

## FINANCING SME EXPORTERS

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### INTRODUCTION

This empirical paper draws on data from the SME Financing Data Initiative (SME FDI)<sup>1</sup> to examine the extent to which Canadian exporter firms face disproportionate difficulty with respect to access to finance. This is important because exporting is vital to the growth of the Canadian economy and constitutes a key component to Canada's growth strategy. Exporter firms account for over 40 percent of Canadian gross domestic productivity<sup>2</sup> and for one in three Canadian jobs (Export Development Canada, 2005). In particular, small and medium-sized enterprises (SMEs) comprise the majority of firms that sell goods and services abroad, collectively accounting for 85 percent of exporter businesses (Halabisky and Parsley, 2005). Between 1993 and 2002, the value of Canada's exports more than doubled, but exporters clearly contributed proportionally far more jobs than non-exporters during this period (Industry Canada, 2006). Lu and Beamish (2001: 565) anticipate that the importance of exporting will continue to increase: "the internationalization of SMEs can be expected to gain further momentum because the world economy is becoming increasingly integrated with continued declines in government-imposed barriers and continued advances in technology." Given the links among small business exports, increased productivity, job creation, and economic growth (Baldwin and Gu, 2003; Lefebvre and Lefebvre, 2000), it is essential to ensure that exporter businesses, especially SMEs, are able to access financing on terms that are appropriate.

There is reason to suspect that small Canadian exporter firms may face particular challenges with respect to securing financing. These suspicions arise from two literatures: the general literature on financing gaps, and from the particular literature on the internationalization of small firms. The literature of capital market gaps posits that certain types of firms face more difficulty accessing financial capital than do other firms (OECD, 2006). There appears to be some suggestive empirical evidence that this might be true. Surveys conducted by the Canadian Federation of Independent Business (CFIB) of their members report that a disproportionate number of "younger, high growth firms" were among those businesses that were unable to obtain the financing they sought (CFIB, 2001). In addition, Export Development Corporation's (EDC) semi-annual surveys of exporters reported that 21 percent of enterprises cited insufficient

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<sup>1</sup> The SME Financing Initiative is a joint undertaking by Industry Canada, Finance Canada, and Statistics Canada to gather and analyze data pertaining the SMEs' financing experiences. The data employed here are drawn from the SME FDI Survey on Financing of Small and Medium Enterprises (2004).

<sup>2</sup> Statistics Canada, CANSIM, Table 380-0002 and Catalogue No. 13001-XIB.

financing as a reason for not investing outside of Canada). Lastly, work undertaken by Nitani *et al.* (2004) reported that Canadian SME exporters had applications for bank loans turned down with a relatively high frequency.

Research on the internationalization of new firms, particularly that on so-called “international new ventures” (INVs), suggests three types of liability common to INVs (Zahra, 2005, p.23). First, their newness and inexperience limits access to resources (including financial resources). Second, many INVs are small firms with few slack resources constraining their ability to compete. Third, the “foreignness of INVs” implies that they must work especially hard to overcome barriers to entry. According to Zahra (p. 23) “any of these liabilities can increase the risk of INVs potential failure” and thereby reduce the firms access to debt financing.

The juxtaposition of these literatures provides a conceptual basis for expecting that exporter firms may face particular difficulties obtaining financing. This paper seeks to examine empirically this possibility, and whether, after allowing for reasonable determinants of access to capital, exporters face a financing gap in terms of their access to debt capital. The work also examines empirically the extent to which recently established exporter firms, after allowing for reasonable determinants of access to capital, face a financing gap in terms of their access to debt capital.

To do so, the paper is organized as follows. The next section presents a concise summary of the literatures on capital market gaps and on the financing of exporter firms. This is followed by a description of the data and methodologies employed here to assess the extent to which Canadian SME exporters are able to access financing on an appropriate basis. Some common attributes about Canadian exporter SMEs and their financing characteristics are then presented, followed by the empirical findings of the two propositions to be tested above. The paper closes with a discussion of the overall findings and suggestions for future research.

## **REVIEW OF THE LITERATURE**

### **Financing Gaps**

Many of the issues related to the financing of SMEs revolve around the concept of “gaps” in financial marketplaces, the presence of which has been the subject of extensive debate and research over the last generation. As used in the popular media the word “gap” connotes the idea of a shortage: a sense that the supply of the commodity in demand is insufficient and that the demand cannot be satisfied. According to economic theory, a shortage (surplus) exists when the price for the product/service is too low (high). In the case of a shortage, prices ought then to rise to the point that supply and demand clear. For a shortage to persist some form of imperfection must interfere with the ability of the market to clear. If so, remedial measures ought ideally to be based on the nature of the imperfection. In the absence of an imperfection, intervention is not warranted.

The mere fact that some firms are unable to obtain as much debt or equity capital as they seek is not evidence of financing gaps. Applications for financing from some firms are, and should be, turned down. The seminal works of Stiglitz and Weiss (1981, 1983) and their successors has given rise to an extensive academic literature in which capital market gaps and capital rationing continue to be debated. In the literature, it is argued that the causes of financing gaps are imperfections in the marketplace that arise because of differences in the information available to the parties involved in the transaction. A capital market gap exists if: (a) among loan applicants who appear to be identical some receive credit while others do not; or, (b) there are identifiable groups in the population that are unable to obtain financing at any price (OECD, 2006 among others). Parker (2002: 163) states the case:

*“Information about [small] firms may be limited and asymmetric, stacked on the side of the borrower at the lender’s hazard. This has led many influential academics and politicians to claim that these problems can be so severe that the supply of finance may disappear altogether. Banks, it is argued, may ration credit to new enterprises, strangling new, dynamic and innovative future industrial giants at birth.”*

It is beyond the scope of this paper to review the extensive theoretical and empirical literature on credit rationing. Parker (2002) provides a review of the literature pertaining to capital rationing from which he concludes (p. 162) that theoretical arguments are inconclusive and empirical evidence, which is inherently difficult to obtain, does not support the view that credit rationing is important or widespread.

In the Canadian context, work conducted by the Angus Reid Group (2000) on behalf of the Business Development Bank of Canada (BDC, 2001) suggested four perceived gaps that relate to the debt markets in which SMEs participate. According to the BDC (p. 117), Canadian SMEs face four types of financing gaps:

1. A **size** gap such that business owners who seek small loans perceive that their borrowing needs are too small to be of interest to institutional lenders.
2. A **risk** gap whereby lenders do not price loans to reflect risk (rather, they reject loan applications if risk exceeds a particular threshold or if insufficient collateral is available).
3. A **flexibility** gap such that financial institutions do not provide flexible terms and conditions on their loans.
4. A **knowledge** gap based on the belief that “financial institutions do not understand knowledge-based businesses.”

These conclusions were based on qualitative data from a combination of focus group meetings and interviews. However, it is not clear that the results of this work are reliable, for three reasons.

1. The number of participants in the study necessarily leads to a high standard error. The report, (Angus Reid Group, 2000) is not explicit about the number of focus group participants; however, the report documents responses by 97 SME owners who completed questionnaires as part of the work.
2. Participation in focus groups implies a strong likelihood of survival, selection, interest, and non-response biases. The report does not address these biases.
3. The conclusions are based entirely on the perceptions of the participants and did not appear to involve any form of actual direct comparisons without which conclusions of relative differences are untenable.

In Canada, the finding that margins on commercial loans to SMEs are generally limited to within prime and prime plus three percent might suggest that lenders do not price business loans to risk and that credit is rationed. Similar limited ranges have been reported in the UK (Bank of England; 1993). However, this observation is also consistent with the rationale that loan account managers are reluctant to increase interest rates for higher risk applicants because charging higher interest rates might engender an undesirable “usurer” image in a competitive banking marketplace (National Economic Research Associates, 1990).

In summary, there is an ongoing debate in the literature about whether or not certain classes of borrower firms may face relatively greater difficulty with access to credit. However, the empirical evidence is mixed, inconclusive, and relatively silent about the particular situation of SME exporters. This paper undertakes further empirical analysis of this question.

## Financing Exporting

Previous studies have linked access to, and terms of, financing to size of firm (OECD, 2006). Conceptually, there is a rationale that firms need to obtain a minimum size threshold in order to export (see, for example, Julien, 1993). This reasoning is founded on the understanding that a minimum scale is necessary to qualify for base levels of export and investment insurance coverage, bank lending, as well as to mitigate lenders' requirements that personal assets be used as collateral. Moreover, globalization has increased both the need for multinational coverage of transactions and the costs of export market development. Moreover, cyclicity in the supply of credit may reduce firms' access to capital when it is most needed. However, Liargovas (1998) suggests that firm size is a function of the market size that a firm competes in and that enterprises in small markets may not have the resources to address export markets.

The empirical literature displays mixed evidence regarding links between firm size and export propensity. In large sample surveys (8,810 and 14,072 observations respectively), Bonaccorsi (1992) and Calof (1994) find that firm size is positively related to export propensity, but the magnitude of the statistically significant effect is very small. However, Mittelstaedt, Harben and Ward (2003) examined the known population of manufacturing firms in South Carolina and that smaller firms are under-represented among exporters and that the minimum firm size for benefiting from exporting appears to be 20 employees for the 49 industries they examined. Conversely, Zahra, Neubaum and Huse (1997) find that a venture's age and R&D intensity are positively related to export performance, while venture size is not significant. Wolff and Pett (2000: 34) found "no significant differences in export intensity across three size categories" of small firms. They posit that international-at-founding and international-by-stage may be endpoints of a continuum and that small businesses that export may do so based on opportunity or may be forced to do so through competitive pressure. In a survey of small firms with fewer than 200 employees Pope (2002) was able to discern that firms with 25 or fewer employees export for two primary reasons. Either they had a unique product or a technological advantage. Firms with more than 25 employees also export for these reasons. In addition, export motives for larger firms include achieving economies of scale or capitalizing on a foreign opportunity. In this context, Mascarenhas (1986: 3) observed that "in some industries the dominant firm had remained primarily domestic while a smaller firm had gone international in a big way to avoid competitive pressures in the home market."

In terms of the role of financial capital, Leonidou (2004) reviewed 32 empirical studies on export barriers and found that financing (i.e., availability of working capital) was only of moderate impact on export behavior. Likewise Wolf and Pett (2000) were among the very few studies to consider availability of financing and found that availability of capital to finance exports held explanatory power (Wolff and Pett 2000). Dhanaraj and Beamish (2003) note that "smaller firms may have to spend a disproportionately larger sum on their R&D to be as effective as the bigger firms."

Given the conceptual evidence and the literature on financing gaps it seems reasonable to expect that exporter firms would face particular challenges with access to financing; however, the empirical evidence is unclear. Recent findings from Statistics Canada (2004) reports that loan applications from SME exporter firms were turned down relatively more often than were loan applications from non-exporters; however the difference in turndown rates between the two categories of firms was not statistically significant<sup>3</sup> In addition, no allowance for size or other attributes of firms was made and INVs were not broken out. To the extent that exporter firms are systematically larger than non-exporters, the stated difference in turndown rates may potentially understate the underlying difference. Therefore, the extent

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<sup>3</sup> Statistics Canada, Small Business and Special Surveys Division, Survey on Financing of Small and Medium Enterprises, 2004, Table 7. In addition, Table 32 shows that exporters were significantly more likely to identify access to financing as a barrier to growth than were non-exporters.

to which turndown rates differ, after controlling for other determinants of access to credit, remains unclear. Thus, previous empirical research does not provide convincing evidence of financing gaps being faced by SME exporters. Previous work fails to account for the confounding linkages among firm size, firm age (and, possibly, other potential determinants of access to credit) on exporting, and access to financing. The literature also suggests that financing challenges may be concentrated among smaller and younger exporting firms, such as INVs, and it may be these firms that face financing challenges. If so, aggregating financing challenges across all exporters may mask the problems faced by INVs. Accordingly, this paper seeks to examine empirically this possibility, and tests the following research propositions.

*Proposition 1: After allowing for reasonable determinants of access to capital, exporters face a financing gap in terms of their access to debt capital.*

*Proposition 2: Recently established exporter firms, after allowing for reasonable determinants of access to capital, face a financing gap in terms of their access to debt capital.*

## **DATA AND METHODOLOGY**

The methodological challenge of this study is to determine if exporter firms constitute an “identifiable group in the population that is unable to obtain financing” on an equivalent basis with otherwise similar firms. The work examines empirically whether or not exporting affects access to or terms of financing. This work draws on data from the Survey on Financing of Small and Medium Enterprises (2004) to accomplish this task.

### **Sources of Data**

The data employed to undertake the following analysis is derived from the Survey on Financing of Small and Medium Enterprises, 2004. The survey, administered by Statistics Canada, is a part of the SME Financing Data Initiative that seeks to help inform public policy with financing data representative of the population of Canadian SMEs. The target population for the Survey are enterprises that in 2004 had fewer than 500 employees and annual gross revenues of less than \$50 million. Financing and leasing companies, co-operatives, subsidiaries, non-profit organisations, government offices, schools, hospitals and other public sector organisations are not covered by this survey. The sample size for this survey was 34,509 enterprises obtained from the Statistics Canada Business Register and other administrative data sources. Valid responses were received from a total of 13,042 business owners, corresponding to a response rate of 47% of eligible respondents. The survey collection took place between September 2004 and March 2005. Sampling weights have been applied in compiling the estimates and firms in the agriculture sector were excluded. That is, the individual enterprises in the stratified sample are weighted according to their representation in the target population.

### **Methodology**

To examine the impact of exporting on access to, and terms of, financing it is essential to identify and measure the impact of factors that suppliers of capital consider in their financing decisions. Therefore, analysing the data using simple crosstabs is inappropriate because other variables can legitimately affect financing outcomes. Ideally, comparison of financing experiences between the two sets of firms (exporters and non-exporters) needs to be conducted, to the extent possible, on a *ceteris paribus* basis by controlling for those factors that are reasonable determinants of financing outcomes and that may also vary systematically between the two groups of firms.

In designing the model, the empirical challenge is to determine the impact of two types of factors associated with access to, and terms of, credit. The first set of factors includes those that are generally considered to be legitimate determinants of financing decisions: determinants of creditworthiness such as the firms' track record, the owners' attributes, etc. The other factor is that across which a gap has been hypothesized: here, whether or not a firm is an exporter business. Analyses must evaluate the impact on access to credit of exporter propensity while allowing for the effect of legitimate determinants of credit. In the presence of a gap, the gap dimension (exporting) acts as a filter through which legitimate credit determinants may differentially affect the credit outcome.

The approach employed here is based on estimation of logistic regression models of the determinants of outcomes of term loan applications and (separately) of new applications for operating loans (lines of credit). This approach is similar to credit scoring in that the dependent variable, whether or not a loan application was turned down, is statistically related to a set of independent variables that measure determinants of creditworthiness. The first step in the analysis is therefore equivalent to the estimation and validation of a "credit scoring model" that seeks to provide reliable predictions of the actual lending decisions known from the data. The second step is to examine the extent to which the accuracy of the model is improved by adding a variable that connotes whether or not a firm is an exporter. Findings of a credit market gap facing exporters would be consistent with a result that a firm's export propensity is a statistically and materially significant factor the credit scoring model, after allowing for other determinants of credit.

In addition, similar analyses are undertaken with respect to terms of credit as the dependent variable. Terms include the interest rate charged and the extent to which collateral (both personal and commercial) is required by lenders. The work compares, between exporters and non-exporters, business owners' perceptions of obstacles to growth and the ranking of financing among these obstacles.

### **Profile of SME Exporters**

According to the published findings of the 2004 Survey on Financing of Small and Medium Businesses, eight percent of Canadian SMEs exported. Among all Canadian SMEs that report export sales, one-third (33 percent) of sales revenues are generated from exports. By comparison, the Canadian Federation of Independent Business estimates that 24 percent of SMEs sell to foreign markets, an estimate that includes tourism-related sales (CFIB, 1997). Thompson Lightstone & Company Limited (1996) reported that 15 percent of SMEs are involved in exporting activity. These estimates are likely to be high because both samples employed commercial databases. As such, the samples do not include a representative proportion of start-ups, early stage firms and micro-firms in which exporters are arguably less numerous. The CFIB study is also based on a survey of firms that have survived to become, and which can afford to be, CFIB members. Hence, the samples are disproportionately dominated by larger, mature firms — firms that are more likely to export.

Industry Canada has reported that approximately 2 percent of small businesses (firms with 1 to 99 employees) and 12 percent of medium-sized firms (100 to 499 employees) export (Halabisky and Parsley, 2005). These estimates, drawn on the Exporter Registry, include only merchandise or goods exporters. Accordingly, SMEs involved in exporting of services are not included in the data and the Department of Foreign Affairs and International Trade (2005) reports that \$33 billion of services are exported, annually. Second, the Export Registry does not include (as exporters), establishments that export less than \$30,000 in at least one year. In Seringhaus and Botschen's (1991) survey of 271 Canadian manufacturing exporters with 500 or fewer employees, sales to export markets averaged 36% and these firms expected export sales to grow to 46% over the next 2 years.

## EMPIRICAL FINDINGS

### Growth Intentions and Perceptions of Challenges

Attitude and owners' growth intentions are also linked to exporting. One-third of Canadian small business owners (34 percent) expressed the intention to expand the size and scope of their business in 2004. Growth-oriented business owners were twice as likely to export compared to owners that did not seek expansion of their firm: 65 percent of small business owners that sought growth were engaged in export compared to 37 percent of non-growth-oriented business owners. Growth orientation is also reflected in owners' attitudes to the sharing of equity in the business. Exporters were again twice as likely to indicate a willingness to share equity in the business compared to non-exporters. Hence, growth and exporting are associated as many business owners export as a means to growth.

Firms whose owners were seeking to grow were asked to identify the barriers to growth they perceived from a pre-specified list. Table 1 presents the frequencies with which owners of exporter firms and owners of non-exporters mentioned each barrier. Financing was generally not among the most-frequently-cited barriers for either category of firm, although owners of exporter firms were more likely to mention obtaining financing as a barrier to growth than were owners of other firms.

**Table 1: Perceived Barriers to Growth, Exporters and Non-exporters**

	Non-exporters	Exporters
Levels of taxation	52	47
Instability of consumer demand	36	42
Insurance rates	36	42
Low profitability	40	38
Finding qualified labour	37	35
Government regulations	34	33
Obtaining financing	19	29
Management capacity	13	18

### Financial Profile of Exporting SMEs

Table 2 compares the financial profile of SMEs that exported with that of other SMEs in 2004. On average, Canadian SME exporters are larger and report more than twice the annual revenues from sales of goods and/or services (\$1.2 million) compared to other SMEs (\$505,761). They are also substantially larger with respect to current and total assets, retained earnings and total equity. The financial profile of SME exporters also reflects liabilities that were twice as large compared to other SMEs. It is not clear from these data if export is a means to growth or if firm size (revenue) is a precursor to export.

**Table 2: Financial Statement Data\*, 2004**

		<b>Firms that Export (Average \$000)</b>	<b>Other SMEs (Average \$000)</b>
<b>Revenue</b>	Sales	1,196	505
	Total Revenue	1,221	552
<b>Cost of goods sold, interest, and bank charges</b>		849	344
<b>Net Profit Before Tax</b>		72	NA
<b>Assets</b>	Current	404	177
	Total	759	495
<b>Liabilities</b>	Current	231	105
	Total	409	241
<b>Retained Earnings</b>		176	131
<b>Total Equity</b>			254
<b>Sought external financing in 2004</b>		36%	23%
	Sought debt financing	28%	18%
	Sought trade credit	6%	3%

\*Figures may not add up exactly due to rounding and omission of expenses such as interest and bank charges. Net profit before tax is not available for “other SMEs” due to size of sampling error.

Consistent with previous studies, the data show that the incidence of exporting is higher among larger firms, measured either in financial terms or by number of employees. Overall, eight percent of respondents reported that they had sold products or services outside Canada during 2004, however, among firms with 20 or more employees 25 percent of firms exported. On average, firms derived 33 percent of sales from exporting and this export intensity measure did not vary significantly across firm size. Exporting was also most prevalent among manufacturers where 31 percent sold goods outside Canada, compared to 17 percent of knowledge-based small businesses who reported sales from outside of Canada (however, knowledge-based exporters reported the highest level of export intensity). Among other small businesses, approximately 1 in 10 wholesale/retail and 2 in 10 professional service firms sold services outside of Canada. Exporters were significantly more likely ( $p$ -value=0.000) to seek debt financing or supplier credit than other SMEs.

Given this profile of Canadian SME exporters, the next section aims to test the impact of certain factors on access to, and terms of, debt financing. Using estimation of logistic regression models, the determinants of outcomes of term loan applications and (separately) of new applications for operating loans (lines of credit) will be assessed.

### **Access to Bank Debt: Determinants of Lending Decisions**

Lenders employ a variety of factors in making loan decisions. In order to ascertain the impact of export propensity on lending decisions, it is first necessary to identify lending criteria than lenders might reasonably employ. The second task is to determine if export propensity is statistically related to lending decisions after controlling for such criteria.

In their 1991 review of the Canadian SME banking market, Wynant and Hatch (pp. 139-140) reported that loan account managers typically managed loan portfolios of 80 to 120 borrower clients. At that time, Wynant and Hatch (pp. 139-140) identified the following as the key criteria for screening loan requests:

- Character of the key principals of the firm
- Competitive position of the industry
- Borrower's ability to compete and viability
- Company's net worth position
- Borrower's cash flow prospects
- Availability of business and personal assets as security
- Sector (certain sectors were identified as high risk, including restaurants, small retailers, trucking firms, etc.)
- Start-up businesses
- Loans for assets with little collateral value

Historically, lenders are said to employ the so-called "5 C's" of lending: character, capacity (to repay the loan), capital structure, collateral, and (business) conditions. The SME FDI data allow measurement of these attributes. Table 3 supplements Table 2 and describes measures of potential lending criteria available in the data. In addition to these variables, the data also provided information on several categorical variables that included the gender and ethnic composition of the management team, the length of experience of the primary owner, the number of loan account managers, and levels of expenditure on R&D.

**Table 3: Potential Lending Criteria**

Criterion	Measure	Non-exporters	Exporter
<b>Character</b>	Length of relationship with financial institution	11.3	9.8
	Age of firm	20.2	20.4
	Age of owner	49.2	50.0
<b>Capacity</b>	Sales revenues	See Table 1	
	Profits		
	Full-time equivalent employees	3.5	7.8
<b>Capital</b>	Balance sheet data	See Table 1	
	Financial ratios		
<b>Conditions</b>	Industry sector		
<b>Collateral</b>	Availability of personal assets for collateral	41.8%	42.3%
	Availability of commercial assets for collateral	39.6%	46.2%
	Cosignature requirements	6.8%	8.2%

In order to reduce the number of measures of creditworthiness, factor analysis was employed. Given the likely collinearity among variables within the various lending dimensions, it seemed appropriate to use principal components analysis to reduce the number of variables in the data. Stevens (p. 388) notes that this approach is "one way of attacking the multicollinearity problem and that this means of data reduction also makes it more likely that the regression model will hold up under cross-validation." The use of principal components analysis also allows a determination of the extent to which the logical dimensions (5 Cs) under which the variables are categorized hold up empirically. Accordingly, Table 4 shows the principal components associated with the variables employed here using principal components analysis

with varimax rotation. Collectively, the five factors explained 59 percent of the variation and inspection of the scree plot confirmed the suitability of a 5-factor solution.

The factors correspond broadly to the 5 C's. The first factor connotes the age and track record of the firm (character); the second factor measures size (capacity); the third measure corresponds to collateral; the fourth factor – number of loan account managers – is more a property of the lender than of the firm. The final factor relates to capital and deployment of capital. The analysis does not yield a factor that relates to conditions; however, this can be accommodated by taking account of the firm's industrial sector.

**Table 4: Results of Principal Components Analysis**

Variable	Factor Loadings (suppressed for ease of interpretation if less than 0.4)				
	1	2	3	4	5
Experience of primary owner	0.75				
Length of FI relationship	0.73				
Age of owner	0.71				
Year started trading:=1 if > 2002	-0.64				
Full-time equivalent employees		0.86			
Total Revenues		0.86			
Collateral: Personal Property Required			0.76		
Collateral: Commercial Property Required			0.62		
Co-signature Required			0.52		
Number of loan account managers				0.87	
Debt to Assets Ratio					0.78
R&D Expenditure >20%					0.63

#### Access to Bank Debt: Estimation of Pseudo Credit Scoring Models

The next step in the analysis is to associate these factors to loan application outcomes, which are known from the SME FDI data. For each firm, the attributes above are recorded along with whether the firm applied for a loan, the type of loan, and the outcome of the loan application. In this context, the focus is on applications for term loans and operating loans as these are the two most frequent types of loans employed by SMEs. Using these data, logistic regression models of lending decisions were estimated. This is akin to credit scoring but where the outcome (dependent) variable is whether or not a given loan was turned down. Selection of control variables in the model was based on a trade off between factor loading and maximization of the number of observations in the logistic regression model. For example, only a minority of respondents supplied sufficient data to allow computation of the debt/asset ratio; however, the level of investment in R&D was known for almost all firms and (as seen above) is highly correlated with the same principal component as the debt/asset ratio. Accordingly, control variables employed here were NAIC sector and whether the firm was located in a rural setting (conditions), whether a firm began trading since 2002 (character), whether a firm is an innovative firm (investment in R&D greater than 20 percent of total investment, correlates with capital structure), the availability of personal collateral, and the number of full-time equivalent employees.

If after controlling for these variables, exporter firms are still turned down more frequently, then a gap may be implied. In the event that turndowns are explained by the risk factors a gap is not supported. Accordingly, the following logistic regression model was estimated.

$$\text{logit}[\theta(x)] = \log\left[\frac{\theta(x)}{1-\theta(x)}\right] = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_i x_i$$

Where

$$\theta = \frac{e^{(\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_i x_i)}}{1 + e^{(\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_i x_i)}}$$

Here, the  $X_i$  represent the various independent variables in the regression model (sector, firm age, etc.). When the exponent of  $e$  in the above equation is large,  $\theta$  approaches a value of 1 (for example, here, the loan application was turned down). When the exponent of  $e$  is negative,  $\theta$  approaches a value of 0, corresponding to the loan application not being turned down. The estimates of  $\beta_i$  allow inference about the relative impact of each variable. Logistic regression models of loan turndowns were estimated separately for new applications for operating loans (697 cases) and for term loan applications (681 cases).

### Findings: Applications for Operating Loans

The first stage of estimating the logistic regression model of outcomes for operating loans employed the five principal component scores determined in Table 4. This is reported in the left-hand-side panels of Table 5. The second stage of the estimation involved development of a more refined model derived from the base model. Two types of refinements were made. First, explanatory variables that were insignificant in the first stage base model were deleted sequentially until a final parsimonious model obtained. In this instance, two variables were suppressed, one being the urban/rural location dummy variable and the other being the dummy variable connoting the availability of commercial collateral. Neither of these variables were associated to a statistically significant extent with the likelihood that loan applications would be turned down.

The second refinement involved adding a categorical variable to the model that defined four types of firms:

- firms that had started trading since January 2003 (start-ups) and that also reported exporting;
- firms that had started trading since January 2003 (start-ups) but that did not report exporting;
- firms that started trading prior to January 2003 (start-ups) and that also reported exporting;
- firms that started trading prior to January 2003 (start-ups) but that did not report exporting.

The resulting model, described in the right-hand-side panels of Table 5, was statistically significant ( $p=0.000$ ; Hosmer Lemeshow  $p=0.475$ , Cox & Snell;  $R^2 = 0.086$ ; Nagelkerke  $R^2 = 0.149$  and had an in sample prediction accuracy of 84.4 percent of the cases used to derive the model).

According to the model, turndowns were significantly less likely for larger firms and relatively more likely where collateral is used and where investments in R&D form a higher proportion of the firms' total investments. After controlling for these factors as well as for sector, turndown rates for operating loan applications were more than four times as likely for start-up exporters as for established non-exporters (base case) and 2.5 times more likely than non-exporter start-up firms. The likelihood that a start-up (non-exporter) firms would have its application for an operating loan turned down was more than 60 percent greater than for an established (non-exporter) firm. Compared with the base case of established non-exporter SMEs, the rate of loan application turn downs did not differ significantly for established

exporter firms. Therefore, the problem in terms of access to financing is particular to start-up firms but is especially severe for early-stage firms engaged in exporting.

**Table 5: Logistic Regression Estimate of Operating Loan Decisions**

	Base Model			Expanded Model		
	Coefficient Estimate	p-value	Exp(B)	Coefficient Estimate	p-value	Exp(B)
Industry Sector		0.181			0.145	
Primary	-0.88	0.179	0.41	-1.15	0.075	0.32
Construction	-0.44	0.444	0.65	-0.53	0.360	0.59
Manufacturing	-0.15	0.782	0.86	-0.16	0.771	0.85
Wholesale	-0.73	0.178	0.48	-0.90	0.100	0.41
Finance etc.	-0.20	0.863	0.82	-0.32	0.784	0.72
Professional Services	-0.75	0.171	0.47	-0.79	0.153	0.45
Accommodation, food, etc	0.54	0.384	1.71	0.33	0.596	1.39
Other services	-0.18	0.732	0.83	-0.33	0.545	0.72
Personal Collateral	0.64	0.007	1.90	0.60	0.011	1.82
Commercial Collateral	0.06	0.822	1.06			
Co-signature	1.28	0.000	3.61	1.39	0.000	4.00
Urban location (vs Rural)	0.49	0.107	1.63			
No R&D Investment	-0.38	0.128	0.68	-0.44	0.086	0.64
Intensive R&D Investment	0.71	0.058	2.03	0.72	0.058	2.06
Full-time equivalent employees	-0.03	0.017	0.97	-0.03	0.023	0.97
Firm Category					0.004	
Start up / Exporter				1.45	0.004	4.27
Established / Exporter				-0.32	0.390	0.72
Start-up / Non-exporter				0.49	0.064	1.63
Constant	-1.90	0.001	0.15	-1.52	0.003	0.22
Nagelkerke R <sup>2</sup>	0.149	0.000		0.170	0.000	
Cox & Snell R <sup>2</sup>	0.086			0.100		
Hosmer/Lemeshow		0.844			0.475	
In-sample prediction accuracy	84.3%			84.4%		

### Findings: Application for Term Loans

The estimation of a credit scoring model for operating loan applications was repeated for term loans with the results listed in Table 6. The results, however, were quite different. For applications for term loans, firm size and sector continued to have a significant impact on turndown rates. However, neither age of firm, exporter status, nor combinations of these two attributes were statistically correlated with the

likelihood of loan turndowns. Arguably, this is because terms loans tend to be secured by the assets they finance.

**Table 6: Logistic Regression Estimate of Term Loan Decisions**

	Base Model			Expanded Model		
	Coefficient Estimate	p-value	Exp(B)	Coefficient Estimate	p-value	Exp(B)
Industry Sector		0.000			0.000	
Primary	-0.16	0.794	0.85	-0.09	0.886	0.92
Construction	0.78	0.207	2.19	0.85	0.175	2.33
Manufacturing	1.54	0.006	4.66	1.55	0.007	4.72
Wholesale	1.49	0.008	4.45	1.57	0.006	4.80
Finance etc.	-18.67	0.999	0.00	-18.61	0.999	0.00
Professional Services	0.75	0.213	2.12	0.83	0.170	2.30
Accommodation, food, etc	2.14	0.000	8.50	2.17	0.000	8.78
Other services	0.56	0.366	1.75	0.63	0.315	1.88
Personal Collateral	-0.14	0.606	0.87			
Commercial Collateral	-0.31	0.268	0.74			
Co-signature	0.52	0.213	1.69			
Urban location (vs Rural)	0.17	0.554	1.19			
No R&D Investment	-0.36	0.198	0.70			
Intensive R&D Investment	0.59	0.225	1.80			
Full-time equivalent employees	-0.03	0.006	0.97	-0.03	0.007	0.97
Firm Category					0.471	
Start up / Exporter				0.98	0.160	2.66
Established / Exporter				-0.16	0.712	0.85
Start-up / Non-exporter				0.15	0.640	1.16
Constant	-2.22	0.000	0.11	-2.26	0.000	0.10
Nagelkerke R <sup>2</sup>	0.166	0.000		0.172	0.000	
Cox & Snell R <sup>2</sup>	0.088			0.092		
Hosmer/Lemeshow		0.092			0.110	
In-sample prediction accuracy	87.4%			86.9%		

## CONCLUSIONS AND DISCUSSION

This empirical paper set out to test the extent to which turndown rates differ, after controlling for other determinants of access to credit, between Canadian SME exporters and other SMEs for operating and term loans. Accordingly, the research tested empirically the two following research propositions.

*Proposition 1: After allowing for reasonable determinants of access to capital, exporters face a financing gap in terms of their access to debt capital.*

*Proposition 2: Recently established exporter firms, after allowing for reasonable determinants of access to capital, face a financing gap in terms of their access to debt capital.*

With regard to the first proposition, it was found that after controlling for size, sector, and other reasonable determinants of commercial lenders loan decisions, the rates at which exporters' applications for term or operating loans were turned down did not differ from non-exporters' turn-down rates. With regard to the second proposition it was found that after controlling for size, sector, and other determinants of credit decisions, start-up firms were turned down significantly more frequently for operating loans than were established firms. In particular, start-up firms engaged in export activity were experienced rejection of applications for operating loans at a much higher rate than did non-exporter start-up enterprises.

The finding that early-stage exporter firms experience turndowns of their applications for operating loans so frequently is a finding that is consistent with Zahra's (2005) observations that the newness and inexperience associated with such firms limits their access to financial resources. Second, many new exporter firms are small firms with few slack resources constraining their ability to compete. Such firms, however, are increasingly important to Canada's competitive situation. To the extent that inability to access financing constrains development of early-stage exporters Brierley (2001) might argue that "intervention should be targeted at those areas where market imperfections can be identified" To this end, many nations and trade associations have undertaken initiatives that seek to redress perceived imperfections. Typically, these involve loan guarantee programs or steps to stimulate the formation of risk capital.

In Canada, export assistance is handled primarily by the federal government; provincial assistance is of a secondary nature, and in contrast to other countries, support services from the private sector are minimal (Serrinhaus and Botschen 1991). According to Kotabe and Czinkota (1992) the prime benefit of government export assistance to firms "appears to accrue in the area of competitiveness, rather than profitability...the early stages of internationalization, export activities produce lower levels of profit than do domestic business activities." It would appear that new exporter businesses may require further support from the public sector.

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