowers (phase I).....	40
Table 11: Logistic regression using the modified definition for Discouraged Borrowers (phase II) .....	41
Table 12: Research Hypothesis and Related Findings.....	43
Table 13: Summary of relationships for Model 1 .....	45
Table 14: Summary of relationships for Model 1 .....	48
Table 15: Logistic Models for discouraged borrower and Discouraged borrower_redefined (Phase 1) using missing values as one of the categories.....	65
Table 16: Logistic Regression using missing values as one of the categories for Discouraged Borrowers (Phase II).....	66
Table 17: Logistic Regression using missing values as one of the categories for Redefined Discouraged Borrowers (Phase II) .....	67
Table 18: Cross tabulation with Growth Intention.....	68
Table 19: Correlation Matrix of Variables.....	69

## 1. Introduction:

---

It is now widely understood that SMEs are important because of their contribution to the economy in terms of job creation, economic growth and commercialization of innovation<sup>1</sup>. Less well-known is the finding (Haltiwanger et al., 2010) that it is the growth of young firms that accounts for much of the disproportionate share of economic welfare often attributed to SMEs in general. However, one acknowledged constraint on growth is lack of access to the financial capital necessary to sustain growth (Beck et al., 2005, 2006). Financial capital is a key ingredient for innovation, growth and job creation while insufficient capital is often cited as one of the main reasons for small business failure (Coleman, 2000). It is widely argued that informational asymmetries between lenders and borrower firms can form a supply-side restraint on access to capital and that such asymmetries are particularly severe for growth-oriented firms (Binks and Ennew, 1996). However, Kon and Storey (2003) have shown that business owners may choose not to seek financing out of an expectation of being turned down—a self-imposed financing constraint—and that these so-called “discouraged borrowers” may exceed, in numbers, those businesses whose loan applications are in fact turned down (Levenson and Williard, 2000; Freel et al., 2012).<sup>2</sup>

In this work, it is argued that such discouragement is especially prevalent among younger firms—those firms that account for much job creation—and among women-owned firms. According to Sabarwal and Terrell (2008), women entrepreneurs are more credit constrained as compared to male counterparts. Since the 1970’s, the rate of entry into self-employment (that is, embryonic new firms) has been higher among women than among men. However, after 40 years of on-going higher entry rates, women-owned businesses remain, on average, smaller than those owned by men even after accounting for systemic differences (such as sector and age, among

---

<sup>1</sup>Industry Canada (2012) defines SMEs as “businesses with fewer than 500 employees”. A recent report from Business Development Bank of Canada (BDC, 2012) mentions that in 2011, SMEs created about 79,000 jobs and they employed 63.7% of private sector employees (6.8 million people) across the country. According to Industry Canada (*July 2012*) small businesses contributed 27% to the GDP of Canada in 2010.

<sup>2</sup> According to Kon and Storey (2003, pg. 47) a discouraged borrower is “a good borrower, requiring finance, that chooses not to apply because it feels its application will be rejected.”

others).<sup>3</sup> Recent findings also confirm that women-owned businesses do not grow as quickly as those owned by men, also after allowing for salient systemic differences (Orser et al., 2013, Hulten 2012). Not, perhaps, coincidentally, Coleman and Robb (2009) find that women-owned SMEs have less external capital when compared to male-owned SMEs. To explain this, it has been argued that loan applications from women owners are relatively more likely to be rejected due to discrimination (for example, Fay and Williams, 1993). According to Hulten (2012), most quantitative studies on SMEs focus on supply-side financing differences between male-owned and female-owned firms because they are oriented towards testing financial discrimination. However, Robb and Wolken (2002) posit that gender-based differences in loans may be driven by demand rather than supply. Certainly, the preponderance of more recent research has not supported the discrimination argument (Coleman, 2000; Fabowale, et al., 1995; Orser et al., 2006; Madill et al., 2006). Accordingly, this work examines the alternative premise - that women owners of new firms are more likely to eschew growth-enabling financing out of a belief that their applications will be rejected.

Thus, the objective of this research is to investigate the likelihood of discouragement in young SMEs in the Canadian setting, with a particular focus on the gender mix of the ownership team. Given the focus of this research, the demand-side financing differences between male and female are discussed from the perspective of discouraged borrowers as this, to a certain extent, is a self-rationing criterion (Han et al., 2009). The research in this area is still in a nascent stage. No research so far has specifically investigated the concept of discouraged borrowers among young firms and from a gender perspective. To accomplish this, this paper is structured in the following way. The next section presents a review of the salient literature on discouraged borrowers. The subsequent section provides a conceptual foundation for the work's testable hypotheses. This is followed by a description of the research methodology. The penultimate section discloses the empirical findings and the paper concludes with a discussion of implications, limitations and directions for future research.

---

<sup>3</sup> According to Industry Canada (2012) the number of self-employed women grew by 23 per cent between 2001 and 2011 (compared with 14 per cent growth in male self-employment) and women owned 17.1% of SMEs and held partial ownership in almost half of all SMEs. Despite women entrepreneurs' significant contributions to the world economy this area is still viewed as under-researched (Brush and Cooper, 2012).

## 2. Review of Previous Work

---

With respect to bank borrowing, many small and medium enterprises lack the financial track record to prove their creditworthiness and a lack of information from SMEs limits banks' ability to distinguish good borrowers from bad ones (Chandler, 2012; Han et al., 2009). This can lead to adverse selection such that smaller firms may be more likely to be credit constrained and discouraged than larger firms (Levenson and Williard, 2000). In particular, this may especially be a problem facing growth-oriented firms (Binks and Ennew, 1996). Further, Kon and Storey (2003) posit that if firms have imperfect knowledge about themselves (example young firms), they are more likely to be discouraged when application costs are positive.

### 2.1. *Discouraged Borrowers*

The traditional understanding of SME financing preferences goes back to the work of Timmons (1994) that small and young firms tend to draw capital from internal sources, personal sources, and informal investments. As firms grow, they face additional capital requirements and must turn to external sources such as banks and public debt and equity markets (Thornhill et al., 2003). This can be related to the 'Restricted pecking Order Theory' (Holmes and Kent, 1991) that can be applied to SMEs assuming that small firms are not able to issue shares through IPOs and owner managers have a desire for control. Thus, managerial preferences undoubtedly play a meaningful role in the composition of SME capital structure (Pettit and Singer, 1985).

However, research shows that many small firms prefer not to apply for external financing even if they need finance and fear of denial is found to be a frequent reason by many (Constantinidis et al., 2006, Kon and Storey, 2003; Han et al., 2009). Thus, researchers have started focusing on the emerging concept of discouraged borrowers (Kon and Storey, 2003) that arises due in part to information opacity<sup>4</sup>. Small firms have historically been considered more informationally opaque than larger firms and some have argued that the act of collecting information from smaller firms is costly (e.g., Freel et al., 2012), although one could alternatively argue that credit scoring renders such costs as negligible. Nonetheless, it is widely assumed that banks have poor information about small businesses and that they therefore either ration credit or offer a menu of

---

<sup>4</sup>Scott (2006, p. 545) defines 'information opacity' as: "the inability of lenders to completely understand the risk characteristics of enterprise, possibly due to short-operating histories or lack of complete financial information".

contracts that act as a self-selection mechanism to distinguish good from bad borrowers (Kon and Storey, 2003; Freel et al., 2012). In their reviews of the literature, however, neither Parker (2002) nor Cressy (2002) report unambiguous evidence of credit rationing. Fearing rejection, and given imperfect information, some small businesses, discouraged borrowers, do not apply for loans even when they need capital. Kon and Storey (2003) stress that discouraged borrowers exist because of imperfect screening and increased application costs by banks. Han et al. (2009) look at the positive side of discouragement and posit that high risk borrowers are more likely to be discouraged. Chandler et al. (2010) lends some support to the self-rationing principle put forward by Han et al. (2009).

### **Firm Characteristics and Discouragement:**

Robb and Wolken (2002) report that firm characteristics (firm age and size) significantly influence financing preferences, finding that loan applications from younger firms are less likely than from older firms and they attribute this finding to fear of rejection. Freel et al. (2012) and Han et al. (2009) also find that older firms are less likely to be discouraged than younger firms and that the likelihood of discouragement decreases with firm size. In the Canadian context, Chandler (2010) concludes that a lack of management skills acts as a barrier to growth leading to high application costs and then to discouragement. He finds that industry sector also influences the likelihood of discouragement as firms operating in retail and tourism sectors are relatively more frequently discouraged, but results are mixed. For example, according to Chandler (2010), 8.06% of knowledge-based firms were discouraged as compared to 12.90% of wholesale and retail and 27.42% of firms in the tourism industry. Conversely, Freel et al. (2012) find that 21% of knowledge-intensive service firms were discouraged, compared with 12.6% of production firms and 14.5% of wholesale and retail firms because knowledge.

### **Lending Relationship and Discouragement:**

Among other things, lending relationships can be argued to play a role in the incidence of discouragement; however, this can be argued both ways.

On the one hand, lending relationships reduce information asymmetries and so are likely to be associated with a higher success rates in loan applications and more lending at the margins

(Petersen and Rajan, 1995). Longer and broader relationships increase the amount and flow of information to (and from) lenders, enabling good borrowers to obtain better access to finance over time. Consistent with this belief, Freel et al. (2012) find that firms with banking relationships that extend beyond merely financial transactions are relatively less likely to report discouragement.

By the same token, however, lending relationships work both ways and arguably disclose weak firms to lenders. To this point, Wynant and Hatch (1990) report a surprisingly high frequency of what they call “informal turndowns,” communications within the lender-borrower relationship whereby a bank representative may advise a potential loan applicant that a rejection would be likely. Consistent with this point, Han et al. (2009) suggest that with longer relationships, risky borrowers become increasingly pessimistic about the outcome of their loan applications and hence, are more likely to be discouraged from applying. Moreover, Chandler (2010) reports that discouraged borrowers tend to deal with credit unions which, like small banks, focus on relationship lending and foster information exchange between financial institutions and credit seekers (Chandler, 2010). Chandler (2010) suggests that discouraged borrowers are generally better informed by their financial institutions. Han et al. (2008) find that the likelihood of discouragement is jointly determined by borrower’s quality, length of relationship and market concentration. They further postulate that discouragement is an efficient self-rationing mechanism because bad borrowers are more likely to be discouraged than good borrowers. Discouragement can therefore reduce banks’ costs in dealing with loan applications from risky borrowers.

Clearly prior research is at odds on this point and there does not appear to be any research on the phenomenon of informal turndowns. Thus, it may be that business owners that do not apply for loans may have good reasons for not doing so and may not qualify as discouraged in the Kon and Storey sense.

## ***2.2. Gender and Discouragement***

Female-owned firms are generally smaller (in terms of both profit and assets) than male-owned firms (Cliff, 1998 and Watson, 2002, Industry Canada, 2010). Comparing male- and female-owned firms in terms of their financial structure, female-owned firms report relatively lower

levels of external funding as compared to male-owned firms (Watson, 2006). Women owned firms have less start-up capital than male-owned firms (Coleman, 2000; Orhan, 2001). According to Chaganti (1986), women tend to start enterprises that require little capital and are service-oriented. Robb and Wolken (2002) find that even though women entrepreneurs are significantly less likely to apply for a new loan compared to their male counterparts, there is no difference in the approval rates for female- and male-owned firms.

Research indicates that firms owned by women are less likely to use commercial banks for their financial services (Robb and Wolken, 2002). According to Robb and Wolken (2002), female-owned firms are significantly less likely to have at least one financial service from sources other than the firm's owners and they have significantly shorter duration of relationships with their primary institutions as compared to their male counterparts.

According to Orhan (2001, pg. 98), women generally possess fewer personal funds due to their previous experience of being in either less qualified positions than men or earning less. While this finding is consistent with that of Verheul and Thurik (2002), Coleman and Robb (2009) argue that "...women are less likely to have degrees in business and technical field and have fewer years of prior experience in industry...". This means that women bring less human capital than men and accordingly feel less financially competent (Constantinidis et al., 2006). According to Shragg et al. (1992 cited in Constantinidis et al, 2006, p. 137), women entrepreneurs have higher negative self-perception about themselves as compared to men and that this acts as a barrier to their success. Furthermore, lack of self-confidence may also be a cause of discouragement (Freel et al, 2012).

To date, fear of denial has been found to be more related to owner characteristics and credit history than to gender (Robb and Wolken, 2002). However, Hil et al. (2007, p.178) find support for discouraged borrowers effect among women as they find that relatively fewer women seek finance from banks owing to their negative perception about banks that banks have a 'negative view of women business owners'. "Women were perceived by bank workers as less entrepreneurial than men..."(Buttner and Rosen, 1988 cited in Brindley, 2005, p. 151). Roper (2009) finds that women are more likely to perceive financial barriers to start-up than their male counterparts.

On the basis of the extant literature, the following questions are among the research questions that remain and which this work investigates.

1. Existing empirical studies of discouraged borrowers have relied on broad samples of SMEs, consistently finding that age of firm is a factor. Arguably, the financing preferences of young SMEs might be different from those of older SMEs. The existing literature on financing preferences of SMEs does not focus on young firms exclusively. Thus, inclusion of more established firms in previous studies may introduce a survival bias. Firm age may also mask other systemic factors (for example, women-owned firms tend to be younger; more established firms tend to have longer borrower-lender relationships); hence, collinearity may also be reflected in previous studies. Accordingly, this work focuses exclusively on young firms and seeks to compare attributes of potentially self-limiting discouraged borrowers within that subset of firms that accounts for such a high proportion of economic welfare.
2. A few of the existing studies related to gender differences in SME financing, examine the actual growth of the companies but ignore owners' growth intention which is an important parameter to consider for predicting the actual growth (Kolvereid and Bullvag, 1996) because past intentions are related to later actions.

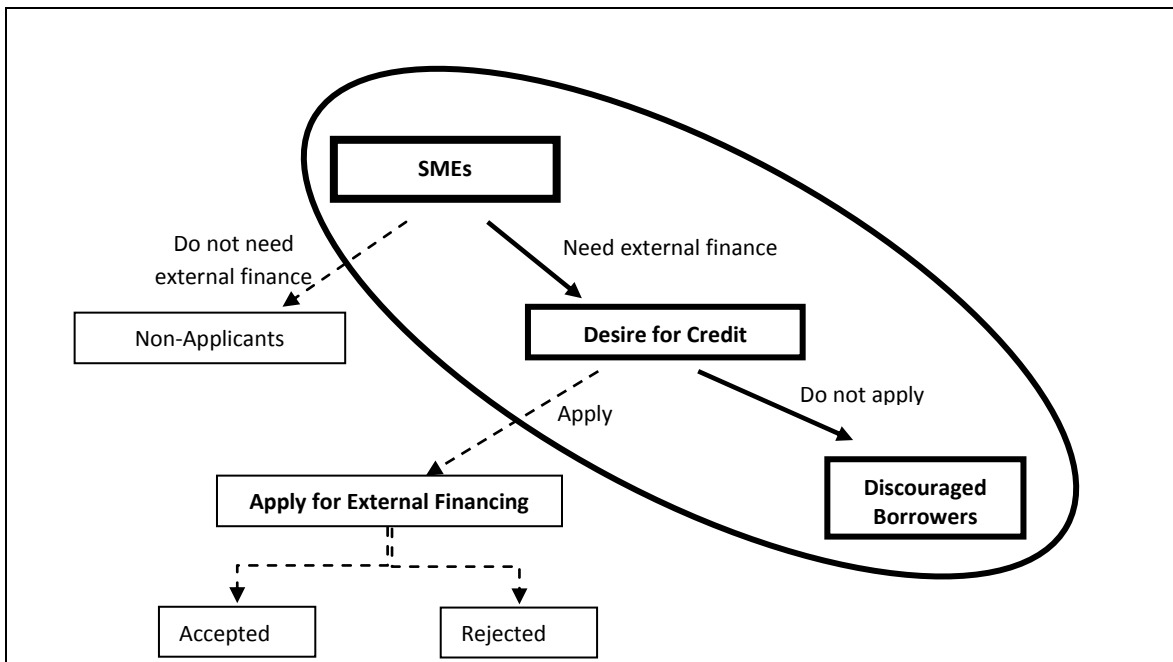
## **Research Questions**

The focus of this thesis is to address the above mentioned gaps in the research. This provides an impetus for the following research questions:

1. Are female-owned SMEs more likely to be discouraged borrowers than male-owned SMEs?
2. How does gender of SME ownership affect the financing preferences of young versus established SMEs?

### 3. Conceptual Development

Broadly, this research seeks to investigate the firm and personal attributes that are associated with affecting the financing preferences of SME owners. In particular, the work seeks to understand better the association between the gender composition of SME ownership and the incidence of discouraged borrowers in the context of young SMEs. Thus, instead of focusing on approved or rejected loan applications for male and female-owned SMEs and possible reasons for the same, this study focuses on discouraged borrowers. Figure 1 outlines the broad scope of this research and the particular subsamples of interest.



**Figure 1: Financing Categories of Small Firms**

This section presents conceptual arguments regarding factors expected to influence the level of discouragement in SMEs and the expected direction of influence, that is, positive or negative. Next, it will include arguments regarding why a difference between the discouragement level of male and female business owners might be expected.

#### 3.1. Firm Size and Age:

According to Watson (2006), larger firms have comparatively more assets to offer as collateral and more profits to service debt, thus, they have more confidence in getting loans as compared to

smaller firms that have lesser assets and smaller profits. The likelihood of discouragement decreases with firm size, thus, large firms are less likely to be discouraged (Freel et al., 2012; Han et al., 2009) and according to Jensen and McGuckin (1997), firm size and age are correlated. Larger and older firms are less informationally opaque and are considered to be less risky by lenders and thus are offered capital at lower interest rates (Chakravarty and Xiang, 2012; Ortiz-Milina and Penas, 2008; Freel et al., 2012). These arguments suggest that smaller and younger firms should be more discouraged than their larger and older counterparts. Thus, the following hypothesis can be formulated:

*Hypothesis 1: Firm size and age are negatively correlated with the level of discouragement of SMEs.*

### **3.2. Industry sector**

Firms operating in different sectors have different financing requirements. Freel et al. (2012) categorize firms into three sectors viz. production, knowledge intensive and wholesale / retail sectors. Firms in the production sector tend to have more tangible assets and relatively high requirements for financing. Industries with more tangible assets are capable of attracting more debt (Abor, 2007), thus, these firms are less likely to be discouraged.

According to Czarnitzki and Hottenrott (2009), R&D firms are more informationally opaque because such firms might face substantial cost to reveal their innovative ideas to the market and especially to their competitors (Hall and Lerner, 2009). Further, firms in knowledge-intensive sector invest heavily in R&D (generally, firm-specific assets) and tend to involve intangible assets (Balakrishnan and Fox, 1993). Thus, according to Balakrishnan and Fox (1993), R&D firms find it difficult to fund such investments through debt (Balakrishnan and Fox, 1993). However, they do not appear to recognize that lenders can and do use owners' personal assets as collateral as well as business assets. Thornhill et al., (2004) find that small firms in high-knowledge sectors do tend to use less debt and more use of reinvested profits than those in low-knowledge sectors. They also argue that debt financing adds financial leverage, risk, to firms that are already risky. For the third category, wholesale and retail sector, Orser et al. (2006) argue that service and wholesale & retail sectors generally have lower capital requirements, even

though the need for large inventories may demand financial capital. Thus, based on above discussion, following hypotheses can be formulated:

*Hypothesis 2(a): Firms operating in service and wholesale & retail sectors are more likely to be discouraged than firms operating in goods sector.*

*Hypothesis 2(b): Firms that invest in R&D are more likely to be discouraged than non-R&D firms.*

### **3.3. Growth Intention of firms**

Ennew and Binks (1995) argue that growing firms may experience a greater credit constraint as compared to non-growing firms. On the contrary, it can be argued that firms planning future growth will require more funds and to meet this requirement they would typically need greater external financing as compared to non-growth firms (Thornhill et al., 2004). Indeed, it is almost tautological that growth (increase in assets and working capital) requires an increase in capitalization. Cassar (2004, p. 268) argues that "...if the firm is more likely to need capital in future, it has greater incentives to establish credit relationships ..." This suggests that firms with growth intentions are more likely to seek external financing (less likely to be discouraged) than firms with no growth intention as the former will need funds in order to meet its high growth objective and hence, will not be reluctant to apply for bank loans.

*Hypothesis 3a: Firms with growth intentions are relatively more likely to have a need for finance than firms with no growth intentions.*

*Hypothesis 3b: Firms with growth intentions are relatively less likely to be discouraged than firms with no growth intentions.*

### **3.4. Owner Education and experience**

Higher education level is related to a greater likelihood of commercial success and loan officers tend to reject loan applications from people with limited education and lack of experience in the field in which they wish to operate (Fay and Williams, 1993). According to Berger et al. (2013), more experienced and educated owners are more likely to receive business credit. Thus, it can be expected that bank managers relate owners' education and experience with capability of a firm.

Likewise, firm owners with less education and less work experience may lack self-confidence and may be more likely to be discouraged. According to Hulten (2012), firms with lesser years of owner experience are more likely to report financial constraints. This suggests that longer years of owner experience might reduce discouragement among firms. In line with this discussion, the following hypothesis is extended:

*Hypothesis 4: SME owners with fewer years of work experience are more likely to be discouraged than more experienced counterparts.*

### **3.5. Lending relationships**

Long-term relationships with a commercial bank or another financial institution, according to Petersen and Rajan (1994), are important to gain access to credit markets. Scott (2006) finds that soft-information such as owner's character, reputation and management ability collected by loan officers through relationship banking can increase credit availability for small, informationally opaque and those firms without sufficient operating history or tangible assets. Long-term lending relationships help to reduce information asymmetries between borrowers and lenders. Niskanen and Niskanen (2010) suggest that close lending relations enhance loan availability and reduce collateral requirements. This suggests that firms with longer and stronger lending relationships should not be discouraged as they might be more confident of their borrowing position but as mentioned previously, lending relationships work both ways and arguably disclose weak firms to lenders. Thus, lending relationships can, on conceptual grounds, be either positively or negatively associated with discouragement. Hence, as a testable hypothesis:

*Hypothesis 5a: SMEs with banking relationship are less likely to be discouraged than those with no banking relationship.*

*Hypothesis 5b: SMEs with longer lending relationships are less likely to be discouraged than those with shorter lending relationships.*

### **3.6. Gender and Discouragement**

Previous studies offer mixed evidence related to access of capital and gender discrimination by lenders, however, recent research show that lenders do not discriminate against women on the basis of their gender (Coleman, 2000; Fabowale et al. 1995; Buttner and Rosen, 1989).

Robb & Wolken (2002) and Orser et al. (2006) argue that financing gaps between male and female owned firms are the result of systemic differences between the characteristics of male and female owned firms rather than discrimination by lenders. Given these arguments, one might expect that the discouragement level between male and female-owned SMEs might not be different. Nonetheless, there exist alternative arguments that suggest otherwise and lead to an expectation that women owners might be more likely to be discouraged borrowers than male owners for several reasons. These arguments are discussed below:

1. The Influence of the Media and Perceptions of Discrimination: As noted earlier, the majority of recent studies report no gender discrimination by lenders; however, a minority of studies that do report findings consistent with discrimination or disrespectful treatment (for example, Bigelow et al., 2012; Buttner and Rosen, 1992; Carter and Rosa, 1998; Fay and Williams, 1993; Hil et al., 2007; Riding and Swift, 1990) garner considerable press. Media such as newspaper articles, online blogs, etc. discuss examples of women entrepreneurs who feel financially discriminated.<sup>5</sup> As Haines et al. (1999, p. 305) observe: "...if women business owners are (possibly erroneously) informed that banks discriminate against them, they may well avoid lending institutions and forego growth opportunities."
2. Risk appetite: Women have relatively a stronger degree of risk-aversion (Powell and Ansic, 1997; Constantinidis et al., 2006, Chaganti, 1986). Sexton and Bowman-Upton (1990) and Watson and Newby (2009) find women entrepreneurs to be more risk averse than male entrepreneurs and this makes women entrepreneurs to be less inclined to access external source of funds as compared to male entrepreneurs. Further, Coleman and Robb (2009) find that women-owned firms start their businesses with less start-up capital and they rely more on internal capital or personal or relatives' savings than on bank loans (Orhan, 2001). According to Watson et al. (2009, pg. 52-53), women prefer to remain debt-free and in cases where women have taken debt from a financial institution, their priority is to repay it earlier

---

<sup>5</sup> For example, Noreena Hertz (2011) asserts in *Financial Times* that banking institutions discriminate between men and women with women paying higher interest rates than men borrowers (Amin, 2009). Kelly Keating (2012), in a blog on *Funding Gates*, states that women still face discrimination when it comes to potential investors and clients who may take women entrepreneurs less seriously (Ransom, 2011). Stengel (2012) in her article in *Forbes Magazine*, gives an example of a successful woman who felt discriminated when it came to seeking loan from a bank.

as compared to their male counterparts. This might provide an additional explanation of their reluctance to apply for bank loans.

3. Lack of self-confidence: Brindley (2005) notes that individuals who lack self-confidence are more likely to be risk averse. Verhuel and Thurik(2000, p. 334) postulate that “lack of confidence of female entrepreneurs in their own entrepreneurial capabilities may be attributed to a relatively negative self-perception.” Sara and Peter (1998, pg. 231) assert that, “... not only female business owners are less likely to use institutional arrangements such as bank overdrafts and loans, they are also less likely to take advantage of cheaper sources such as extended supplier credit...”
4. Role Investment Theory: According to Role Investment Theory, males and females have different specializations and specification roles in a spousal relationship (Orser et al., 2006). Generally, men have been found to be more financially literate than women (Goldsmith et al., 1997). Orser et al. (2006) argue that financial decisions, according to role investment theory, are usually considered to fall into this category (Orser et al., 2006, p. 648) such that, as Hisrich (1985 in Orhan, 2001 pg. 100 notes, “Women owners tend to rely more on the business advice from their spouse as compared to men who have professional experts as their first source of advice”. Ponthieu and Caudill (1993) find that in copreneurial ventures, males tend to dominate their spouses in decision making at work and females lack confidence in their own decision making and consult their spouse for the same (Kirkwood, 2009). This suggests that women might have less autonomy in decision making, rely on suggestions from spouse or family members in making their financial decisions and have less confidence in their own decisions. Thus, women might feel less motivated to apply for loans and hence be discouraged borrowers.
5. Banking Relationships: As noted, longer relationships are indicative of stronger relationships (Madill et al., 2006). Madill et al. (2006) after controlling for age of firms find that male-owned firms have longer banking relationships as compared to female-owned firms. Female-owned firms are less likely to use commercial banks for their financial services and they have significantly shorter duration of relationships with their primary institutions as compared to

their male counterparts (Robb and Wolken, 2002), possibly suggesting female-owned firms to be discouraged borrowers.

6. Creditworthiness/Financial Literacy: Robb and Wolken (2009) report that Dun and Bradstreet credit scores tend to be lower for female-owned businesses than for male-owned firms (although this may alternatively reflect sector, size and age of firm). To this point, Robb and Wolken (2002) and Hendon and Bell (2011) find that women are more likely to borrow through the use of credit cards which are typically more expensive sources of capital than other loans and which are usually extended for a shorter time periods. Also, Verheul and Thurik (2001) report that women have lesser experience in financial management which means that they might have limited information of what financing options are available to them, how can they acquire financial capital and the benefits of loans to their enterprise such as tax shields (Constantinidis et al., 2006).

Examining both sides of arguments, it is proffered that women might be less likely to apply for bank loans because they are more likely to lack of self-confidence and financial literacy, they may perceive that banks discriminate against female borrowers and they have lower risk appetites. Thus, a testable hypothesis is:

*Hypothesis 6: Women-owned firms are more likely to be discouraged borrowers than male-owned firms.*

### **3.7. Summary of Study Propositions:**

Table 1 presents the summary of expected relationships between level of discouragement and the various firm-specific and owner-specific characteristics of SMEs. This is related to the hypotheses formulated above.

**Table 1: Summary of Study Propositions**

<b>Factor</b>	<b>Expected Relation with Discouragement</b>	<b>Key References</b>	<b>Key Arguments</b>
1. Size, Age	-ve	Freel et al., 2012; Han et al., 2012, Thornhill et al., Berger and Udell, 1998; Robb & Wolken, 2002	<ul style="list-style-type: none"> <li>• Large information asymmetry</li> <li>• Younger firms are more likely than older firms to not to apply for loans for fear of rejection.</li> </ul>
2. Industry-sector			
<ul style="list-style-type: none"> <li>• Goods</li> </ul>	-ve	Freel et al. (2012); Abor (2007); Orser et al. (2006); Balakrishnan and Fox (1993).	<ul style="list-style-type: none"> <li>• Firms in knowledge intensive sector have more specific and lesser tangible assets leading to collateral issues;</li> <li>• Retails sectors have less capital requirement</li> </ul>
<ul style="list-style-type: none"> <li>• Knowledge Intensive</li> </ul>	+ve		
<ul style="list-style-type: none"> <li>• Retail and Whole sale</li> </ul>	+ve		
<ul style="list-style-type: none"> <li>• Service</li> </ul>	+ve		
3. Growth Intention	-ve	Thornhill et al. (2004); Cassar (2004)	<ul style="list-style-type: none"> <li>• To meet high growth, more capital may be required</li> </ul>
4. Owner's Experience	-ve	Fay and Williams (1993)	<ul style="list-style-type: none"> <li>• Higher education level is related to more likelihood of commercial success and the loan officers tend to reject loan applications from people with limited education and lack of experience in the field they wish to operate.</li> </ul>
5. Lending Relationship	-ve	Petersen and Rajan (1994); Scott (2006); Niskanen and Niskanen (2010)	<ul style="list-style-type: none"> <li>• Long-term relationships with a commercial bank or other financial institution are important to gain access to credit markets. (Petersen and Rajan, 1994)</li> </ul>
6. Gender			
<ul style="list-style-type: none"> <li>• Females</li> </ul>	+ve	Fay and Williams (1993); Hil et al. (2009); Bigelow et al. (2012); Orhan (2001)	<ul style="list-style-type: none"> <li>• Negative self-perception among women</li> <li>• Media highlights that women are discouraged</li> <li>• Different risk appetites</li> </ul>
<ul style="list-style-type: none"> <li>• Males</li> </ul>	-ve		

## 4. Research Methodology

---

The following section describes the data and methodologies to be used to test the hypotheses formulated in the previous chapter.

### 4.1. Data Collection

The data is drawn from the *Survey on Financing of Small and Medium Enterprises 2004* conducted by Statistics Canada between September 2004 and March 2005. The target population consisted of enterprises with fewer than 500 FTE<sup>6</sup> employees and annual gross revenues of less than \$50 million. Financing and leasing companies, co-operatives, subsidiaries, non-profit organizations, government offices, schools, hospitals and other public sector organizations were not covered by this survey. The total target population count was 1,357,348 enterprises. Using a simple random sampling, a sample size of 34,509 enterprises was selected from the target population. An instrument based on Computer Assisted Telephonic Interviews (CATI) was used to collect both quantitative and qualitative information related to enterprises and their primary owners. Telephone follow-up was used to increase response rates. Out of the total 23,750 in-scope entries, valid responses were received from 12,487 enterprises, a response rate of about 50%. Further, sampling weights were applied in compiling the estimates. The businesses were weighted based on region, industry type, size and age of the business. Consequently, individual enterprises in the sample are weighted according to their representation in the target population.

Further, the nearest neighbor donation imputation was used to correct partial response present in the returned questionnaires. This imputation method consists of replacing one or more missing values from a respondent, called receiver, by values provided by one or more respondents, called donors.

### 4.2. Variables and Methodology

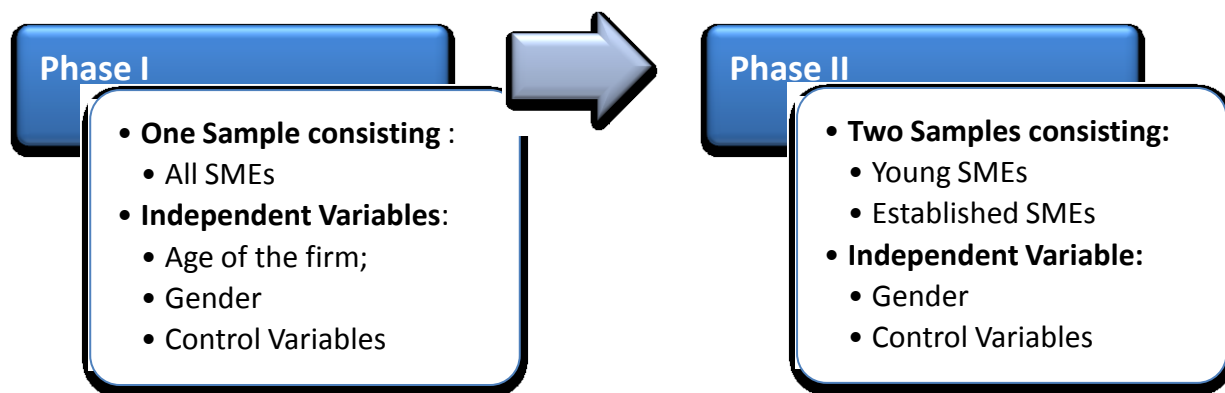
Research shows that young firms are more likely to be discouraged and are less likely to be applying for loans as compared to established firms (Chandler, 2010; Freel et al., 2012; Cole, 2013). However, as mentioned earlier in research gaps (chapter 2), no research has yet compared

---

<sup>6</sup> Full time equivalent concept is used to define the size of a business. It is calculated using this simple formula: number of full-time employees + (total number of part-time employees x 0.5). (Industry Canada, date modified: 2012-05-11) <http://www.ic.gc.ca/eic/site/061.nsf/eng/01990.html>

young and established firms in terms of their financing preferences in general and discouraged borrowers in particular. In order to answer the previously mentioned two research questions (chapter 2), this research is conducted in two phases as shown in figure 2. The first phase involves sample from all SMEs where as for the second phase, the total sample of SMEs are classified into two categories - young and established firms, on the basis of firms' age<sup>7</sup> ( $\leq 6$  years and  $> 6$  years respectively). In this study, the age of the business is estimated using the year that the business started selling goods and services.

The first phase will answer the following two questions: 1) if a firm's age is significant in affecting the level of discouragement; 2) after controlling for age and other variables, if gender is significant in affecting the level of discouragement. It is expected that the age of a firm might affect a firm's likelihood of discouragement, with young SMEs to be more discouraged borrowers. If the age of a firm is found to be significant in phase 1, this may suggest that the significance of the gender variable might be overshadowed by the age variable. To isolate such effect, phase-II has been proposed. This phase will answer the second research question.



**Figure 2: Phases of Research Design**

Further, to test the hypotheses formulated in the previous chapter, two separate logistic models are developed along with initial descriptive statistics. The first logistic model (model 1) is used

<sup>7</sup> Inconsistencies are found in the literature in terms of how age of a firm is defined. For example, some studies define age of the firms using the year when the firm was founded, purchased or acquired (Cole, 2009,pg. 10) while others use the number of years that a firm participate in the product market(Mitchell, 1994 pg. 586). It is found that even when the criteria for young firm age is reduced to 3 years instead of 6 years, regression model still provide almost similar results. Similarly, there are inconsistencies in how studies define new or young firms. Riding et al. (2012) and Neville et al (2013) define new firms as those firms that have been trading for 5 years or less, Stel et al. (2007) define young firms as firms that are less than 42 months old, whereas Smallbone and North (1995) define young firms as firms that are less than 10 years of age.

for firms that do not need finance versus firms that do need finance (inclusive of both discouraged borrowers and applicants). The second model (model 2) is based only on firms that need finance and it compares firms that do not apply because they are discouraged against those firms that apply for finance (bank loans). Figures 3 and 4 present a graphical representation showing two phases as well as two logistic models.

#### 4.2.1. Dependent Variables

The focus of this study is to compare the financing preferences of SMEs with specific focus on gender. The dependent variables are dichotomous in nature and are described below:

**Model 1:** This model is based on two types of firms, first being the ones that do not need finance and second being those that need finance. In this model, the dependent variable is *need for finance* which is set equal to ‘0’ for firms that do not need finance and equal to ‘1’ for firms that need finance (discouraged borrowers, denied borrowers and approved borrowers). Equation 1 shows such a logistic model.

$$P(\text{Need Finance}=1) = f(\text{gender}) + f(\text{Control Variables}) \quad \dots(\text{Eq. 1})$$

$$= f(\text{gender}) + f(\text{firm's size, firm age, industry, growth intention, owner experience, lending relations, location, R\&D investment})$$

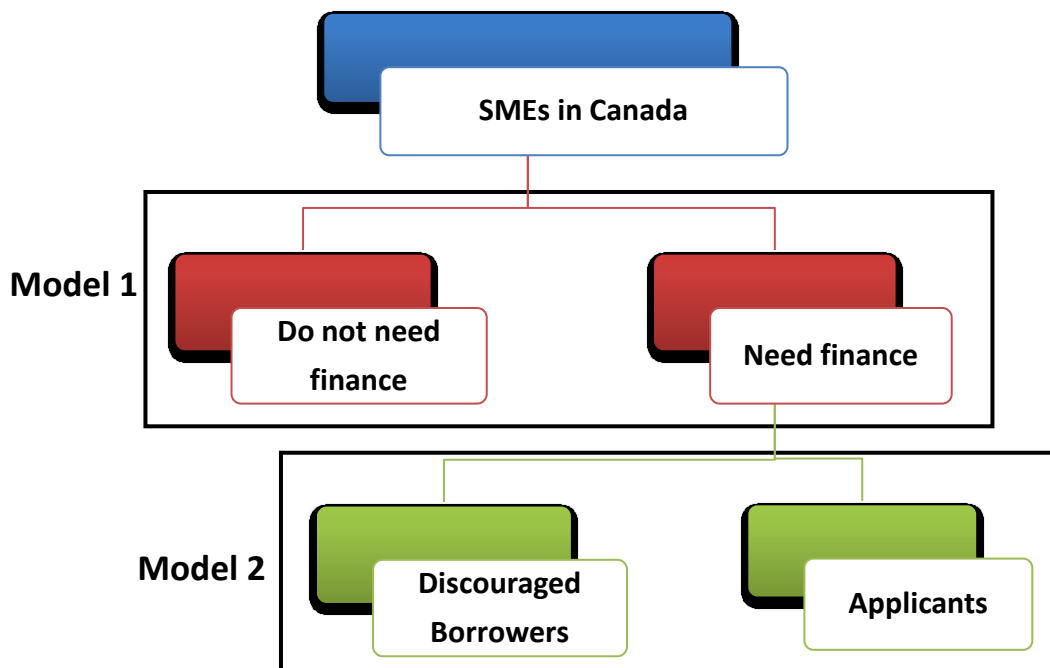


Figure 3: Phase-I Research Design

**Model 2:** This model is developed only for those firms that need credit and then decide whether to apply for finance or not. In this model, the dependent variable is *discouraged borrower* which is set equal to ‘1’ for firms that are discouraged firms and equal to ‘0’ for firms that apply for loans<sup>8</sup> (denied and approved borrowers). The logistic model is described as below (equation 2):

$$P(\text{Discouraged borrower}=1) = f(\text{gender}) + f(\text{Control Variables}) \quad \dots(\text{Eq. 2})$$

$$= f(\text{gender}) + f(\text{firm's size, industry, growth intention, education, experience, lending relations, location})$$

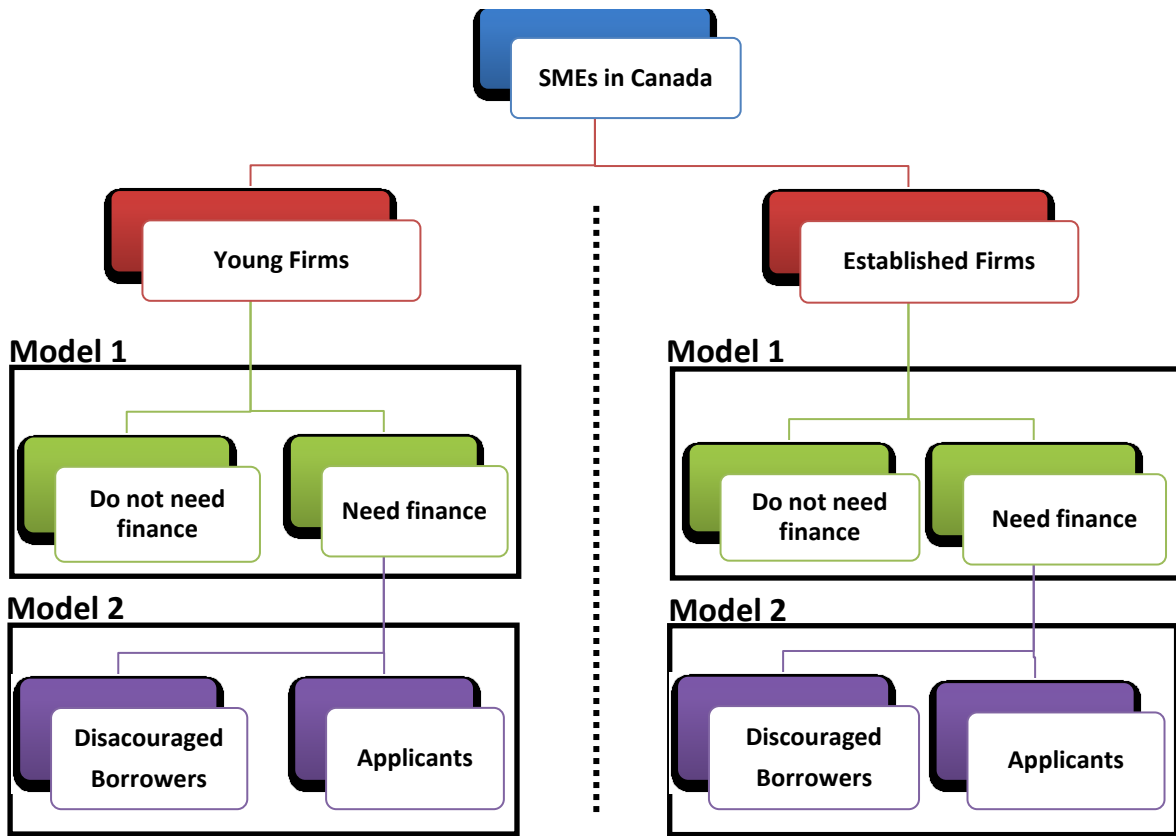


Figure 4: Phase-II Research Design

#### 4.2.2. Independent Variables

This section provides the description of explanatory variables that are expected to affect the level of discouragement among SMEs.

The key explanatory variable is gender since the primary focus of this thesis is to identify the relationship between SME’s discouragement and gender of the SME owner. I expect female

<sup>8</sup> For simplification purpose, the study focuses only on the loan applicants.

business owners to be more discouraged borrowers than their male counterparts. The variable gender is defined as a categorical variable with three categories: 'majority-female owned firms' and '50-50 ownership' with 'majority-male owned firms' as a reference category.

#### **4.2.3. Control Variables**

In order to understand the effect of gender of the owner on a firm's discouragement, it is important to control for other variables that might also affect discouragement. The control variables, as presented below, represent such independent variables that are expected to affect the likelihood of discouragement of an SME. These control variables are explained as below:

Research shows that both firm *age* and *size* are related to discouragement (Freel et al, 2012). *Firm age* is a dichotomous variable, with young firms (=0) and established firms (=1). To estimate *firm size*, full-time equivalent employees are used as a proxy (Industry Canada). Thus, the firm size is a natural logarithm of full-time equivalent employees (FTEs). The size is transformed into logarithm to achieve normal distribution and linearity.

*Industry* in which a firm operates affects its financing preferences and the level of discouragement (Orser et al., 2006; Freel et al, 2012). Thus, industry is an important control variable and is categorical in nature indicating three broad industry-sectors such as wholesale& retail and service industries, with goods industry as a reference category.

*Knowledge-intensive firms* are said to be related to growth intention (Riding et al., 2012). The variable, innovative firm is used to represent knowledge-intensive firms and is defined as a firm that invests in R&D activities. It is a binary dummy variable indicating whether a firm has invested in R&D (innovative) or not (non-innovative).

*Growth intention* is equally important as the growth of a firm (Kolvereid and Bullvag, 1996) and can affect the level of discouragement among SME owners. Firms with future growth orientation will look forward to applying for external financing to meet their growth requirements. The variable, growth intention is a binary dummy variable indicating if a firm has future growth intention or not.

According to Freel et al. (2012) and Chandler (2010), *education* and *experience* of business owners might affect their application cost as bank managers relate these qualities to one's capability. This shows that both education and experience are important variables to understand the level of discouragement among SME owners. However, due to unavailability of data on the education qualification of business owners, only experience of business owners will be used as a control variable in this study. *Owner Experience* is a dummy variable including years of experience as less than 10 years and more than 10 years.

Long-term relationships with a commercial bank or other financial institution, according to Petersen and Rajan (1994), are important in gaining access to credit markets as they help to reduce information asymmetries between borrowers and lenders. According to Niskanen and Niskanen (2010) close lending relations enhance loan availability and reduce collateral requirements and thus, it might affect the level of discouragement. Hence, it makes sense to study if the level of discouragement is related to *banking (lending) relationship* and the *length of lending relationship*. While the available data has information about firms' length of relationship with their main financial institution, it does not provide any information about if an SME has a banking relationship or not. In order to capture the latter, the presence of a designated account manager is used as a proxy for banking relationships. Thus, *relationship banking* is a dummy variable indicating if a firm has a designated account manager or not and the variable, *length of relationship with FI*, is a continuous variable measured by the natural logarithm of the number of years a firm has dealt with its main financial institution. The logarithm function is used to achieve normal distribution and linearity in the data.

Another important control variable to consider is the *location* of a firm as research suggests that firm location may also influence discouragement among firms (Freel et al., 2012). Businesses at urban locations might benefit from the presence of other businesses to benchmark and determine their quality; more access to lending institutions because of more concentrated market in urban locations (Chandler, 2010; Freel, et al., 2012). The variable location is a binary dummy variable indicating if the firm is located in urban or rural area.

Table 2 summarizes the description of both dependent and independent variables with their corresponding question asked in the survey.

**Table 2: Summary of Variables and the Corresponding Questions asked in the Survey.**

<b>Variables</b>	<b>Description of Variables</b>	<b>Corresponding Question in the Survey</b>
<b>Need Finance</b>	Dichotomous Variable 1=Need finance 0=Do not need finance	Why did the business not attempt to obtain new financing? <ul style="list-style-type: none"> <li>• Financing not needed</li> </ul>
<b>Discouraged Borrower</b>	Dichotomous variable 1=Discouraged Borrower 0=Loan Applicant	<ul style="list-style-type: none"> <li>• Thought the request would be turned down</li> <li>• Applying for financing is too difficult</li> <li>• Applying for financing is too time consuming</li> <li>• Cost of debt financing is too high</li> <li>• Don't like to be in debt</li> <li>• Other</li> </ul>
<b>Age</b>	Young firms (> 6 years) Before 1999 Established firms (6 years and younger) 1999-2004	Year in which the firm started selling its goods and services.
<b>Gender</b>	Categorical variable indicating “majority-females ownership”, “50-50 ownership”, with “majority-males ownership” as a reference category.	What percentage of the business ownership is held by women? <ul style="list-style-type: none"> <li>• None</li> <li>• 1% to 49%</li> <li>• Exactly 50%</li> <li>• 51% to 99%</li> <li>• 100%</li> </ul>
<b>Size of firm</b> <i>(in terms of full time equivalent employees)</i>	Continuous variable. $\ln(1+\text{number of FTEs})$ <i>Note: Full-time equivalents = # full time employees + (# part time employees*.5)</i>	Q1: On average, how many paid full-time employees --excluding the owners of the business and contract workers-- did the business have during the past twelve months? Q2: On average, how many paid part-time employees --excluding the owners of the business and contract workers-- did the business have during the past twelve months?

<b>Variables</b>	<b>Description of Variables</b>	<b>Corresponding Question in the Survey</b>
<b>Industry</b>	Categorical variable indicating three broad industry-sectors: "wholesale & retail sector" and "service sector", with "goods sector" as a reference category.	
<b>Growth Intention</b>	Binary dummy Variable 1= Yes; 0=No	During the next two years, do you intend to expand the size and scope of your business?
<b>Innovative Firm</b>	Binary Dummy Variable 1=R&D Investment 0=No R&D Investment	What percentage of total investment expenditure was devoted to research and development?
<b>Location</b>	Binary Dummy Variable 1=Urban; 0= Rural	
<b>Experience</b>	Binary Dummy variable. 1= more than 10 years 0= less than 10 years of experience	How many years of experience does the majority owner have in owning or managing a business? <ul style="list-style-type: none"> <li>• less than 5 years</li> <li>• 5-10 years</li> <li>• more than 10 years</li> </ul>
<b>Relationship Banking</b>	Binary dummy variable. 1= Yes (Firm has a designated account manager) 0= No (Firm does not have a designated account manager)	Do you have a designated account manager assigned by your main financial institution to manage your firm's banking relationship?
<b>Length of Relationship with FI</b>	Ln (# of years of relationship with the main financial institution).	How many years has the business been dealing with this financial institution?

### 4.3. Research Method

**Logistic Regression:** Owing to the dichotomous nature of dependent variables (as mentioned earlier), logistic regression seems to be an appropriate method for analysis. Logistic regression allows determining the impact of multiple independent variables presented simultaneously to predict membership of one or other of the two dependent variable categories. Unlike simple linear regression, logistic regression allows for a non-linear relationship between dependent and independent variables. Furthermore, logistic regression also allows for controlling the independent variables.

**Logistic Model:** For this research, the logistic regression is carried out in a hierarchical order. In the first step, only control variables are added as independent variables to the regression model. In the second step, the variable gender is also added to the logistic model.

Following is the general logistic model to be used for both model 1 and model 2.

$$\text{Log}_e \left( \frac{p}{1-p} \right) = \beta_0 + \beta_1 \times \text{Gender} + \sum_{i=1}^n \beta_i \times X_i \quad \dots (3)$$

Where, n is the number of control variables,  $X_i$  represents control variable(s), 'p' is the probability that a case is in a particular category ( $Y=1$ , where Y is a dichotomous dependent variable).  $\beta_0$  represents the matrix of constant coefficients and  $\beta_1$  is a matrix of predictor variable (categorical gender variable) and  $\beta_i$  is a matrix of control variables. The expression  $\left( \frac{p}{1-p} \right)$  is known as the odds ratio and logistic regression calculates changes in log odds of the dependent variable due to a unit change in the independent variable after controlling for other control variables.

### 4.4. Data Description

Before conducting an analysis, the data was first examined for any inconsistencies that were present and was cleaned to ensure there are no more inconsistencies. Then, appropriate variables were defined in the data set in order to conduct further analysis.

Before proceeding with the multivariate analysis of the data, it is important to get an overview of dependent variables used in the analysis. The following tables 3(a) and 3(b) present frequency

distribution of dependent variables: 1) need for finance (applicant plus discouraged borrowers); 2) discouraged borrower (a borrower who does not apply for finance fearing denial) that are used in models 1 and 2 respectively (shown in figure 2) .

**Table 3: Frequency Distribution of Dependent Variables**

<b>Table 3(a): Frequency Distribution of Firms that Need Finance and those that do not.</b>		
	<i>Frequency</i>	<i>Percentage</i>
Firms that do not need finance	8,632	74.0%
Firms that need finance	3,030	26.0%
<b>Total</b>	11663	100.0%

Table 3(a) shows that firms that need finance are comprised of about 26% of the total sample whereas table 3(b) indicates the discouraged firms represent only 17% of the total sample that includes both discouraged and non-discouraged firms. This indicates that the proportion of discouraged firms in the total sample is quite small.

<b>Table 3(b): Frequency Distribution of Discouraged Firms and Applicants</b>		
	<i>Frequency</i>	<i>Percentage</i>
Loan Applicants	2,178	82.6
Discouraged firms	459	17.4
<b>Total</b>	2637	100.0

### **Descriptive Statistics:**

The purpose of descriptive analysis is to get an initial overview of the relationships that might be found in the logistic analysis conducted later. Since the weighting scheme is based on region, industry type, size and age of the business, this means that the sample is representative of the target population (SMEs in Canada). Table 4 presents results of descriptive statistics comparing the salient features of SMEs that are discouraged borrowers with those that apply for a bank loan and SMEs that have need for finance with those that do not need finance.

A t-test is used to identify significant differences between firms with need for finance and those that don't need finance; discouraged borrowers and applicants, on the basis of firm size and firms' length of relationship with their main financial institution (FI).

**Table 4: Descriptive Statistics Based on 'Discouraged Borrowers' and 'Need For Finance'**

Variable	Need For Finance				Discouraged Borrowers			
	Don't Need Finance	Need Finance	Total firms	t and $\chi^2$ statistics	Discourage d firms	Loan Applicants	Total firms	t and $\chi^2$ statistics
<b>Mean Firm Size</b> (ln(1+FTEs))	.6718 (0, 6.02) <sup>s</sup>	.8804 (0, 5.96) <sup>s</sup>	11662	-9.899***	.6921 (0, 4.46) <sup>s</sup>	.9652 (0, 5.96) <sup>s</sup>	2637	6.320***
<b>Mean of Ln(length of relationship with FI)</b>	.4120 (0, 4.55) <sup>s</sup>	.3931 (0, 4.01) <sup>s</sup>	11662	1.004	.2559 (0, 3.26) <sup>s</sup>	.4238 (0, 4.01) <sup>s</sup>	2637	4.227***
<b>Growth Intention</b>				224.665***				1.489
Intention to grow	53.2%	46.8%	4105		9.4%	90.6%	1286	
No Growth Intention	70.6%	29.4%	2971		8%	92%	1101	
<b>Broad Industry Sectors</b>				96.786***				43.940***
Wholesale & retail	71.9%	28.1%	1824		27%	73%	430	
Services	77.5%	22.5%	6410		17.9%	82.1%	1271	
Goods	68.6%	31.4%	3429		12.4%	87.6%	936	
<b>Gender Ownership</b>				42.776***				38.957***
Majority-females	63.1%	36.9%	4427		17.5%	82.5%	309	
50-50 Ownership	58.2%	41.8%	1471		5.1%	94.9%	568	
Majority-males	70.5%	29.5%	1179		8.4%	91.6%	1511	
<b>Relationship Banking</b>				42.393***				38.408***
Firm with a designated account manager	65.9%	34.1%	1127		5.9%	94.1%	358	
Firm without a designated account manager	74.9%	25.1%	10536		19.2%	80.8%	2278	

Variable	Need For Finance				Discouraged Borrowers			
	Don't Need Finance	Need Finance	Total firms	t and $\chi^2$ statistics	Discourage d firms	Loan Applicants	Total firms	t and $\chi^2$ statistics
<b>Experience of the majority owner</b>				1.995*				23.981***
>10 years of experience	62.8%	37.2%	4817		6.9%	93.1%	1647	
<10 years of experience	64.5%	35.5%	2260		13%	87%	739	
<b>R&amp; D Investment</b>				70.079***				5.023**
R&D Firms	56%	44%	2105		10.5%	89.5%	854	
Non R&D Firms	66.5%	33.5%	4972		7.8%	92.2%	1533	
<b>Firm Age</b>				.164				57.890***
Young Firms	74.2%	25.8%	4154		25.1%	74.9%	921	
Established Firms	73.9%	26.1%	7509		13.3%	86.7%	1715	
<b>Location</b>				158.388***				73.272***
Urban	77.2%	22.8%	8450		22.2%	77.8%	967	
Rural	65.7%	34.3%	3213		9.1%	90.9%	1670	

Note: The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.  
 \$-Number in brackets represent the minimum and maximum value.

Further, a Chi-square analysis is used to investigate if there is an association between a dependent variable and an independent variable. It also helps to analyze the proportion differences between discouraged borrowers and applicants, firms with need for finance and those that do not need finance, on the basis of various firms specific and owner specific characteristics.

Table 4 suggests that on average, firms that need finance are larger in size (.8804 approx.) and have a fewer years of relationship (0.3931 approx.) with their primary financial institution as compared to firms that do not need finance. The table also indicates that as compared to firms that do not need finance, firms that need finance are more likely to invest in R&D, have owners with more than 10 years of work experience and to be in wholesale & retail and goods industry sector. However, there is no significant association between firm age and need for finance. It is also found that firms that need finance are more likely to be majority-female owned and 50-50 ownership firms as compared to majority male owned firms.

The right panel of table 4 shows that discouraged firms more likely to be both smaller and younger as compared to loan applicants. It is observed that discouraged firms are more likely to be smaller (mean firm size=.6921) as compared to applicants (mean firm size=.9652). Table 4 shows that almost 27% of wholesale & retail firms are discouraged, compared with 17.9% of services firms and 12.4% of goods firms. Further, discouraged firms are: majority-female owned firms, firms without a designated account manager, firms with less than 10 years of owner experience and firms that invest in R&D. There is no significant association between discouraged borrowers and growth intention. Thus, overall, the results from descriptive analysis support most of the initial hypothesis; however, caution should be taken as unlike multivariate statistics, the descriptive statistics does not take into consideration the effect of other important variables while comparing two variables. The following section will conduct data analysis based on multivariate statistics (logistic regression).

## 5. Study Findings

---

This section analyses the data using multivariate statistics considering models and phases as described in the research design section. The multivariate analysis will help to test hypotheses proposed earlier.

### 5.1 Model 1:

This model estimates the probability of Need for Finance (=1). This model has two phases as described earlier (section 5).

**Phase I:** Table 5 presents results of a hierarchical binary logistic regression employed to estimate the probability of *need for finance* among all SMEs.

The base model in table 5, comprises only control variables based on firms' growth intention, firm size (measured in terms of full-time equivalent employees), industry-sector, owner experience, whether or not a firm invests in R&D, location of a firm, firm age, relationship banking and length of banking relationship. The augmented model expands the base model by adding the gender variable that is categorical in nature.

The likelihood ratio test for base model indicates that the model is statistically significant (model p-value=.000) with Cox & Snell and Nagelkerke's R square values .10 and .137 respectively, which are acceptable values for a logistic regression. Another statistics to check if the model is significant or not is the Hosmer-Lameshow goodness of fit test. It tests the null hypothesis that there is no difference between the observed values and expected values. Thus, it is desirable for H-L goodness-of-fit test to have a p-value greater than 0.05 to have a well-fitted model. However, the Hosmer-Lameshow test is very sensitive to larger and smaller sample size and thus, cannot be relied upon completely. Due to this reason, the study will consider likelihood ratio test only.

The variables in the model show that firms with growth intentions are twice as likely to need finance as compared to firms with no growth intentions(Exp B=2.035). Firm size has a significantly positive relationship with need for finance, indicating that larger firms are more likely to have requirement for finance as compared to smaller firms; however, the variable- firm

age does not have a significant relationship with need for finance. Consistent with the descriptive analysis (table 4), table 5 shows that both wholesale & retail and service firms are less likely to have the need for finance as compared to goods firms (Exp B=.837 & .662, respectively).

**Table 5: Logistic Regression with the probability of Need for finance (Phase I)**

	Base Model			Augmented Model		
	Coefficient	Standard	Exp	Coefficient	Standard	Exp (B)
	of	Error	(B)	of	Error	
	Estimation			Estimation		
Growth Intention	.710***	.055	2.035	.712***	.056	2.037
Firm Size	.244***	.027	1.276	.240***	.027	1.271
<i>Industry-sector</i>						
Wholesale & retail	-.177**	.083	.837	-.159*	.084	.853
Service	-.413***	.061	.662	-.376***	.062	.687
Relationship Banking	.285***	.089	1.330	.293***	.089	1.341
Length_Relation_FI	-.383***	.032	.682	-.390***	.032	.677
Owner Experience	.025	.062	1.026	-.010	.062	.990
R&D Firms	.326***	.058	1.386	.333***	.058	1.395
Location	-.657***	.059	.518	-.641***	.059	.527
Firm Age	.050	.061	1.052	.050	.062	1.051
<i>Owner gender</i>						
50-50 Ownership				.197***	.065	1.218
Majority-female owned				-.219***	.076	.803
Constant	-.314***	.085	.731	-.328***	.088	.721
<b>Goodness of Fit Tests</b>						
-2 Log Likelihood		8553.67			8531.36	
<b>p-values</b>						
Step		.000			.000	
Block		.000			.000	
Model		<b>.000</b>			<b>.000</b>	
Cox & Snell R Sq.		.100			.103	
Nagelkerke R Sq.		.137			.141	
<b>N</b>		<b>7076</b>			<b>7076</b>	

Note: The logistic regression models the probability of a firm that needs finance (=1) from a sample of firms that need finance and those that do not need finance(=0). The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

It is also observed that relationship banking significantly affects the likelihood for need for finance, with firms having a designated account manager are more likely to have need finance (Exp B= 1.330) whereas firms with longer relationship with a bank are less likely to have the need for finance (Exp B=.682). Firms investing in R&D activities are also more likely to have a need for finance (Exp B=1.386). It is found that firms located in urban areas are less likely to have the need for finance as compared to firms located in rural areas.

Looking at the augmented model, the goodness-of-fit tests suggests that the model is significant (model p-value=.000) with pseudo-R square values showing a little improvement over the base model (.103 and .141). Even after controlling for the gender variable, results of the augmented model seem consistent with those in the base model. It is also found that while controlling for control variables, the variable, gender is significantly associated with a firm's need for finance. Results indicate that firms with 50-50 gender ownership are more likely to need finance (Exp 1.218) as compared to majority-male owned firms; whereas firms with majority-female ownership reduce the odds of need for finance by approximately 19.7% (Exp .803) as compared to majority male-owned firms. Firm age and owner experience are again not significantly associated with need for finance.

## **Phase II: Need for Finance in Young Vs Established Firms**

Further, to explore the effect of gender on firms' need for finance and to isolate the effect of young firms in the analysis, the total sample is categorized into young and established firms and the model is run again (phase II analysis). Results from phase II are presented in table 6. The goodness-of-fit tests (table 6) for augmented models for both young and established firms indicate that these models are significant with model p-values equal to .000.

The Cox & Snell and Nagelkerke's R square values are equal to .096 and .132, respectively for the augmented model under young firms. Although these pseudo-R square values are not too big, these are acceptable for a logistic regression. The results for young firms show consistency with previous results (table 5), in terms of the relationship between most independent variables and the dependent variable, need for finance. The only exceptions are the relationships with majority-female owned firms and wholesale & retail industry.

**Table 6: Logistic regression for young firms and established firms separately (Phase II)**

	YOUNG FIRMS				ESTABLISHED FIRMS			
	Base Model		Augmented Model		Base Model		Augmented Model	
	B (I)	Exp(B) (II)	B (III)	Exp(B) (IV)	B (V)	Exp(B) (VI)	B (VII)	Exp(B) (VIII)
Growth Intention	.777***	2.176	.783***	2.188	.689***	1.991	.688***	1.990
Firm Size	.338***	1.402	.338***	1.402	.215***	1.240	.207***	1.229
<i>Industry-sector</i>								
Wholesale & Retail	.113	1.120	.114	1.121	-.316***	.729	-.294***	.745
Service	-.455***	.635	-.458***	.632	-.385***	.681	-.318***	.727
Relationship Banking	.392***	1.481	.392***	1.480	.191*	1.210	.200*	1.221
Length_Relation_FI	-.319***	.727	-.323***	.724	-.383***	.682	-.391***	.676
Owner Experience	.085	1.089	.072	1.075	-.035	.966	-.114	.892
R&D Firms	.324***	1.383	.325***	1.385	.323***	1.381	.327***	1.387
Location	-.608***	.545	-.612***	.542	-.684***	.504	-.664***	.515
<i>Owner Gender</i>								
50-50 ownership			.230*	1.258			.178**	1.195
Majority-female owned			.017	1.017			-.424***	.655
Constant	-.542***	.581	-.578***	.561	-.143	.866	-.102	.903
<b>Goodness of Fit Tests</b>								
-2 Log Likelihood		2842.201		2838.555		5688.649		5660.270
<b>p-values</b>								
Step		.000		.162		.000		.000
Block		.000		.162		.000		.000
Model		.000		.000		.000		.000
Cox & Snell R Square		.095		.096		.107		.112
Nagelkerke R Square		.130		.132		.146		.154
<b>N</b>			<b>2331</b>				<b>4745</b>	

Note: The logistic regression models the probability of a firm that needs finance (=1) from a sample of firms that need finance and those that do not need finance (=0) for samples of young firms and established firms, separately. The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

These variables are no longer significant when only young firms are considered. This shows that for young firms, there is no statistical difference in the financing preferences (need for finance) between majority-male owned firms and majority-female owned firms.

On the contrary, it is found that results from the augmented model under established firms are completely in consistent with earlier results (table 5). They suggest that while controlling for control variables, firms with majority -female ownership are less likely to have need for finance (Exp B=.655) as compared to majority-male owned firms.

Thus, the analysis from model 1 suggests that firms with a need for finance are more likely to be large in size, have future growth intentions, are more likely to have a designated account manager and innovative firms that have R&D investment. Further, firms that need finance are more likely to be in goods sector and less likely to be majority-female owned firms.

## **5.2 Model 2:**

This model is based on estimating the  $P(\text{discouraged borrower}=1)$ , as explained in equation 2 (section 4). Similar to model1, there are two phases in this analysis.

**Phase 1:** Table 7 summarizes results of a hierarchical binary logistic regression employed to estimate the extent of discouragement among all SMEs. It shows that the base model is statistically significant (model p-value of 0.000), with Cox & Snell and Nagelkerke  $R^2$  values equal to 3.7% and 8.3% respectively.

The results show that firms with longer banking relationship with a financial institution are significantly more likely to be discouraged. The Exp B value (1.669) signifies that with one year of increase in the banking relationship of a firm, the odds of its being discouraged increases by 66.9%. On the contrary, firms that have a designated account manager are less likely to be discouraged than those with no account manager (Exp B=.254). As expected, firms with more than 10 years of owner experience are significantly less likely to be discouraged than firms with lesser experienced owners (Exp B=.653). The table also shows that firms with R&D activities increase the odds of being discouraged borrowers by 1.38 times as compared to firms with no R&D activities (Exp=1.379). Results show that established firms (older firms) are significantly less likely to be discouraged than their more younger counterparts (Exp B=.553).

**Table 7: Logistic regression for the probability of being a discouraged firm (Phase I)**

	BASE MODEL			AUGMENTED MODEL		
	Coefficient of Estimation	S.E.	Exp(B)	Coefficient of Estimation	S.E.	Exp(B)
Growth Intention	-.130	.159	.878	-.141	.160	.868
Firm Size	-.066	.077	.936	-.057	.077	.945
Firm Age	-.593***	.167	.553	-.599***	.166	.549
<b>Industry</b>						
Wholesale& Retail	-.090	.238	.914	-.106	.239	.899
Services	-.066	.173	.936	-.170	.178	.843
Relationship banking	-1.370***	.288	.254	-1.333***	.290	.264
Length_Relation_FI	.512***	.091	1.669	.530***	.092	1.699
Owner Experience	-.426**	.165	.653	-.344**	.166	.709
R&D Firms	.321**	.156	1.379	.269*	.157	1.308
Location	.787***	.183	2.196	.704***	.185	2.022
<b>Owner Gender</b>						
50-50 Ownership				-.407*	.219	.666
Majority-female owned				.667***	.189	1.948
Constant	-2.278***	.237	.103	-2.253***	.248	.105
<b>Goodness of Fit Tests</b>						
-2 Log Likelihood		1330.296			1311.059	
<b>p-values</b>						
Step		.000			.000	
Block		.000			.000	
Model		.000			.000	
Cox & Snell R-Sq.		.037			.045	
Nagelkerke R-Sq.		.083			.100	
<b>N</b>		<b>2178</b>			<b>2178</b>	

Note: The logistic regression models the probability of a firm being a discouraged borrower (=1) from a sample of firms that are discouraged borrowers and those that apply for loans (=0). The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

The location of a firm is also significant in determining the level of discouragement. The Exp (B) value for location suggests that firms in urban area are twice more likely to be discouraged than their rural counterparts.

The second step of this logistic model is to re-estimate the model described above, with an addition of a gender variable that describes the gender of majority owners of firms. This is called as the augmented model and is shown in the right panel of table 7. The augmented model has slightly better Cox & Snell and Nagelkerke's R square values (4.5% & 10% respectively) as compared to the base model. The results of augmented model are consistent with the base model even after controlling for the gender variable. Even though the coefficient for variable firm age is not statistically significant, both firm age and firm size are negatively related to the discouragement and thus, suggest that older and larger firms are less likely to be discouraged. This supports the first hypothesis.

Further, consistent with the base model, the augmented model shows that a firm with longer banking relationship is significantly more likely to be discouraged (Exp B=1.699), whereas a firm that has a designated account manager is less likely to be discouraged (Exp B= .264). The important variable to notice in the augmented model is the gender variable. It shows that after controlling for the control variables, the variable gender\_owner is statistically significant. The results show that firms with 50-50 ownership are significantly less likely to be discouraged than majority male-owned firms (Exp B=0.666) whereas firms with majority female-ownership almost twice as likely to be discouraged as majority male-owned firms (Exp B= 1.948).

When using a multiple logistic regression, it is important to taken into consideration the effect of multicollinearity among variables. Table 18 (Annexure I) presents a correlation matrix for variables used in the logistic regression. Although many correlations are found to be significant, none of them has a very high value (less than .20). The only exception is the correlation between 'length of relationship with FI' and 'relationship banking' (0.56) that seems high. However, it is observed that when a logistic regression is run including either one or both of these variables, neither the sign of their relationship nor the significance of relationship with the dependent variable changes suggesting that there might not be any potential problem of multicollienarity.

## **Phase-II: Discouragement in Young Vs Established Firms**

As per the second phase of research design (Chapter 4), it is pertinent to compare the extent of discouragement between young and established firms separately as the gender variable might be overshadowed by firm age otherwise. Thus, the following table shows the extent of discouragement in young and established firms, separately. Table 8 presents the phase II output.

### **Young Firms**

The logistic model for young firms shows that the augmented model is significant with the model p-value of .000 and thus, is a good fit. The Cox&Snell and Nagelkerke's R square values equal to 4.6% and 8.5% respectively, are not too bad for a logistic model.

Looking at the variables in the augmented model for young firms, it is noted that when controlled for the gender variable, variables related to length of relationship with a FI, R&D investment and location are no more significant in predicting the extent of discouragement in firms. Consistent with the results from table 7, firms with a designated account manager (relationship banking) reduces the odds of being a discouraged borrower by .327 as compared to a firm with no designated account manager, however, the variable -length of relationship with FI- is no more significant because this model considers only young firms and they have shorter relationships. Further, years of owner experience is also negatively related to the discouragement, with a unit increase in a firm's owners' experience, the odds of firm being discouraged decrease by .550. It is interesting to note that while controlling for control variables, the gender variable is still significantly related to the discouragement. The Exp B (.316) value indicates that firms with 50-50 gender ownership are 68.4% less likely to be discouraged than firms with majority male-ownership.

**Table 8: Discouragement among young and established firms (Phase II)**

Discouraged Borrowers=1								
	Young Firms				Established Firms			
	Base Model		Augmented Model		Base Model		Augmented Model	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Growth Intention	-.139	.870	-.193	.825	-.151	.859	-.184	.832
Firm Size	.002	1.002	.014	1.014	-.114	.892	-.089	.915
<i>Industry</i>								
Wholesale & retail	.512*	1.668	.513	1.671	-1.067**	.344	-.991**	.371
Services	-.197	.822	-.161	.851	.003	1.003	-.193	.824
Relation Banking	-1.097**	.334	-1.117**	.327	-1.457***	.233	-1.375***	.253
Length_Relation_FI	-.101	.904	-.031	.969	.672***	1.958	.692***	1.997
Owner Experience	-.523**	.593	-.597**	.550	-.351	.704	-.043	.958
R&D Firms	-.121	.886	-.159	.853	.752***	2.121	.748***	2.113
Location	.148	1.159	.063	1.065	1.209***	3.350	1.103***	3.014
<i>Owner Gender</i>								
50-50 Ownership			-1.153***	.316			.269	1.308
Majority-female owned			-.108	.898			1.400***	4.054
Constant	-1.515***	.220	-1.245***	.288	-3.438***	.032	-3.857***	.021
<b>Goodness of Fit Tests</b>								
-2 Log Likelihood		583.314		572.438		703.989		679.000
<b>p-values</b>								
Step		.002		.004		.000		
Block		.002		.004		.000		
Model		.002		.000		.000		
Cox & Snell R Square		.032		.046		.051		.066
Nagelkerke R Square		.061		.085		.130		.168
<b>N</b>			<b>792</b>				<b>1594</b>	

Note: The logistic regressions model the probability of a firm being a discouraged borrower (=1) from a sample of firms that are discouraged borrowers and those that apply for loans (=0) for samples of young firms and established firms, separately. The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

## **Established Firms**

Looking at the augmented model for established firms, it is found that the model is a good fit with the model p-value equal to .000. The Cox & Snell and Nagelkerke's R square values are 6.6% and 16.8% respectively.

The variables of the augmented model under established firms suggest that wholesale & retail firms are 63% less likely to be discouraged than goods firms (Exp B=.371). The presence of relationship banking is negatively associated with discouragement, with firms having a designated account manager are almost 75% less likely to be discouraged than firms with no designated account manager. The length of relationship with a financial institution is positively associated with discouragement. The result suggests that with one unit increase in  $\ln(\text{Length of relationship})$ , the odds for discouragement increases by a factor of almost 2 (Exp B=1.99), holding all other variables constant. Also, it is observed that firms with R&D investment increase the odds of discouragement by 2.11 times as over the firms with no R&D investment. Established firms located in urban areas increase the odds of discouragement by almost 3 times (Exp B=3.014) as compared to those located in rural areas. By controlling for all other control variables, majority-female owned established firms significantly increase the odds of discouragement by 4 times (Exp B=4.054) as compared to majority males-owned established firms suggesting that female-owned established firms are more likely to be discouraged.

### **5.2.1 Broadened Definition of Discouraged Borrowers**

According to the initial definition, only those firms that need finance but do not apply fearing denial, qualify as a discouraged borrower. As observed from the frequency distribution of the dependent variable (Table 3(b)), out of a total 2,637 firms, only 459 (17.4%) are discouraged borrowers which seems quite a small proportion. In order to avoid issues that may originate due to a smaller sample size, the same analysis is repeated by using a modified definition of discouraged borrowers. This definition also includes those firms *that need finance but do not apply because of reasons such as applying is too difficult, applying is time consuming, cost of debt is high, etc.* A new variable identifying the discouraged firms as per the modified definition is created and named as "Disc\_Redefined".

Table 9 shows the frequency distribution of the new variable and it indicates that the proportion of discouraged firms in the total sample has now increased to 28%.

**Table 9: Frequency Distribution of modified 'Discouraged borrowers'**

	Frequency	Percentage
<i>Applicants(apply for loan)</i>	2178	71.9%
<i>Redefined Discouraged Firms:</i>	853	28.1%
Thought the request would be turned down		
Applying for financing is too difficult		
Applying for financing is too time consuming		
Cost of debt financing is too high		
Do not like to be in debt		
Other		
<b>Total</b>	<b>3030</b>	<b>100.0%</b>

**Phase I:**

Table 10 presents phase 1 results of the logistic regression using the modified definition of discouraged borrowers. Similar to the previous analysis, a hierarchical logic regression model is employed. The goodness-of-fit test for the augmented model shows that the model is significant (model p-value =.000). The Cox&Snell and Nagelkerke's R square values are 6.2% and 10.6% respectively, slightly better than base model. These psuedo-R square values, however small, are not uncommon to logistic models.

Looking at the variables in the augmented model, it is seen that when controlled for the gender variable in the logistic equation, variables such as firm size and age are negatively related with discouragement. Firms located in urban areas are more likely to be discouraged than firms in rural areas (Exp B= 1.942). As expected, majority-female owned firms increase the odds of being a discouraged borrower by 1.86 times approximately (Exp B=1.859) as compared to majority males-owned firms; whereas, 50-50 gender ownership firms reduce the odds of being a discouraged borrower by almost 11% as compared to majority-male owned firms (Exp B=.892), holding all other variables constant. It is also observed that both larger and older firms decrease odds of discouraged borrowers (considering Exp B=.751 and .684, respectively). In contrast to

the logistic output in table 7, table 10 shows that variables such as owner experience and R&D investment are not significantly related to discouraged borrowers in the augmented model.

**Table 10: Logistic regression using the modified definition for Discouraged Borrowers (phase I)**

	Base Model			Augmented Model		
	B	S.E.	Exp(B)	B	S.E.	Exp(B)
Growth Intention	-.198*	.119	.820	-.195	.120	.823
Firm Size	-.290***	.061	.749	-.286***	.062	.751
Firm Age	-.397***	.126	.672	-.380***	.126	.684
<i>Industry</i>						
Wholesale & Retail	.309*	.169	1.362	.273	.170	1.314
Services	-.021	.133	.979	-.114	.136	.892
Relationship Banking	-1.271***	.209	.281	-1.260***	.211	.284
Length_Relation_FI	.535***	.067	1.707	.547***	.068	1.729
Owner Experience	-.167	.126	.846	-.108	.127	.898
R&D Firms	.201*	.118	1.223	.168	.120	1.183
Location	.698***	.131	2.010	.664***	.133	1.942
<i>Owner Gender</i>						
50-50 ownership				-.114	.147	.892
Majority-female owned				.620***	.150	1.859
Constant	-1.639***	.177	.194	-1.692***	.186	.184
<b>Goodness of Fit Tests</b>						
-2 Log Likelihood		2139.990			2120.529	
p-values						
Step		.000			.000	
Block		.000			.000	
Model		.000			.000	
Cox & Snell R Square		.055			.062	
Nagelkerke R Square		.094			.106	
N		<b>2595</b>			<b>2595</b>	

Note: The logistic regressions models the probability of being a discouraged\_redefined borrower (=1). The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

**Phase II: Logistic Regression using young and established firms separately**

Table 11 presents phase II results of logistic regression using the modified definition of discouraged borrowers.

**Table 11: Logistic regression using the modified definition for Discouraged Borrowers (phase II)**

	Young Firms				Established Firms			
	Base Model		Augmented Model		Base Model		Augmented Model	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Growth Intention	-.108	.898	-.156	.855	-.245	.783	-.241	.786
Firm Size	-.154	.857	-.134	.875	-.363***	.696	-.353***	.703
<i>Industry</i>								
Wholesale & Retail	.853***	2.348	.812***	2.253	-.091	.913	-.176	.838
Services	.246	1.279	.270	1.310	-.191	.826	-.345	.708
Relationship Banking	-1.006***	.366	-.965***	.381	-1.463***	.231	-1.420***	.242
Length_Relation_FI	.062	1.064	.119	1.126	.665***	1.944	.686***	1.986
Owner Experience	-.149	.862	-.207	.813	-.236	.790	-.042	.959
R&D Firms	-.001	.999	-.036	.964	.432***	1.540	.404	1.498
Location	.328	1.388	.289	1.336	.862***	2.369	.887***	2.427
<i>Owner gender</i>								
50-50 ownership			-1.184***	.306			.434**	1.543
Majority-female owned			-.012	.988			1.145***	3.142
Constant	-1.563***	.210	-1.349***	.259	-2.027***	.132	-2.419***	.089
<b>Goodness-of Fit Tests</b>								
-2 Log Likelihood	835.698		817.927		1278.172		1248.693	
<b>p-values</b>								
Step	.000		.000		.000		.000	
Block Model	.000		.000		.000		.000	
Cox & Snell R -Sq.	.040		.060		.068		.084	
Nagelkerke R- Sq	.063		.094		.123		.151	
<b>N</b>	<b>865</b>				<b>1700</b>			

Note: The logistic regressions models the probability of being a discouraged\_redefined borrower (=1), for young firms and established firms, separately. The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

For young firms, results from augmented model suggest that while controlling for other variables, wholesale & retail firms are 2.253 more likely to be discouraged than goods firms (Exp B=2.253). It also indicates that firms with a designated account manager (from a financial institution) are less likely to be discouraged borrowers (Exp B=.381). The variables for gender show that 50-50 ownership firms are less likely to be discouraged than majority males-owned firms; however, the variable for majority-females owned firms is not significant.

For established firms, it can be seen that results are more or less consistent with those shown in table 10. Both firm size and length of relationship with a financial institution are negatively related to discouragement. Firms that have a designated account manager and are located in urban locations are positively related with discouragement (Exp B=1.986 & 2.427, respectively). Consistent with other previous results, gender is a highly significant variable, with majority-female owned firms to be 3 times more likely to be discouraged borrowers (Exp B=3.142) than majority-male owned firms.

A robustness check for the results obtained above is also conducted. A detailed method and results for the same is provided in Appendix-. It is found that results from the robustness model provide support to above results.

The following sub-section summarizes the study findings for further discussion.

### 5.3 Summary of Study Findings:

Table 12 summarizes the hypotheses proposed earlier in the study and their corresponding findings on the basis of above analysis. The following section will discuss these findings in detail by providing appropriate references from the literature.

**Table 12: Research Hypothesis and Related Findings**

Hypothesis	Findings
H1: Firm size and age are negatively correlated with the level of discouragement of SMEs.	<i>Supported (tables 7 and 10).</i> The relationship between firm age and discouragement is negative and highly significant. The relationship between firm size and discouragement is significant only where the definition of discouraged borrowers is re-defined (table 10 & 11).
H2: 2.a. Firms operating in service and wholesale & retail sectors are more likely to be discouraged than firms operating in goods sectors.	<i>Not supported.</i> The relationship is not found to be significant in multivariate analysis.
2.b. Firms that invest in R&D are more likely to be discouraged than non-R&D firms.	<i>Supported (table 3 &amp; table 13).</i> The relationship is significant and positive.
H3: 3.a. Firms with growth intentions are relatively more likely to have need for finance than firms with no growth intentions.	<i>Supported (tables 5&amp;6).</i> The relationship between firms with growth intentions and their need for finance is positive and highly significant.
3.b. Firms with growth intentions are relatively less likely to be discouraged than firms with no growth intentions.	<i>Not Supported.</i> The relationship is not significant in any case.
H4: SME owners with fewer years of work experience are more likely to be discouraged than more experienced counterparts.	<i>Partially Supported (tables 7&amp; 8).</i> The relationship between discouragement and owner experience is negative and significant for young firms but not for

established firms.

H5: 5.a. SMEs with banking relationship are less likely to be discouraged than those with no banking relationship.

*Supported (tables 7, 8, 10 & 11).* SMEs with a designated account manager are less likely to be discouraged and the relationship is highly significant.

5.b. SMEs with longer relationship with a financial institution are less likely to be discouraged than those with shorter relationships.

*Not supported (table 4).* The descriptive statistics suggests that firms with lesser years of relationships with a FI are discouraged. However, results from logistic models (tables 7, 8, 10 & 11) suggest that the relationship between length of relationship with a FI and discouragement is negative and highly significant.

H6: Women-owned firms are more likely to be discouraged than male-owned firms.

*Supported.* The relationship between female owned firms and discouragement is positive and highly significant in established firms.

---

## 6. Discussion on Findings

This section provides insights on the findings shown in section 5 by examining linkages between findings and literature. This will be followed by discussion on study's limitations and then study's implications for future research and policy makers. This section begins with the detailed analysis of model 1, followed by the analysis for model 2.

### 6.1 Summary- Findings from Model 1

Table 13 summarizes results of logistic regression analysis used for model 1 (Section 5- table 5 & 6). It provides a brief overview of the relationship type (+/-) between each independent and the dependent variable for the significant relationships only.

**Table 13: Summary of relationships for Model 1**

S.No.	Independent Variables	Dependent Variable	P(Need Finance)=1		
			Phase I	Phase II	
			All	Young Firms	Established Firms
1.	Growth Intention		+	+	+
2.	Firm Size		+	+	+
3.	Firm Age		ns		
4.	<i>Industry-Sector</i>				
	Wholesale & Retail sector		-	ns	-
	Service sector		-	-	-
5.	Relationship Banking		+	+	+
6.	Length_Relation_FI		-	-	-
7.	> 10yrs of owner experience		ns	ns	ns
8.	R&D Investment		+	+	+
9.	Location		-	-	-
10.	<i>Gender</i>				
	50-50 gender ownership		-	+	+
	Majority-female ownership		-	ns	-

Note: The dependent variable is the probability(Need Finance=1). The symbol + /- denotes a positive/negative relationship with the dependent variable; ns -not significant.

It is observed from table 13 that eight of the independent variables (that is, growth intention, firm size, industry (service sector), lending relationship, length of lending relationship, R&D

investment, location of a firms and 50-50 gender ownership) display significant and consistently similar relationships with 'need for finance' for both phases.

Consistent with Thornhill et al. (2004), this study finds that firms with growth intention are more likely to have a need for finance than firms with no growth intention consistently for young and established firms (table 13- line#1). This supports the hypothesis 3(a) that there is a positive relationship between need for finance and a firm's growth intention.

Further, table 13 (line #2) shows a positive relationship between firm size and need for finance, suggesting that larger firms are more likely to have a need for finance as compared to smaller firms. Larger firms have more financial requirements due to their larger operations and larger investments they might have to make in fixed assets (Robb & Wolken, 2002). On the other hand, the relationship between firm age and firm's need for finance is not found to be significant (table 13, line #3).

In terms of the variable industry-sector, it is found that firms operating in wholesale and retail and service sectors are less likely to have a need for finance than firms operating in goods sector (line #4, table 13). These results support the argument made by Orser et al. (2006) that firms in retail sectors have lesser capital requirements while on the other hand firms in good industry have a lot of investment in plants and machinery and other fixed assets (Abor, 2007).

According to tables -13 (line #5), 5 & 6, firms with relationship banking (presence of a designated account manager) are more likely to have a need for finance. This can be explained from a two-way perspective of borrowers and lenders- 1) firms that have a need for finance may like to have a relationship manager for needing assistance and to discuss their financing requirements; 2) relationship managers in bank tend to focus on prospective borrowers (clients they think will need finance) to bring in more business to the banks (Storbacka et al., 1990).

On the contrary, firms with longer years of relationship with a financial institution (line #6) are less likely to have a need for finance. A possible explanation for this finding could be that such firms might have already applied and received finance from the bank and they don't need finance anymore.

The relationship between owner experience and firm's need for finance is not found to be significant suggesting that a firm's need for finance is not significantly affected by its owner's experience.

The study finds that firms with R&D investment are more likely to have a need for finance as compared to non-R&D firms. According to Riding et al. (2012), R&D firms have more growth intentions suggesting that these firms have more financial requirement. Further, Czarnitzki and Hottenrott (2009) suggest that R&D firms have high investment costs and thus, requiring more funds.

The relationship between firm location and need for finance is negative meaning that firms located in Urban areas are less likely to have a need for finance as compared to firms in rural areas (table 5, 6 & 13). This is consistent with the argument made by Jarmin and Krizan (2010, p.17) that "... savings is a more common funding source in urban areas but not in rural or low income counties...".

In terms of the relationship between gender and firm's need for finance, it is found that firms that are 50-50 owned by males and females are more likely to have a need for finance than majority-male owned firms in both young and established firms (table 6 & table 13-line#10). On the other hand, firms (excluding young firms) that are majority-female owned are significantly less likely to have a need for finance as compared to majority-male owned firms. This is consistent with the findings of Watson (2006) that females are more likely that male owners are more likely to use internal funds than external funds; and that pecking-order theory applies more prominently to female-owned SMEs. The gender variables in table 13 (coefficients related to '50-50 ownership' & 'majority-female owned' firms) indicate that the relationship between gender and need for finance might not be linear in nature and the presence of male-owners in a firm may increase the probability of a firm's need for finance.

## **6.2. Summary- Findings from Model 2**

Table 14 outlines the results of logistic regression analysis used for model 2 (section 5- tables 7, 8, 10 & 11). It outlines the relationship type (+/-) between each independent and the dependent variable (probability of discouraged borrower being equal to 1) for the significant relationships only. This table presents results for both existing (narrower) as well as newer/re-defined

(broader) definitions for discouraged borrowers. Further, the results are summarize for both phase-I (tables 7 & 10) as well as phase-II (tables 8 & 11).

**Table 14: Summary of relationships for Model 1**

S.No.	<div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;"> <span style="font-size: 2em;">↘</span>  <span style="font-size: 1.5em;">↓</span> </div> <div style="text-align: center;"> <span style="font-size: 1.5em;">→</span>  <b>Dependent</b>  <b>Variables</b> </div> </div>	Model 2							
		P(Discouraged Borrower)=1 Phase-I (I)		P(Discouraged_Redefined)=1 Phase-I (II)		P(Discouraged Borrower=1) Phase-II (III)		P(Discouraged_redefined=1) Phase-II (IV)	
		All	All	Young	Established	Young	Established		
1.	Growth Intention	ns	ns	ns	ns	ns	ns		
2.	Firm Size	ns	-	ns	ns	ns	-		
3.	Firm Age	-	-						
4.	Industry Sector								
	Wholesale & Retail sector	ns	ns	ns	-	+	ns		
	Service sector	ns	ns	ns	ns	ns	ns		
5.	Relationship Banking	-	-	-	-	-	-		
6.	Length_Relation_FI	+	+	ns	+	ns	+		
7.	Owner experience	-	ns	-	ns	ns	ns		
8.	R&D Investment	+	ns	ns	+	ns	ns		
9.	Location	+	+	ns	+	ns	+		
10.	Gender								
	50-50 gender ownership	-	ns	-	ns	-	+		
	Majority-female ownership	+	+	ns	+	ns	+		

Note: The symbol +/- denotes a positive/negative relationship with the dependent variable; ns -not significant.

The relationship between growth intention and discouragement is not found to be significant in any of the models (table 14- line #1). This finding persists in the robustness model too (appendix -I). The reason can be that the variable growth intention is associated with other variables such as innovative firms, relationship banking, firm age and owner experience (shown in Annexure-I: table 17). When an interaction term<sup>9</sup> between growth intention and R&D firms is added to the model, both the interaction term and the growth intention variable are found to be significant. This suggests that growth intention may not be related to discouragement on its own (as shown

<sup>9</sup> According to Al and Norton (2003), interpretation of interaction between two variables in a non-linear model (Logistic Regression) is not quite as simple as it is in linear models (Linear Regression). According to them, evaluating the interaction by simply looking at sign, magnitude or statistical significant of its coefficient might lead to wrong inferences.

in descriptive statistics- table 4) but is related to the discouragement through other firm-specific and owner-specific characteristics.

It is observed from table 4 and table 14 (line# 2) that larger firms are less likely to be discouraged than smaller firms (table 4 and table 14- line# 2). However, the relationship is significant only in case of the re-defined (broader) definition of discouraged borrowers and established firms. This suggests that smaller firms are more likely to be discouraged borrowers than larger firms because they either fear denial or feel that the application process is too time consuming or think that the interests rates are too high, etc. The non-significant relationship between firm size and discouragement among young firms can be explained by the fact that young firms tend to be smaller than the established firms. These results are consistent with Robb and Wolken (2002) and Berger and Udell (1998) who argue that larger firms are more likely to apply for loans than smaller firms because they tend to have more tangible assets.

In terms of firm age, results from model 2 (table 13- line #3) indicate that younger firms are significantly more likely than older firms to not to apply for loans as per both existing and newer definition of discouraged borrowers. This is consistent with Berger and Udell (1998) who argue that younger and smaller firms rely more on internal funds because they are more informationally opaque as compared to older firms (Shikimi, 2013). Overall, the study finds that both younger and smaller firms are more likely to be discouraged borrowers and thus, offers support to hypothesis 1.

The relationship between industry sector and discouraged borrowers is not consistent and is non-significant in most of the cases shown in table 14 (line #4). Thus, it fails to support hypothesis 2(a).

In terms of banking relationship, it is found that firms with a designated account manager are consistently less likely to be discouraged across all the categories (table 14- line #5). This finding is supported by the argument made by Berger and Udell (1998) that lending relationships reduce information opacity among small firms. The presence of an account manager leads to the generation of *soft information*, especially young firms and might increase firm's confidence in getting access to finance and thus, make them less likely to be discouraged (Scott, 2006). This offers strong support to the hypothesis 5(a).

Although, the descriptive statistics (table 4) suggest that discouraged firms have lesser years of relationship with their primary financial institution (mean  $\ln(\text{years})=.2559$ ) as compared to loan applicants (mean  $\ln(\text{years})=.4238$ ), the multivariate logistic analysis tells the opposite (as summarized in Table 14- line #6). In line with Han et al. (2009) and Chandler (2010), the multivariate analysis shows that there is a positive association between length of lending relationship of firms and discouragement, suggesting that firms with longer relationship with their main FI are more likely to be discouraged, holding all other variables constant. It is interesting to note that for younger firms (Table 14- III & IV), this relationship is not significant, this can be owed to the fact that for younger firms, the length of relationship might not be substantially longer for such firms. Further, according to Scott (2006, p. 554), "a longer time at their primary bank allows the accumulation of *hard information* that decreases the chance of being turned down" for younger firms. This suggests that with longer relationships, established (older) SMEs become well informed about themselves and their financial institution (Chandler, 2010) and thus, making them realistic borrowers. In contrast to arguments offered by Scott (2006) and Chakravarty and Xiang (2012) that firms with longer lending relationships are more likely to have access to loan, this study suggests the opposite and provides support to the self-rationing mechanism proffered by Han et al. (2009) and later supported by Chandler (2010) that discouraged borrowers are risky borrowers who do not apply because they are well informed.

The descriptive analysis (table 4) shows that 13% of the firms with less than 10 years of work experience are discouraged borrowers as compared to only 6.7% of the firms with more than 10 years of work experience. Consistent with these results, the multivariate analysis find that firms with more than 10 years of work experience are less likely to be discouraged than firms with lesser years of owner experience (table 14- 1& III). These findings are consistent with Chakravarty and Xiang (2013) and Han et al. (2008). Further, it is interesting to note that relationship between owner experience and discouragement is significant among young firms but not among established firms (table 14 - III). As mentioned earlier, younger firms are discouraged since they lack their track records (Shikimi, 2013); however, if a young firm has an owner with more than 10 years of experience, this adds confidence to the firm and it is less likely to be discouraged. Further, according to Cole (2013) "firms with older owners are expected to be more creditworthy because they have long track records".

The result from the descriptive statistics indicates that both wholesale & retail sector and service sector firms have higher proportion of discouraged borrowers as compared to goods-sector firms (table 4). The possible explanation for this could be that firms in good sector have comparatively more tangible assets to offer as collaterals as compared to services and wholesale & retail firms. However, these results are not supported entirely because according to the multivariate analysis, the relationship between industry-sector and discouragement is not significant when the logistic regression is controlled for other control variables.

Table 14 (line #8) shows that established SMEs with R& D investment (innovative firms) are more likely to be discouraged borrowers than firms with no R&D investment (variable is not significant for younger SMEs). This is supported by the findings of Balakrishnan and Fox (1993) and Carpenter and Petersen (2002), who argue that R&D firms have specific assets that are intangibles and are difficult to measure; hence, they are more likely to face financing constraints. Also, Czarnitzki and Hottenrott (2009) find that R&D firms rely on internal sources of finance to a great extent. Thus, the study supports hypothesis 2 (b).

Harhoff and Korting (1998) find that firms in urban areas face higher interest rate despite the higher banking competition in densely populated cities. They argue that firms in urban areas are more likely to be credit constrained because of more competition and more number of firms present in urban areas. This study support such arguments since the multivariate analysis consistently find that firms located in urban areas are more likely to be discouraged than firms in rural locations (table 14- line #9). Thus, it can be argued that because firms at rural areas have to pay relatively lower interest rates and have lesser competition, they are more motivated to apply for external debt and hence are less likely to be discouraged than urban firms.

In contrast to the finding by Freel et al. (2012) that gender and discouragement are not significantly related, the descriptive statistics (table 4) and the multivariate analysis (table 14, line #10) tend to indicate the opposite. It is found that female-owned firms are significantly more likely to be discouraged borrowers as compared to majority-male owned firms, holding various firm-specific and owner-specific characteristics constant. This is consistent with Sexton and Bowman-Upton (1990, p. 29-30) that "female entrepreneurs are less willing than male entrepreneurs to become involved in situations with uncertain outcomes (risk taking)...". Further, this finding lends some support to Fabowale et al. (1995), Hil et al., (2007) and Verhuel and

Thurik (2000) in a sense that females might have low confidence and a negative self-perception that might lead to female-owned firms being discouraged.

If the relationship between discouragement and gender is scrutinized further, it is seen (from table 14) that firms with 50-50 ownership are less likely to be discouraged than majority-male owned firms, indicating that with decrease in the male ownership in a firm, the likelihood of discouragement decreases. Also, it is observed that majority-female owned firms are more likely to be discouraged than majority-male owned firms suggesting that absence of a male presence may increase the probability of discouragement. This indicates that the relationship between discouragement and gender might be non-linear. Additionally, Watson (2006, pg. 43) finds that "...external funding level gaps between male and female-controlled SMEs appear to widen over time". This is consistent with study's finding that the relationship between the majority-female owned firms and discouragement is significant for established firms but not for younger firms. This suggests that with time (older firms), the discouragement gap between majority male- and female-owned SMEs widens.

### **6.3 Study Limitations**

Notwithstanding the rich dataset, the study has some important limitations as described below.

First, the data is secondary and hence, the analysis is limited by the data that is collected. For instance, the study does not incorporate as many owner-specific characteristics (variables), such as owner-education level, as might be ideal for multivariate analysis as the data is not available on them. Further, although this study finds a positive relationship between firm's length of relationship with its main financial institution and discouragement; and lends support to the self-rationing mechanism introduced by Han et al, (2010), the study lacks sufficient data on quality of borrowers in order to judge risky borrowers. Literature shows that market concentration in terms of financial institutions are important determinants of credit access (Petersen & Rajan, 1995), however, there was no data available to capture and control for this effect. Thus, this study takes into account the fact that not all the important factors may have been controlled for in the multivariate analysis.

The second limitation of the study is that it is based on the survey data collected in 2004. It is evident that since 2004, there has been lot of changes in the financial markets following the 2008

recession, rendering lending institutions more conservative now than they were in 2004. This might have further influenced the extent of discouragement among SMEs. Further, missing data has been considered an important limitation. Although the total number of observations in the data is close to 12,000, cases are lost because of missing variables due to skip patterns in the questionnaire. This might lead to an increase in margin of error in results. In order to get rid of this problem, this study uses a method suggested by Cohen and Cohen (1983 in Acock, 20005) to treat missing values as one of the categories. Doing this eradicates the problem related to lost cases (Section 9, appendix -I).

## **6.4 Study Implications**

### **For policy makers:**

The study finds that majority-female owned firms are significantly more likely to be discouraged borrowers holding all other owner-specific (owner experience) and firm-specific characteristics (firm age, size, location, industry, etc.) constant. This suggests that even if majority-female owned firms need finance, they do not apply for loans because they fear denial and/or they feel that the process is inconvenient (time consuming, high interest rates, etc.). Thus, discouragement arguably constrains job-creating growth of many women-owned firms and may partially explain why women-owned firms tend to grow less rapidly than those owned by men. Further, the study finds that relationship banking (having a designated account manager) reduces the likelihood of discouragement among SMEs. Thus, policy makers can encourage both financial institutions as well as SMEs, majority-female owned firms in specific, to promote relationship banking with each other. This will help in relationship building between them and thus may encourage female-owned firms to apply for a loan when they need it.

Also, the study finds that innovative firms are more likely to need finance but they are more likely to fear denial (discouraged borrowers) because of information asymmetry and lack of collaterals (Carpenter and Petersen, 2002) and hence, these firms do not apply for loans. This can be unfavorable to their long-term economic growth.

Further, the study indicates that for young firms, relationship banking is significantly related to discouragement (tables 7, 8, 9 & 10). The presence of an account manager decreases the likelihood of discouragement in young firms. This suggests to policy makers that in order to

encourage young firms to apply for loans, banks can be motivated to provide account managers to these firms. This will help in relationship building between both parties and firms might gain confidence from this arrangement and feel comfortable about the loan process.

**For future research:**

To the best of author's knowledge, this is the first study to report discouragement in majority-female owned firms after controlling for other firm-specific and owner specific characteristics. The study has following implications for researchers:

The study finds a positive relationship between firms' length of relationship with the primary institution and discouragement. However, due to the limited information, the study is unable to comment if discouraged borrowers are risky borrowers (Han et al., 2009). Thus, a further study is required that identifies appropriate determinants of risk and controls for the same.

According to Kon and Storey (2003), discouraged borrowers are good borrowers that need finance but do not apply because they fear denial. This study suggests the need to compare profile of discouraged firms with that of firms whose applications have been rejected (denied borrowers) to determine the extent to which discouraged firms are indeed “good borrowers” per Kon and Storey (2003).

Further, a qualitative study can be conducted on discouraged borrowers to know what steps or measures could reduce the discouragement among firms and to know more about their risk appetite. It would be interesting to explore if discouragement in firms affects their performance in terms of profitability or growth etc. This will help to understand further implications of discouragement and hence, the importance of the concept. Thus, a future study that examines the relationship between discouragement and firm performance would be useful.

The study consistently finds that firms located in Urban locations are less likely to need for finance as compared to firms in rural locations. The study also finds that firms located in Urban locations are more likely to be discouraged than those located in rural locations, thus, supporting Harhoff and Korting (1998) and Scott (2006). Identifying factors responsible for this difference is beyond the scope of this study. Future research can be conducted focusing on these factors and their relationship with discouragement among urban and rural firms.

## 7. Conclusion

---

The study sought to examine and compare the extent of discouragement in young and established firms by using a sample representative of Canadian SMEs- by placing a particular focus on the gender mix of the ownership team. The motivation for conducting this study lay in the fact that previous studies comparing the demand -side financing preferences of male- and female-owned SMEs have not explored discouragement from a gender perspective, except for Freel et al. (2012) who did not find the relationship to be significant. This study extends the work done in the field of discouragement. Following the literature in this area, the study proposed 6 hypotheses related to variables considered important for discouragement. The study employed quantitative data analysis using the secondary data - a survey conducted by Statistics Canada on *Survey of Financing of Small and Medium Enterprise, 2004*.

The study finds that after controlling for various firm-specific and owner-specific characteristics, there is a strong relationship between discouragement and gender-mix of the ownership team among established firms. It finds that majority female-owned firms are significantly more likely to be discouraged than majority-male owned firms. In case of younger firms, however, such relationship is not significant. This indicates that among young firms, the financing preferences - in terms of discouragement- of majority-male and -female owned firms are not different significantly. Although previous literature suggests that there is no gender discrimination from lenders side, the study finds that demand-side gender based financing differences do exist. Further, the study suggests that in young firms, longer owner experience reduces the likelihood of discouragement in firms. The study also indicates that strong lending relationships are important in reducing the probability of discouragement in SMEs and young firms specifically. In terms of length of relationship, the study lends some support to self-rationing process (Han et al, 2009). In consistent with previous studies, it is found that younger firms are more likely to be discouraged than older firms. Further, the robustness of results is checked by using logistic models on young and established firms separately (phase-II), by broadening the definition of discouraged borrowers, and by treating missing values in independent variables as one of the categories. The results appear roughly the same in all these models.

## 8. References

---

- Acock, A. C. (2005). Working with missing values. *Journal of Marriage and Family*, 67(4), 1012-1028.
- Ai, C. & Norton, E.C. (2003). Interaction terms in logit and probit models. *Economic Letters*, 80, 123-129.
- Alec R Levenson,& Kristen L Willard. (2000). Do firms get the financing they want? Measuring credit rationing experienced by small businesses in the US. *Small Business Economics*, 14(2), 83-94.
- Balakrishnan, S., & Fox, I. (1993).Asset specificity, firm heterogeneity and capital structure. *Strategic Management Journal (1986-1998)*, 14(1), 3.
- Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2008). Financing patterns around the world: Are small firms different? *Journal of Financial Economics*, 89(3), 467-487.
- Becker-Blease, J. R., & Sohl, J. E. (2007). Do women-owned businesses have equal access to angel capital? *Journal of Business Venturing*, 22(4), 503-521.
- Berger, A. N., Cerqueiro, G., & Penas, M. F. (2013). Market size structure and small business lending: Are crisis Times different from normal Times? *Conference at the CEPR/ECB/Kelley School of Business/ Review of Finance Conference on Small Business Lending*, Frankfurt.
- Berger, A.N., & Udell, G.F. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking & Finance*, 22(6-8), 613-673.
- Bigelow, L., Lundmark, L., & Parks, J. M. L. (2012). Skirting the issues: Experimental evidence of gender bias in IPO prospectus evaluations . *Journal of Management*.
- Binks, M. R., & Ennew, C. T. (1996).Growing firms and the credit constraint. *Small Business Economics*, 8(1), 17-25.
- Brierley, P. (2001). The financing of technology-based small firms: A review of the literature. *Bank of England. Quarterly Bulletin*, 41(1), 64-83.
- Brindley, C. (2005). Barriers to women achieving their entrepreneurial potential. *International Journal of Entrepreneurial Behaviour & Research*, 11(2), 144-161.

- Brown, M., Ongena, S., Popov, A., & Yesin, P. (2011). Who needs credit and who gets credit in Eastern Europe? *Economic Policy*, 26(65), June 12, 2013-93-130.
- Brush, C. G., & Cooper, S. Y. (2012). Female entrepreneurship and economic development: An international perspective. *Entrepreneurship & Regional Development*, 24(1-2), 1-6.
- Business Development Bank of Canada.(2011). SMEs at a glance - august 2011. Retrieved April, 17, 2013, from <http://www.bdc.ca/EN/Documents/other/SMEsAtAGlance-Summer%202011.pdf>
- Buttner, E. H., & Rosen, B. (1992). Rejection in the loan application process: Male and female entrepreneurs' perceptions and subsequent intentions. *Journal of Small Business Management*, 30(1), 58-65.
- Buttner, E. H., & Rosen, B. (1988). Bank loan officers' perceptions of the characteristics of men, women and successful entrepreneurs. *Journal of Business Venturing*, 3, 249-258.
- Carpenter, R. E., & Petersen, B. C. (2002). Capital market imperfections, high-tech investment, and new equity financing. *The Economic Journal*, 112(447), F54-F72.
- Carter, S., & Rosa, P. (1998).The financing of male and female -owned businesses. *Entrepreneurship & Regional Development*, 10, 225-241.
- Cavalluzzo, K. S., Cavalluzzo, L. C., & Wolken, J. D. (2002). Competition, small business financing, and discrimination: Evidence from a new survey. *Journal of Business*, 75(4), 641-679.
- Chaganti, R. (1986). Management in women-owned enterprises. *Journal of Small Business Management*, 24(4), 18-29.
- Chakravarty, S., & Xiang, M. (2013).The international evidence on discouraged small business. *Journal of Empirical Finance*, 20, 63-82.
- Chandler, V. (2010). An interpretation of discouraged borrowers based on relationship lending (working paper). Retrieved March, 6, 2013, from [http://www.ic.gc.ca.proxy.bib.uottawa.ca/eic/site/061.nsf/vwapj/Interpretation\\_Borrowers-Emprunteurs\\_Aug-Aout2010\\_eng.pdf/\\$FILE/Interpretation\\_Borrowers-Emprunteurs\\_Aug-Aout2010\\_eng.pdf](http://www.ic.gc.ca.proxy.bib.uottawa.ca/eic/site/061.nsf/vwapj/Interpretation_Borrowers-Emprunteurs_Aug-Aout2010_eng.pdf/$FILE/Interpretation_Borrowers-Emprunteurs_Aug-Aout2010_eng.pdf)

- Cliff, J. E. (1998). Does one size fit all? exploring the relationship between attitudes towards growth, gender, and business size. *Journal of Business Venturing*, 13(6), 523-542.
- Cole, R. A. (1998). The importance of relationships to the availability of credit. *Journal of Banking & Finance*, 22, 959-977.
- Coleman, S. (2000). Access to capital and terms of credit: A comparison of men- and women-owned small businesses. *Journal of Small Business Management*, 38(3), 37-52.
- Coleman, S., & Robb, A. (2009). A comparison of new firm financing by gender: Evidence from the Kauffman firm survey data. *Small Business Economics*, 33, 397-411.
- Coleman, S. (2000). Access to capital and terms of credit: A comparison of men- and women-owned small businesses. *Journal of Small Business Management*, 38(3), 37-52.
- Cressy, R. (2002). Funding gaps: A symposium. *The Economic Journal*, 112(477), 1-16.
- Creswell, J. W. (2013). *Qualitative inquiry & research design* (3rd ed.) SAGE Publications, Inc.
- Czarnitzki, D., & Hottenrott, H. (2011). R&D investment & financing constraints of small and medium-sized firms. *Small Business Economics*, 36, 65-83.
- Dobbs, M., & Hamilton, R. T. (2007). Small business growth: Recent evidence and new directions. *International Journal of Entrepreneurial Behaviour & Research*, 13(5), 296.
- Du Rietz, A., & Henrekson, M. (2000). Testing the female underperformance hypothesis. *Small Business Economics*, 14(1), 1-10.
- Fabowale, L., Orser, B., & Riding, A. (1995). Gender, structural factors, and credit terms between Canadian small businesses and financial institutions. *Entrepreneurship Theory and Practice*, 19(4), 41-65.
- Fairlie, R. W., & Robb, A. M. (2009). Gender differences in business performance: Evidence from the characteristics of business owners survey. *Small Business Economics*, 33, 375-395.
- Fay, M., & Williams, L. (1993). Gender bias and the availability of business loans. *Journal of Business Venturing*, 8(4), 363-376.

- Fraser, S. (2006). *Finance for small and medium-sized enterprises: A report on the 2004 UK survey of SME finances*. Centre for Small and Medium-sized Enterprises: Warwick Business School.
- Freel, M., Carter, S., Tagg, S., & Mason, C. (2012). The latent demand for bank debt: Characterizing “discouraged borrowers”. *Small Business Economics*, 38(4), 399-418.
- Goffee, R., & Scase, R. (1983). Business ownership and women's subordination: A preliminary study of female proprietors. *Sociological Review*, 31, 625-648.
- Haines, G. H. Jr., Orser, B. J., & Riding, A. L. (1999). Myths and realities: An empirical study of banks and the gender of small business clients. *Canadian Journal of Administrative Sciences/Revue Canadienne Des Sciences De l'Administration*, 16(4), 291-307.
- Hall, B., H., & Lerner, J. (2009). The financing of R&D and innovation. Working Paper no. 15325. *National Bureau of Economic Research*, 1-55.
- Haltiwanger, J., Jarmin, R. S., & Miranda, J. (2013). Who creates jobs? small versus large versus young. *Review of Economics & Statistics*, 95(2), 347-361.
- Han, L., Fraser, S., & Storey, D. J. (2009). Are good or bad borrowers discouraged from applying for loans? evidence from US small business credit markets. *Journal of Banking and Finance*, 33(2), 415-424.
- Hendon, J. R., & Bell, J. R. (2011). Gender-based attitudes and preferences regarding start-up and ongoing SME financing, financial structure and risk. . *Small Business Institute Journal*, 7(1), 106-126.
- Hertz, N. (2011). Women still get a raw deal in business and finance. *Financial Times*. Retrieved from <http://www.ft.com/cms/s/0/f7b05de6-0abc-11e1-b9f6-00144feabdc0.html>
- Hill, F. M., Leitch, C. M., & Harrison, R. T. (2006). ‘Desperately seeking finance?’ the demand for finance by women-owned and -led businesses. *Venture Capital*, 8(2), 159-182.
- Holmes, S., & Kent, P. (1991). An empirical analysis of the financial structure of small and large Australian manufacturing enterprises. *Journal of Small Business Finance*, 1(2), 141-154.
- Hulten, A. V. (2012). Women's access to SME finance in Australia. *International Journal of Gender and Entrepreneurship*, 4(3), 266-288.

- Industry Canada. (2012). "How many small business entrepreneurs are women?" *Key Small Business Statistics Canada- July 2012*. Retrieved April, 17, 2012, from <http://www.ic.gc.ca.proxy.bib.uottawa.ca/eic/site/061.nsf/eng/02727.html>
- Jarmin, R. S., & Krizan, C. J. (2010). Past experience and future success: New evidence on owner characteristics and firm performance. *US Census Bureau Center for Economic Studies Paper no. CES-WP-10-24.*, (US Census Bureau Center for Economic Studies Paper No. CES-WP-10-24.)
- Jung, O. (2010). Financing profile: Women entrepreneurs (October, 2010). Retrieved May/28, 2013, from [http://www.ic.gc.ca.proxy.bib.uottawa.ca/eic/site/061.nsf/eng/h\\_02215.html](http://www.ic.gc.ca.proxy.bib.uottawa.ca/eic/site/061.nsf/eng/h_02215.html)
- Keating, K. (2012, ). Female entrepreneurs and the challenges they face. Message posted to <http://blog.fundinggates.com/2012/11/female-entrepreneurs-and-the-challenges-they-face/>
- Kon, Y., & Storey, D. J. (2003). A theory of discouraged borrowers. *Small Business Economics*, 21(1), 37-49.
- Lucey, B. M., & Bhaird, C. M. (2006). *Capital structure and the financing of SMEs: Empirical evidence from an Irish survey*. Unpublished manuscript.
- Madill, J., Riding, A. L., & Haines, G. H. (2006). Women entrepreneurs: Debt financing and banking relationships. *Journal of Small Business and Entrepreneurship*, 19(2), 121-142.
- Martins, A. T. 5 obstacles women entrepreneurs encounter and how to surmount them. Retrieved May/22, 2013, from <http://www.evancarmichael.com/Starting-A-Business/5396/5-Obstacles-Women-Entrepreneurs-Encounter-and-How-to-Surmount-them.html>
- Mattis, M. C. (2004). Women entrepreneurs: Out from under the glass ceiling. *Women in Management Review*, 19(3), 154-163.
- Menzies, T. V., & Diochon, M. & Gasse, Y. (2004). Examining venture-related myths concerning women entrepreneurs. *Journal of Developmental Entrepreneurship*, 9(2), 89-107.
- Mitchell, W. (1994). The dynamics of evolving markets: The effects of business sales and age on dissolutions and divestitures. *Administrative Science Quarterly*, 39, 575-602.

- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221.
- Neville, F., Orser, B., Riding, A., & Jung, O. (2014). Do young firms owned by recent immigrants outperform other young firms? *Journal of Business Venturing*, 29(1), 55-71.
- Niskanen, M., & Niskanen, J. (2010). Small business borrowing and the Owner–Manager agency costs: Evidence on Finnish data. *Journal of Small Business Management*, 48(1), 16-31.
- Orhan, M. (2001). Women business owners in France: The issue of financial discrimination. *Journal of Small Business Management*, 39(1), 95-102.
- Orser, B., & Hogarth-Scott, S. (2002). Opting for growth: Gender dimensions of choosing enterprise development. *Canadian Journal of Administrative Sciences*, 19(3), 284-300.
- Orser, B. J., Riding, A. L., & Manley, K. (2006). Women entrepreneurs and financial capital. *Entrepreneurship Theory and Practice*, 30(5), 643-665.
- Ortiz-Molina, H., & Penas, M. F. (2008). Lending to small businesses: The role of loan maturity in addressing information problems. *Small Bus Econ*, 30, 361-383.
- Patterson, H., & Anderson, D. (2003). What is really different about rural and urban firms? some evidence from northern Ireland. *Journal of Rural Studies*, 19(4), 477-490.
- Petersen, M. A., & Rajan, R. G. (1995). The effect of credit market competition on lending relationships. *The Quarterly Journal of Economics*, , 407-443.
- Petersen, M. A., & Rajan, R. G. (1994). The benefits of lending relationships: Evidence from small business data. *The Journal of Finance*, 49(1), 3-37.
- Pettit, R. R., & Singer, R. F. (1985). Small business finance: A research agenda. *Financial Management (1972)*, 14(3), 47-60.
- Ransom, D. (2011). Do women entrepreneurs face gender discrimination? *Entrepreneur*. Retrieved from <http://www.entrepreneur.com/blog/219564>

- Riding, A., Orser, B., & Chamberlin, T. (2012). Investing in R&D: Small- and medium-sized enterprise financing preferences. *Venture Capital*, 14(2-3), 199-214.
- Robb, A., & Wolken, J. (2002). Firm, owner, and financing characteristics: Differences between female- and male-owned small businesses (working paper no. 2002-18). Retrieved March/3, 2013, from [http://www.federalreserve.gov.proxy.bib.uottawa.ca/pubs/oss/oss3/ssbf98/FEDS\\_robbwolken.pdf](http://www.federalreserve.gov.proxy.bib.uottawa.ca/pubs/oss/oss3/ssbf98/FEDS_robbwolken.pdf)
- Robert T. Hamilton, & Mark A. Fox. (1998). The financing preferences of small firm owners. *International Journal of Entrepreneurial Behaviour & Research*, 4(3), 239-248.
- Robert, G., & Richard, S. (1985). *Women in charge: The experience of female entrepreneurs*. London and Boston: Allen & Unwin.
- Romano, C. A., Tanewski, G. A., & Smyrnios, K. X. (2001). Capital structure decision making. *Journal of Business Venturing*, 16(3), 285-310.
- Roper, S., & Scott, J. (2009). Perceived financial barriers and the start-up decision. *International Small Business Journal*, 27(2), 149-171.
- Rosa, P., Carter, S., & Hamilton, D. (1996). Gender as a determinant of small business performance: Insights from a British study. *Small Business Economics*, 8(6), 463-478.
- Sabarwal, S., & Terrell, K. (2008). Does gender matter for firm performance? evidence from eastern Europe and central Asia. *Policy Research Working Paper-4705*. The World Bank.
- Sara, C., & Peter, R. (1998). The financing of male- and female-owned businesses. *Entrepreneurship & Regional Development*, 10(3), 225-242.
- Scott, J. A. (2006). Loan officer turnover and credit availability for small firms. *Journal of Small Business Management*, 44(4), 544-562.
- Sexton, D. L., & Bowman-Upton, N. (1990). Female and male entrepreneurs: Psychological characteristics and their role in gender-related discrimination. *Journal of Business Venturing*, 5(1), 29-36.
- Shikimi, M. (2013). Do firms benefit from multiple banking relationships? Evidence from small and medium- sized firms in Japan. *International Economics and Economic Policy*, 10(1), 127-157.

- Smallbone, D., & North, D. (1995). Targeting established SMEs: Does their age matter? *International Small Business Journal*, 13(3), 47-64.
- Stel, A. V., Storey, D. J., & Thurik, A. R. (2007). The effect of business regulations on nascent and young business entrepreneurship. *Small Business Economics*, 28, 171-186.
- Stengel, G. (Sep, 2012), Why women entrepreneurs make less than men. *Forbes*. Retrieved from <http://www.forbes.com/sites/geristengel/2012/09/19/why-women-entrepreneurs-make-less-than-men/>
- Storbacka, K., Strandvik, T., & Gronroos, C. (1994). Managing customer relationships for profit: The dynamics of relationship quality. *International Journal of Service Industry Management*, 5(5), 21-38.
- Thornhill, S., Gellatly, G., & Riding, A. (2004). Growth history, knowledge intensity and capital structure in small firms. *Venture Capital*, 6(1), 73-89.
- Verheul, I., & Thurik, R. (2001). Start-up capital: "Does gender matter?". *Small Business Economics*, 16(4), 329-346.
- Watson, J., Newby, R., & Mahuka, A. (2009). Gender and the SME finance gap. *International Journal of Gender and Entrepreneurship*, 1, 42-56.
- Watson, J. (2006). External funding and firm growth: Comparing female- and male-controlled SMEs. *Venture Capital*, 8(1), 33-49.

## 9. Appendix-1: Robustness Check

---

In order to check the robustness of results obtained in model2 using both narrower and broader definitions of discouraged borrowers, the following technique is used.

### **Treating Missing Values as One of The Categories:**

While conducting the logistic regression analysis, it is found that although the number of discouraged firms in the total sample are 459 and 853 as per the regular and modified definition of discouraged borrowers, respectively (table 3(b) and table 9); this number gets reduced by almost half when these variables are fed into the logistic regression model. This is found to be so because of the presence of missing values in the independent variables. By default, SPSS logistic regression does a listwise deletion of missing data. In order to avoid such a problem, variables related to *growth intention*, *R&D investment*, *owner experience* and *gender* are re-coded by treating missing values in these variables as one of the categories (Cohen & Cohen, 1983 in Acock, 2005). In doing so, cases with missing values are not lost and all cases are included in the logistic regression analysis. This method further allows checking the robustness of previous results related to model 2.

The left panel in table 15 provides results for the logistic regression by taking discouraged borrower as the dependent variable; whereas the right panel provides results for the logistic regression, taking redefined discouraged borrower as the dependent variable. Table 15 shows that even after retreating the missing values as one of the categories, the logistic regression results are almost similar to the initial findings (table 7 and 10) and thus, provide support to the earlier findings.

The output of augmented model in the left panel (discouraged\_borrowers) still proffers support to the hypothesis that female-owned firms are more likely to be discouraged. Similarly, the augmented model in the right panel (discouraged\_redefined) seems to be in consistent with results in Table 10. The logistic regression models for young and established firms (tables 16 & 17) provide similar results as obtained in table 8 and table 11, thus, support earlier findings.

**Table 15: Logistic Models for discouraged borrower and Discouraged borrower\_redefined (Phase 1) using missing values as one of the categories**

	P(Discouraged_Borrower)=1				P(Discouraged_Redefined)=1			
	Base Model		Augmented Model		Base Model		Augmented Model	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	Exp(B)
Firm Size	-.066	.936	-.057	.945	-.290***	.749	-.286***	.751
Firm Age	-.593***	.553	-.599***	.549	-.397***	.672	-.380***	.684
Industry								
Wholesale & Retail	-.090	.914	-.106	.899	.309*	1.362	.273	1.314
Services	-.066	.936	-.170	.843	-.021	.979	-.114	.892
Relationship Banking	-1.370***	.254	-1.333***	.264	-1.271***	.281	-1.260***	.284
Length_Relation_FI	.512***	1.669	.530***	1.699	.535***	1.707	.547***	1.729
GI_Missing								
Missing Cat.	23.287	12983743814	23.375	14171813301	22.745	7552626187	22.855	8425722606
Growth Intention	-.130	.878	-.141	.868	-.198	.820	-.195	.823
Location	.787***	2.196	.704***	2.022	.698***	2.010	.664***	1.942
R&D_Missing								
R&D Investment	.321**	1.379	.269*	1.308	.201*	1.223	.168	1.183
Exp_Missing								
>10 years of experience	-.426**	.653	-.344**	.709	-.167	.846	-.108	.898
Gender_Missing								
Majority-females			.667***	1.948			.620***	1.859
50-50 owned			-.407*	.666			-.114	.892
Constant	-2.278***	.103	-2.253***	.105	-1.639***	.194	-1.692***	.184
<b>Goodness of Fit Tests</b>								
-2 Log Likelihood		1330.296		1311.059		2139.990		2120.529
<b>p-values</b>								
Step		.000		.000		.000		.000
Block		.000		.000		.000		.000
Model		.000		.000		.000		.000
Cox & Snell R Square		.343		.348		.383		.387
Nagelkerke R Square		.569		.577		.550		.556
	<i>N</i>	<b>2637</b>			<b>3031</b>			

Note: Note: The logistic regressions model the probability of being a discouraged borrower (=1) and a discouraged\_redefined borrower (=1), for samples of young firms and established firms, separately. The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

**Table 16: Logistic Regression using missing values as one of the categories for Discouraged Borrowers (Phase II)**

	Young Firms				Established Firms				
	Base Model		Augmented Model		Base Model		Augmented Model		
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	EXP(B)	
Firm Age	.002	1.002	.014	1.014	-.114	.892	-.089	.915	
Industry									
Wholesale & Retail	.512*	1.668	.513	1.671	-1.067**	.344	-.991**	.371	
Services	-.197	.822	-.161	.851	.003	1.003	-.193	.824	
Relationship Banking	-1.097**	.334	-1.117**	.327	-1.457***	.233	-1.375***	.253	
Length_Relation_FI	-.101	.904	-.031	.969	.672***	1.958	.692***	1.997	
GI_Missing									
Missing Cat.	22.524	6051090003	22.304	4859083097	24.386	3896092385	24.866	62952826238	
Growth Intention	-.139	.870	-.193	.825	-.151	.859	-.184	.832	
Location	.148	1.159	.063	1.065	1.209***	3.350	1.103***	3.014	
R&D_Missing									
R&D Investment	-.121	.886	-.159	.853	.752***	2.121	.748***	2.113	
Exp_Missing									
>10 yrs of experience	-.523**	.593	-.597**	.550	-.351	.704	-.043	.958	
Gender_missing									
Majority-females			-.108	.898			1.400***	4.054	
50-50 owned			-1.153***	.316			.269	1.308	
Constant	-1.515***	.220	-1.245***	.288	-3.438	.032	-3.857***	.021	
<b>Goodness of Fit Tests</b>									
<i>-2 Log Likelihood</i>		583.314		572.438		703.989		679	
<i>p-values</i>									
Step		.000		.004		.000		.000	
Block		.000		.004		.000		.000	
Model		.000		.000		.000		.000	
<i>Cox &amp; Snell R Square</i>		.390		.397		.312		.322	
<i>Nagelkerke R Square</i>		.577		.587		.574		.592	
<i>N</i>		<b>921</b>				<b>1715</b>			

Note: The logistic regressions model the probability of being a discouraged borrower (=1) for samples of young firms and established firms, separately. The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

**Table 17: Logistic Regression using missing values as one of the categories for Redefined Discouraged Borrowers (Phase II)**

	Young Firms				Established Firms			
	Base Model		Augmented Model		Base Model		Augmented Model	
	B	Exp(B)	B	Exp(B)	B	Exp(B)	B	EXP(B)
Firm Size	-.154	.857	-.134	.875	-.363***	.696	-.353***	.703
Industry								
Wholesale & Retail	.853***	2.348	.812***	2.253	-.091	.913	-.176	.838
Services	.246	1.279	.270	1.310	-.191	.826	-.345*	.708
Relationship Banking	-1.006***	.366	-.965***	.381	-1.463***	.231	-1.420***	.242
Length_Relation_FI	.062	1.064	.119	1.126	.665***	1.944	.686***	1.986
GI_Missing								
Missing Cat.	22.324	4956784737	22.125	4062073813	23.133	11133587875	23.592	17621532459
Growth Intention	-.108	.898	-.156	.855	-.245	.783	.128	.786
Location	.328	1.388	.289	1.336	.862***	2.369	.887***	2.427
R&D_Missing								
R&D Investment	-.001	.999	-.036	.964	.432***	1.540	.404**	1.498
Exp_Missing								
>10 yrs of experience	-.149	.862	-.207	.813	-.236	.790	-.042	.959
Gender_missing								
Majority-females			-.012	.988			1.145***	3.142
50-50 owned			-1.184***	.306			.434**	1.543
Constant	-1.563***	.210	-1.349***	.259	-2.027***	.132	-2.419***	.089
<b>Goodness of Fit Tests</b>								
<i>-2 Log Likelihood</i>	835.698		817.927		1278.172		1248.693	
<i>p-values</i>								
<i>Step</i>	.000		.004		.000		.000	
<i>Block</i>	.000		.004		.000		.000	
<i>Model</i>	.000		.000		.000		.000	
<i>Cox &amp; Snell R Square</i>	.405		.415		.364		.374	
<i>Nagelkerke R Square</i>	.557		.571		.545		.559	
<i>N</i>	<b>1070</b>				<b>1950</b>			

Note: The logistic regressions model the probability of being a redefined\_discouraged borrower (=1) for samples of young firms and established firms, separately. The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

## 10. Annexure-I

**Table 18: Cross tabulation with Growth Intention**

	<b>No Growth Intention</b>	<b>Growth Intention</b>	<b>Total</b>	<b>Chi-Square Statistics</b>
R&D Firms	37.5%	62.5%	2341	537.130***
Non-R&D Firms	65.9%	34.1%	5406	
Relationship Banking	50.9%	49.1%	1211	23.893***
No Relationship Banking	58.5%	41.5%	6537	
Young Firms	44.0%	56%	2586	281.494***
Established Firms	64.0%	36%	5161	
<10 years of experience	48.6%	51.4%	2462	112.871***
>10 years of experience	61.4%	38.6%	5285	

Note: Result from Chi-square statistics. The levels of significance are defined in the following way: \*\*\* corresponds to 1%, \*\* corresponds to 5% and \* corresponds to 10%.

**Table 19: Correlation Matrix of Variables**

	Growth Intention	Firm Size	Industry Sectors	Owner Gender	Have a lending relationship	Length of Relation_FI	Owner Experience	R& D Firms	Discouraged Borrower	Firm Age	Location
<b>Growth Intention</b>	1										
<b>Firm Size</b>	.115**	1									
<b>Industry Sectors</b>	-.016	-.050**	1								
<b>Owner Gender</b>	-.041**	-.083**	-.100**	1							
<b>Have a lending relationship</b>	.056**	.075**	-.015	.003	1						
<b>Length Relation_FI</b>	-.017	-.026**	-.002	-.037**	.560**	1					
<b>Owner Experience</b>	-.121**	.089**	.099**	-.109**	.035**	.120**	1				
<b>R&amp; D Firms</b>	.263**	.064**	-.031**	.043**	.051**	.015	-.021	1			
<b>Discouraged Borrower</b>	.051**	-.010	-.045**	.028*	-.033**	-.031**	-.051**	.046**	1		
<b>Firm Age</b>	-.190**	.126**	.066**	-.033**	.024**	.136**	.408**	-.043**	-.059**	1	
<b>Location</b>	.071**	.029**	-.194**	.000	.002	-.029**	-.149**	.050**	.040**	-.102**	1

Note: N= 7,747. \*\* corresponds to significance at the 0.01 level (2-tailed), \* corresponds to the significance at .05 level (2-tailed) .