



Innovation, Science and
Economic Development Canada

Innovation, Sciences et
Développement économique Canada



INCREMENTALITY STUDY OF THE CANADA SMALL BUSINESS FINANCING PROGRAM

MARCH 2018

Innovation, Science and
Economic Development Canada
Small Business Branch, Research and Analysis
Patrice Rivard

www.ic.gc.ca/SMEresearch

Canada 

This publication is also available online in HTML in print-ready format at www.ic.gc.ca/SMEResearch/reports.

To obtain a copy of this publication or an alternate format (Braille, large print, etc.), please fill out the [Publication Request form](#) or contact:

Web Services Centre
Innovation, Science and Economic Development Canada
C.D. Howe Building
235 Queen Street
Ottawa, ON K1A 0H5
Canada

Telephone (toll-free in Canada): 1-800-328-6189
Telephone (Ottawa): 613-954-5031
TTY (for hearing-impaired): 1-866-694-8389
Business hours: 8:30 a.m. to 5:00 p.m. (Eastern Time)
Email: ISED@Canada.ca

Permission to Reproduce

Except as otherwise specifically noted, the information in this publication may be reproduced, in part or in whole and by any means, without charge or further permission from the Department of Industry, provided that due diligence is exercised in ensuring the accuracy of the information reproduced; that the Department of Industry is identified as the source institution; and that the reproduction is not represented as an official version of the information reproduced, nor as having been made in affiliation with, or with the endorsement of, the Department of Industry.

For permission to reproduce the information in this publication for commercial purposes, please fill out the [Application for Crown Copyright Clearance](#) or contact the Web Services Centre (see contact information above).

© Her Majesty the Queen in Right of Canada,
as represented by the Minister of Industry Canada, 2018
Cat. No. Iu188-130/2018E-PDF
ISBN 978-0-660-24613-0

Aussi offert en français sous le titre *Étude sur l'effet d'accroissement du Programme de financement des petites entreprises du Canada*, mars 2018.

Contents

Executive Summary	ii
1. Introduction.....	1
2. Access to Financing for Small and Medium Enterprises in Canada	3
3. Literature Review	9
4. Data Source	9
5. Methodology	11
6. Variables	12
7. Results	14
8. Conclusion	17
References.....	19

EXECUTIVE SUMMARY

The Canada Small Business Financing Program (CSBFP) is a statutory loan loss-sharing program administered by Innovation, Science and Economic Development Canada (ISED) that helps Canadian small businesses obtain access to financing. Under the CSBFP, ISED and commercial lenders share the risk of providing small businesses with term loans for real property, equipment or leasehold improvements. The primary objective of the CSBFP is to increase financing for small businesses by extending financing that would not otherwise be available (full incrementality) or would be available under less favourable terms (partial incrementality).

This paper investigates the level of full incrementality of the CSBFP by analyzing data from the *Survey on Financing and Growth of Small and Medium Enterprises, 2014*. The main finding of the paper is that the CSBFP is 69 percent fully incremental. In other words, 69 percent of debt financing requests from small businesses would have been denied without the existence of the CSBFP, which is consistent with previous studies. Partial incrementality will be examined in the near future. It is expected that once partial incrementality is considered in concert with full incrementality, the program will be closer to 100% incremental.

1. INTRODUCTION

Small businesses¹ are well recognized for playing a fundamental role in the Canadian economy (Seens and Song, 2015; Coe, 2016; Chandler, 2012 and Riding, 2007). They represent 98 percent of the total number of employer businesses in Canada, and approximately 71 percent of total private sector employment in 2015 (Innovation, Science and Economic Development Canada, 2016c). Canadian small businesses from the private sector accounted for approximately 30 percent of the gross domestic product of the total economy (Leung et al., 2012 and Industry Canada, 2013b). This situation is not unique to Canada and may be observed in many countries such as the United States, the United Kingdom, France and Germany (Banerjee, 2014).

The Government of Canada supports small businesses through several channels. One of them is the Canada Small Business Financing Program (CSBFP). The CSBFP originated in 1961 and was launched under the *Small Business Loans Act*. This act has evolved over time and was renamed, in 1999, as the *Canada Small Business Financing Act* (CSBFA).² The main purpose of the CSBFP is "to increase the availability of loans for establishing, expanding, modernizing and improving small businesses." (Industry Canada, 2014). Other countries such as the United States and the United Kingdom also have a loan guarantee program for small businesses (Riding, 2001; OECD, 2013 and OECD, 2015).

Under the program, small businesses³ may obtain, if eligibility criteria are met, financing from a lender for the following assets: real property (immovables), equipment and leasehold improvements. The loan may not exceed \$1 million, of which a maximum of \$350,000 can be used for purposes other than the purchase or improvement of real property.⁴ The loan terms vary according to the type of asset: 10 years for leasehold improvements and equipment; and 15 years for real property. Also, fees other than the interest rate are applicable; they include a 2 percent registration fee and a 1.25 percent administration fee payable quarterly.

Under the CSBFP, the role of the Government of Canada is to share the risk with the lender by guaranteeing 85 percent of the lender's net eligible losses⁵ in the case of default by a borrower. As program administrator, ISED's role is to register loans, collect fees and pay lenders' eligible losses on defaulted loans (Industry Canada, 2015). During the fiscal year 2015–2016, the CSBFP registered 5,044 loans with a total value of \$879.9 million.

1. Innovation, Science and Economic Development Canada defines a *small business* as having 1 to 99 employees, a *medium enterprise* as having 100 to 499 employees, and a *large enterprise* as having 500 employees and more.

2. For more details, please visit www.laws-lois.justice.gc.ca/eng/acts/C-10.2/page-1.html.

3. Under the CSBFA, *small businesses* are defined as businesses with an estimated gross annual revenue not exceeding \$10 million.

4. For example, purchasing leasehold improvements or improving lease property and purchasing or improving new or used equipment (www.ic.gc.ca/eic/site/csbfp-pfpec.nsf/eng/h_la02855.html).

5. Up to the maximum Minister's liability towards the lender (Innovation, Science and Economic Development Canada, 2016b).

Loans between \$125,000 and \$375,000 accounted for 74 percent of the total value of registered loans. Moreover, 40 percent of the loans' total value was for equipment. Finally, the majority of loans granted were in the accommodation and food services and retail trade sectors, which accounted for 42 percent of the total number of loans (Innovation, Science and Economic Development Canada, 2016a).

As legislated by the CSBFA of 1999, the CSBFP operates on a statutory five-year review cycle. The program is required to table a comprehensive review in both Houses of Parliament within 12 months after each review period. The purposes of the review are to examine the extent to which the program meets its objectives, outline the rationale and relevance of the program in meeting the financing needs of small and medium-sized enterprises (SME)s, and suggest possible program improvements.

An effective way to assess if the program has achieved its goal to increase loan availability to small businesses is to determine whether financing would have been available without the program's existence. This program objective is called *incrementality* or *additionality* (Riding, 2001). While more details about how incrementality is measured are provided in Sections 3 and 5, it is important to note that this study only measures full incrementality. Partial incrementality—loans that would have been made but under less favourable lending conditions such as higher interest rates or lower loan amounts—will be estimated in the upcoming 2018 *Lender Awareness and Satisfaction Study*. When full and partial incrementality are combined, almost all CSBFP loans can be considered incremental.

This paper aims to estimate the incrementality of the CSBFP using recent data, i.e., from the *Survey on Financing and Growth of Small and Medium Enterprises, 2014* and other data sources. Another objective is to update the results obtained by Seens and Song (2015). The paper is divided as follows:

- Section 2 discusses the context of SMEs' access to financing;
- Section 3 presents a literature review on incrementality in Canada over time;
- Section 4 contains a description of the dataset used in this study;
- Section 5 explains the methodology and the econometric model;
- Section 6 describes variables;
- Section 7 discusses the results of the regression; and
- Section 8 concludes the paper by summarizing the main finding.

2. ACCESS TO FINANCING FOR SMALL AND MEDIUM ENTERPRISES IN CANADA

In order to act as economic drivers, small businesses need an environment where there are no obstacles to financing. In fact, cross-country evidence shows that financial constraints have been largely reported by small businesses. Those financial constraints take different forms, such as credit rationing or higher costs to borrow. Given the importance of SME financing, the Organisation for Economic Co-operation and Development (OECD) now records credit conditions and access to financing of SMEs. This was initiated in 2010 and the first edition appeared in 2012 (OECD, 2012). This report is now published yearly and contains information on trends regarding SMEs' and entrepreneurs' access to financing in many countries, including Canada. The *Survey on Financing and Growth of Small and Medium Enterprises*, which is generally conducted every three years, is one of the main sources of information on the financing activities of SMEs in Canada. A natural question could be raised within this context: Is access to financing for SMEs really constrained in Canada?

The *Survey on Financing and Growth of Small and Medium Enterprises*, 2014 reveals interesting facts on that topic. Only 51 percent of SMEs requested external financing in 2014. External financing takes different forms, such as debt financing (non-residential mortgages, lines of credit, term loans, credit cards), lease financing, trade credit financing, equity financing and government financing (grants, subsidies or non-repayable contributions). For those that did not request external financing, the most popular reason given was that they did not require financing (Table 1).

Table 1: Reason for Not Seeking External Financing by Business Size (percentage)

Reasons	1-4 employees	5-19 employees	20-99 employees	100-499 employees
Financing not required	87.4	89.0	93.0	86.4
Thought the request would be turned down	1.9	2.2	X	X
Applying for financing is too difficult or time consuming	2.5	X	2.0	X
Cost of financing is too high	1.0	X	X	0.0
Unaware of financing sources available to the business	3.6	2.3	X	X
Other	3.6	4.4	2.5	8.3

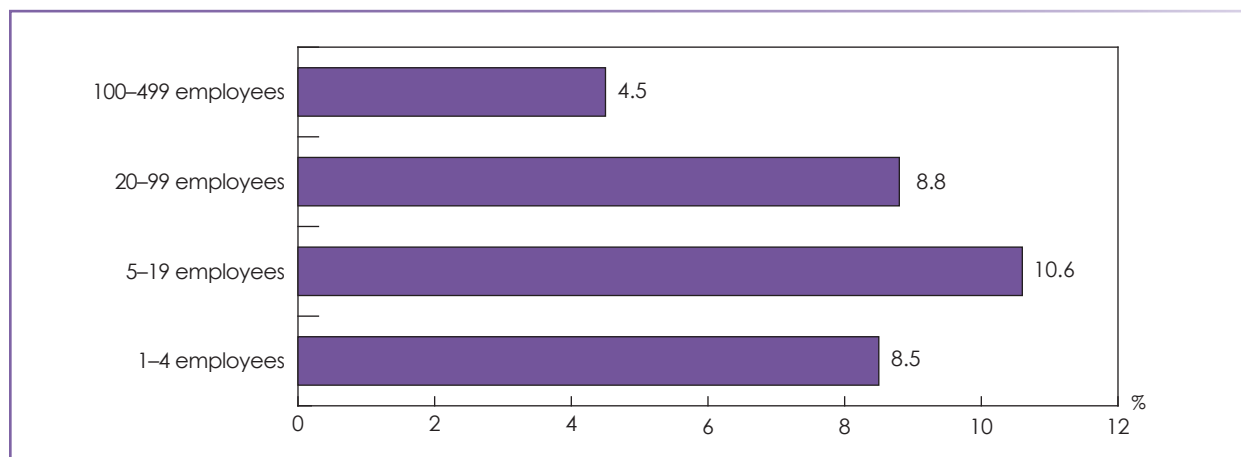
Note: "X" indicates that data were suppressed to meet confidentiality requirements of the *Statistics Act*.

Source: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014.

In particular, only a few SMEs, about 28 percent, requested debt financing. Figure 1 provides a partial answer to the aforementioned question. Between 9 and 11 percent of small businesses (1 to 99 employees) answered that obtaining financing was a major obstacle to business growth in 2014, compared with

5 percent for medium businesses (100 to 499 employees). Thus, in terms of percentage, there are around twice as many small businesses than medium businesses that were concerned with obtaining financing. However, among all the obstacles to business growth pointed out by SMEs, obtaining financing was at the bottom of the list (Table 2).

Figure 1: Obtaining Financing as an Obstacle to Business Growth by Business Size, 2014



Source: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014.

Table 2: Major Obstacles to Business Growth of SMEs (percentage) by Business Size

	1-4 employees	5-19 employees	20-99 employees	100-499 employees
Fluctuations in consumer demand	18.4	20.4	21.0	19.4
Increasing competition	17.6	19.6	20.9	22.8
Recruiting and retaining skilled employees	14.7	18.9	18.9	16.4
Rising cost of inputs	14.6	18.9	19.3	16.9
Government regulations	14.2	16.9	16.4	14.0
Maintaining sufficient cash-flow or managing debt	12.7	15.4	13.0	11.6
Shortage of labour	11.5	16.9	16.7	18.5
Other	11.5	11.6	13.4	9.9
Corporate tax rate	11.1	12.6	10.9	7.9
Obtaining financing	8.5	10.6	8.8	4.5

Note: Totals may exceed 100% since businesses could declare more than one major obstacle to business growth.

Source: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014.

The survey also provides information on the amount of debt financing requested versus authorized. Thus, it is possible to target the type of SMEs that have experienced difficulty in obtaining debt financing, i.e., those that have undergone credit rationing by lenders. Moreover, the authorized-to-requested ratio is a particularly robust financial indicator that completes the answer given by entrepreneurs in

relation to business growth obstacles, as it is an objective measure rather than an opinion. The lower the authorized-to-requested ratio is, the more difficult it is to access financing. As a consequence, SMEs face credit rationing in this case. Information on the debt requested rate could also be used as an indication of the extent of debt financing requested by category of SME (start-ups, industry sector, etc.). Figure 2 shows the comparison between the debt requested rate and the authorized-to-requested ratio by business size, industry sector, business location, export orientation, business age, innovation activity, age and gender owner(s). Figure 2 is similar to Figure 21 in Industry Canada's *Financing Statistics* (2013a), which used data from the *Survey on Financing and Growth of Small and Medium Enterprises, 2011*.

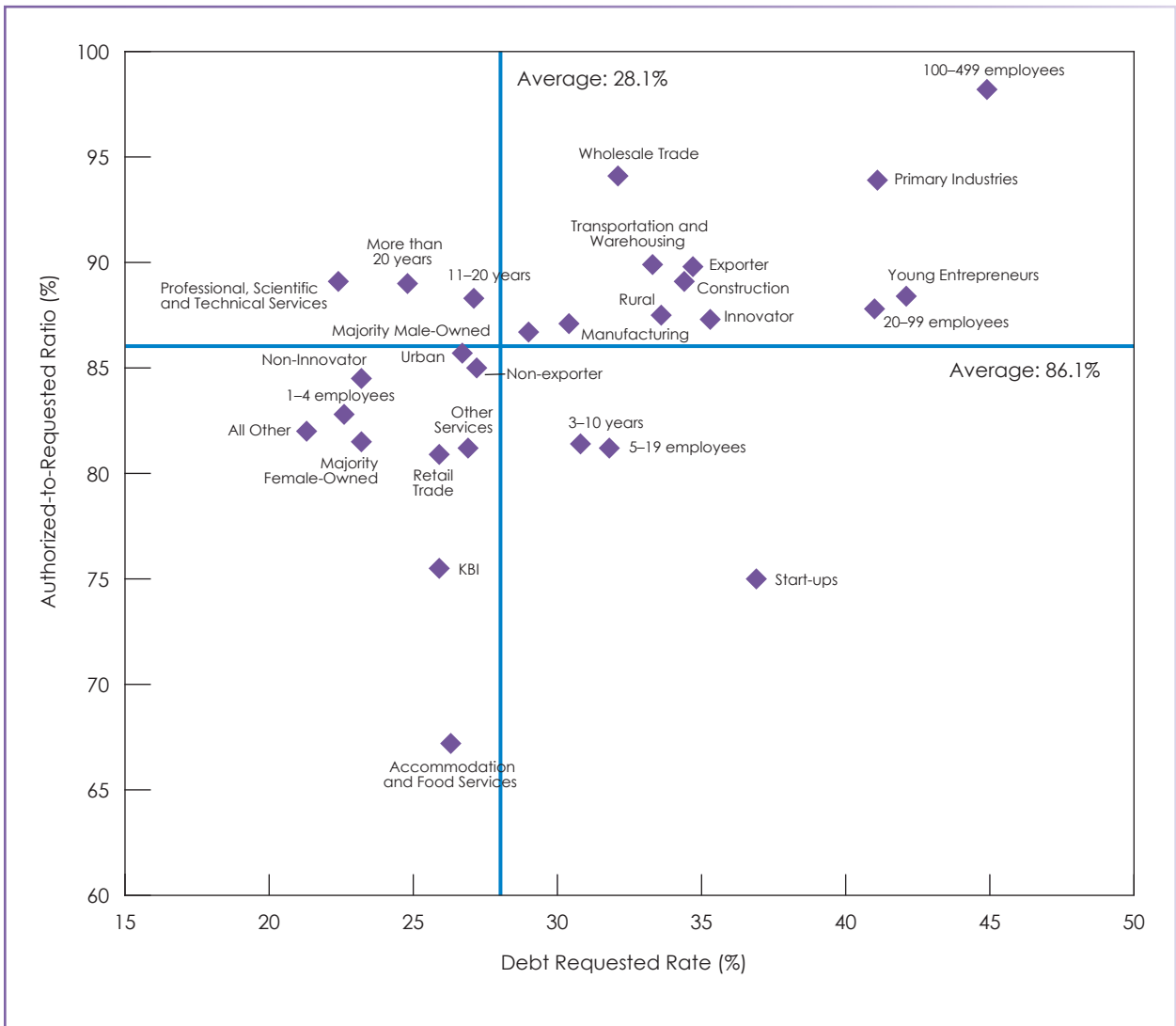
We observed that start-ups (i.e. businesses that are two years old and less) struggled to obtain the financing that they asked for, as they only received 75 percent of the total amount requested. In comparison, firms aged 20 years and more received 89 percent of the total amount requested. In addition, the debt requested rate for start-ups is greater than that for established businesses, which shows that the demand for debt financing from young firms is quite important. It should be noted that start-up firms represent a significant proportion of CSBFP borrowers. In 2015–2016, just over 60 percent of CSBFP loans (in value) were granted to firms less than one year old.

Businesses with 1 to 4 employees also had more difficulties than larger ones. The authorized to requested ratio is 83 percent for micro-enterprises (1–4 employees) and 98 percent for larger businesses (100–499 employees).

Figure 2 reveals that some industry sectors had more difficulties than others. This is the case for accommodation and food services. This sector had the lowest authorized-to-requested ratio, with 67 percent. This situation reflects the fact that a large proportion of CSBFP borrowers, about 31 percent, were active in the accommodation and food services sector in 2015–2016. As mentioned by Coe (2016), this sector is generally associated with a high degree of risk for those starting an enterprise. Primary industries (agriculture, forestry, fishing and hunting, mining, quarrying, and oil and gas extraction) had the highest authorized-to-requested ratio, with about 94 percent. It is worth noting that, in general, those industries are known to have more collateral (Industry Canada, 2013a). Overall, the previous findings are similar to those from the *Survey on Financing and Growth of Small and Medium Enterprises, 2011*.

The previous results may show that this situation is asymptomatic of market imperfections and that SMEs suffer from a structural financing problem (Wagenvoort, 2003). Asymmetric information is often cited as the major cause of distortions in the market. For example, compared with larger and well-established firms, start-ups have a shorter or non-existent credit history, they have no reputation, and information on them could be difficult to find for lenders.

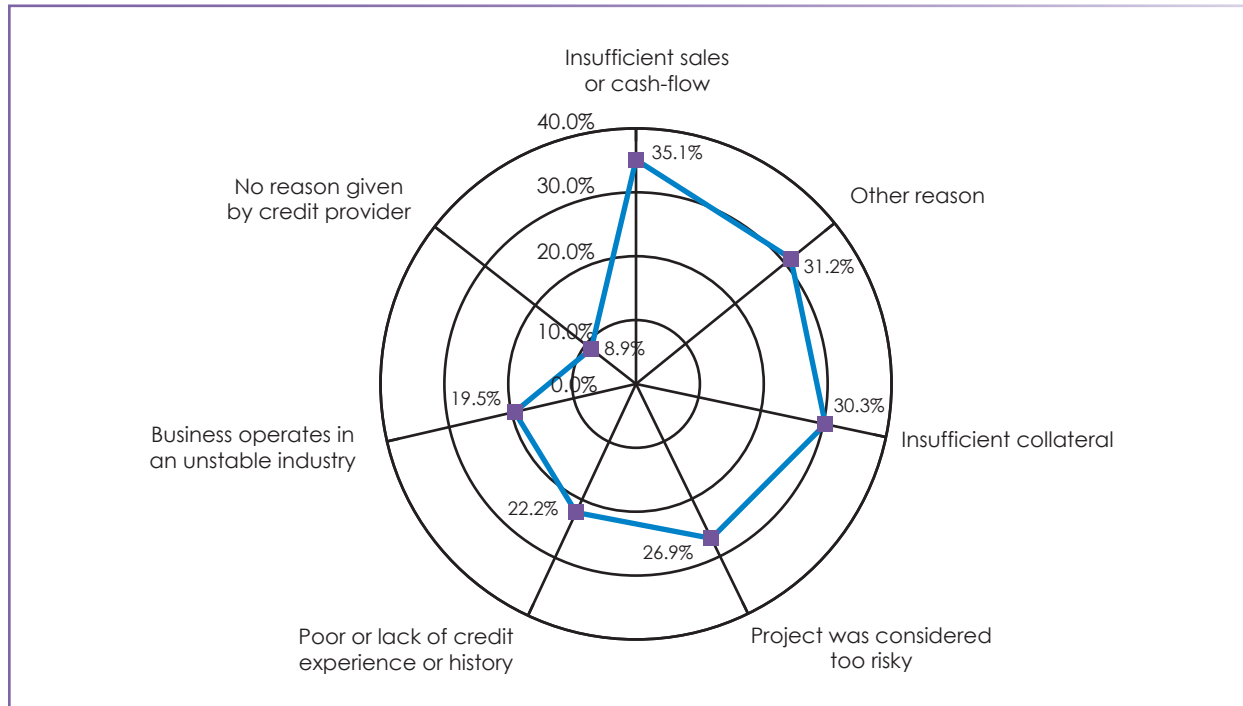
Figure 2: Authorized-to-Requested Ratio and Debt Requested Rate by Category of SME, 2014



Source: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises, 2014*.

Another issue is that SMEs could have less collateral to provide as securities. As a consequence, they are judged as riskier borrowers by lenders. Approximately 30 percent of SMEs cited insufficient collateral as the reason for being denied debt financing in 2014 and 22 percent cited poor or lack of credit experience (Figure 3). However, insufficient sales or cash-flow was the most common reason cited by businesses, with approximately 35 percent, as shown by Figure 3.

Figure 3: Reasons SMEs Were Denied Debt Financing, 2014



Note: Total exceeds 100% since businesses could declare more than one reason given by the credit provider for turning down the debt financing request.

Source: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014.

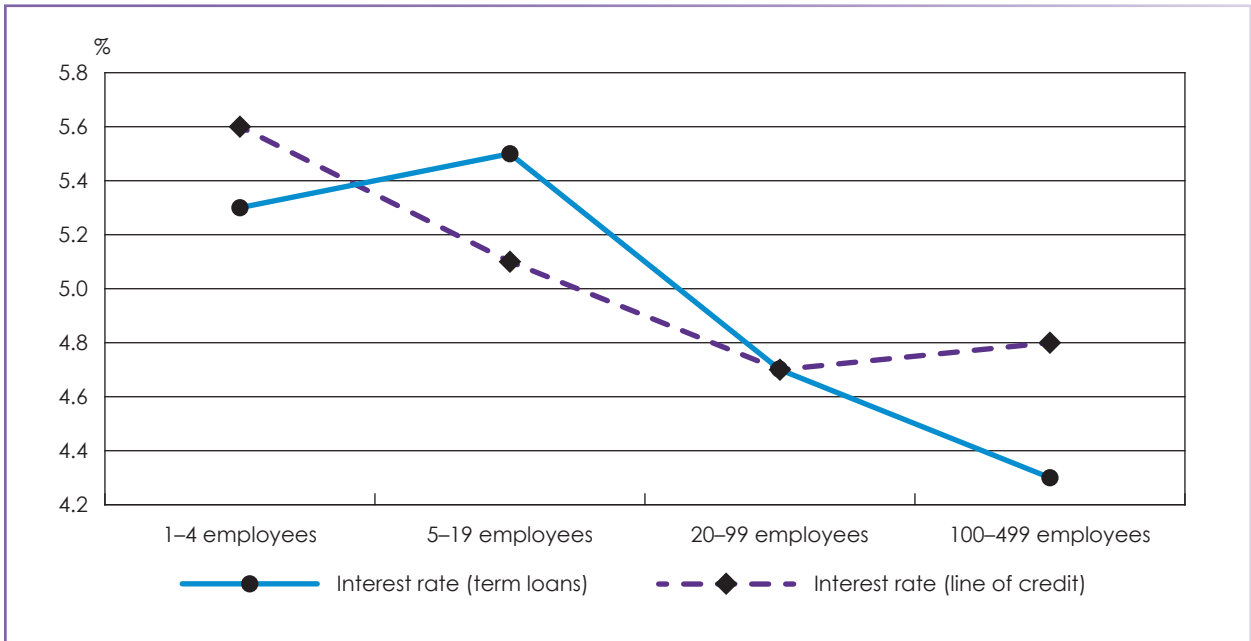
Since SMEs are often seen as riskier borrowers, they also face higher costs, i.e., they have to borrow with higher interest rates (Figure 4). However, in this case, the interest rate difference between firm size is small and could be considered as not statistically significantly different. Moreover, the fact that the probability of delinquency is higher for smaller firms may also explain why lenders charged SMEs higher interest rates. Figure 5 shows delinquency rates⁶ by business size.⁷ Clearly, it appears that the delinquency rate is higher for smaller businesses.

The previous results offer good reasons for the Government of Canada to facilitate access to financing for SMEs. The federal government, as a regulator, needs to ensure that access to debt financing is not too restricted for SMEs due to asymmetric information, market imperfections or other reasons.

6. The PayNet 90+ day loan delinquency rate measures the percentage of loans to small and medium-sized businesses that are past due by 90 or more days.

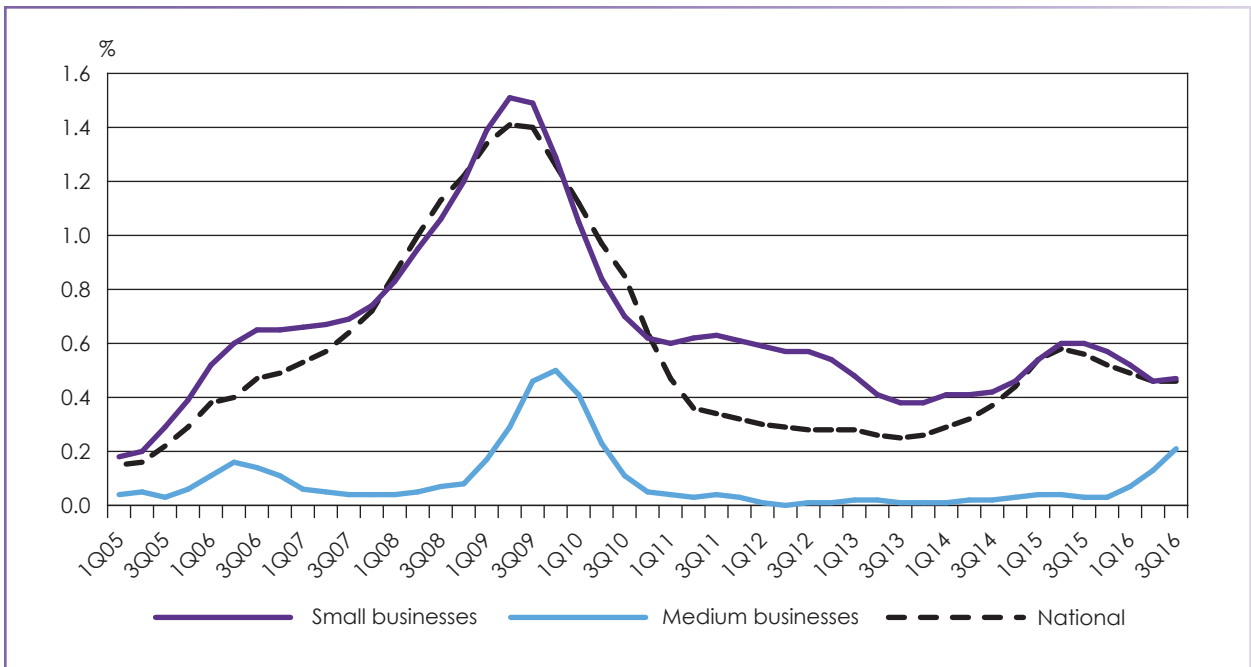
7. Borrower size classification is based on the following: small borrowers are those with the highest total balance outstanding less than \$1.5 million; medium borrowers are those with the highest total balance outstanding more than \$1.5 million but less than \$11 million.

Figure 4: Interest Rate Charged for Term Loans and Line of Credit for SMEs, 2014



Source: Statistics Canada, Survey on Financing and Growth of Small and Medium Enterprises, 2014.

Figure 5: 90+ Day Loan Delinquency Rates, 2005 Q1–2016 Q3



Source: PayNet Inc.

3. LITERATURE REVIEW

This section identifies the work that has been done to evaluate and measure the level of incrementality of the CSBFP over the years. The methodology adopted by researchers in Canada uses a credit scoring model. This is a two-step approach: in the first step, parameters are estimated using a logit regression applied to firms that were non-CSBFP borrowers. The model estimates a firm's probability of having its debt financing request approved or rejected. The second step consists in applying the model's estimates to CSBFP borrowers to calculate each firm's probability of being approved or rejected. The proportion of firms that the model identifies as being rejected is the measure of incrementality. Equinox (2003) and Riding et al. (2007) used this approach with data from the *Survey on Financing of Small and Medium Enterprises*. The authors used a sample of 382 businesses, 281 of which were non-CSBFP borrowers and 101 of which were CSBFP borrowers. Riding et al. (2007) found that the level of incrementality for the CSBFP was 75 percent. Thus, 75 percent of the debt financing requests would have been denied without the CSBFP. Riding (2009) obtained an incrementality of approximately 80 to 85 percent by adopting a similar methodology. As a benchmark, he used the same credit scoring model with data from the *Survey on Financing of Small and Medium Enterprises, 2000*, but applied its methodology to firms in the CSBFP from the *Survey on Financing of Small and Medium Enterprises, 2007*. The author mentioned that the estimates from the former model were more reliable than the latter.

Recently, Seens and Song (2015) investigated the incrementality of the CSBFP. They applied the credit scoring model on data from the Statistics Canada *Survey on Financing of Small and Medium Enterprises, 2011*. Their sample contained 2,404 SMEs, 516 of which were CSBFP borrowers and 1,888 of which were non-CSBFP borrowers but had asked for debt financing in 2011. The authors found that the CSBFP was incremental and obtained a measure of incrementality of 67 percent.⁸

4. DATA SOURCE

This paper used the *Survey on Financing and Growth of Small and Medium Enterprises, 2014* linked to other data sources such as the General Index of Financial Information (GIFI) and Payroll Account Deductions (PD7) from 2010 to 2014.

The *Survey on Financing and Growth of Small and Medium Enterprises, 2014* is a survey that collects information on the types of financing that businesses used in 2014, such as debt, lease, trade credit and equity financing, and government grants or subsidies. It considers to cover the demand side

8. It should be noted that this study measured only full incrementality, whereas the previous studies attempted to measure both full and partial incrementality—partial incrementality being that a business may still receive a loan outside of the CSBFP, but under less favourable terms than those offered under the CSBFP.

of financing for SMEs. It also contains other general business information such as growth, exports and innovation. Moreover, the survey provides information on the owner's characteristics, e.g., level of education, number of years of experience and gender.

The *Survey on Financing and Growth of Small and Medium Enterprises, 2014* excludes any business with 0 employees, with 500 employees or more that has gross revenues of less than \$30,000, that is a non-profit organization⁹ or a public agency, and that is a member of specific business groups.¹⁰

Conducted between February and May 2015, the survey, to which 10,397 businesses responded, had a response rate of 61 percent. These respondents form a representative sample of 621,417 SMEs of the survey's target population. For the CSBFP, the sample contains 743 firms representative of 1,833 businesses of the survey's target population.

In addition, the survey is augmented with administrative financial information from the GIFI such as total assets, total liabilities, total sales of goods and services, net income or loss after taxes and the annual average number of employees. Microdata from the *Survey on Financing and Growth of Small and Medium Enterprises, 2014* and GIFI were only available at the Canadian Centre for Data Development and Economic Research (Statistics Canada) in 2016. This explains, among other factors, the lag between the year of the survey (2014) and the publication of this report.

For the purpose of this project, we restrained the sample to firms that had requested debt financing in 2014, more specifically, a non-residential mortgage or term loan. Indeed, under the CSBFP, firms can borrow for land or buildings used for commercial purposes, equipment or leasehold improvements. This is a first distinction from the work of Seens and Song (2015), since the authors included all types of debt financing (mortgages, lines of credit, term loans and credit cards). The reason was that the *Survey on Financing and Growth of Small and Medium Enterprises, 2011* did not separate information by type of financing as it is done in the *Survey on Financing and Growth of Small and Medium Enterprises, 2014*. Also, only incorporated firms are considered in this study, as the majority of firms in the CSBFP are incorporated. After eliminating outliers and missing observations, 1,748 SMEs were included in the sample. Table 3 shows that the sample drawn from the *Survey on Financing and Growth of Small and Medium Enterprises, 2014* contains approximately 8 percent of non-CSBFP borrowers whose debt financing request was rejected in 2014.

9. For the purpose of the *Survey on Financing and Growth of Small and Medium Enterprises, 2014*, a non-profit organization is an organization that does not distribute its surplus funds to owners or shareholders, but instead uses them to pursue its goals. Examples include charities, trade unions, trade associations and public arts organizations. By this definition, co-operatives are for-profit enterprises.

10. Utilities, finance and insurance, management of companies and enterprises, educational services, public administration, automotive equipment rental and leasing, commercial and industrial machinery and equipment rental and leasing, out-patient care centers, medical and diagnostic laboratories, other ambulatory health care services, general medical and surgical hospitals, psychiatric and substance abuse hospitals, specialty hospitals, community food and housing, and emergency and other relief services (reference: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, No. 2941).

Table 3: Sample Size

	Non-CSBFP Participants			Total
	CSBFP Participants	Rejected Borrowers	Approved Borrowers	
Total	710	110	1,223	2,043
Incomplete records	232	6	57	295
Total usable records	478	104	1,166	1,748

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; and Canada Revenue Agency, *General Index of Financial Information 2013–2014, Payroll Account Deduction (PD7)*.

5. METHODOLOGY

In order to evaluate the incrementality of the CSBFP, we used the two-step approach mentioned in Section 3. In particular, we followed the same framework¹¹ employed by Seens and Song (2015). We first estimated the probability that a firm's application for a non-guaranteed loan would be approved, conditionally on explanatory variables related to the firm's performance metrics, characteristics and industry sector. The base equation that was estimated is given by

$$y_i^* = \beta x_i + \varepsilon_i,$$

where $i = 1, \dots, N$ and y_i^* denote a latent dependent variable that represents the propensity of a firm's loan application to be approved or denied. In the equation, ε_i denotes the error term. As the latent variable is not directly observed in the data, we will use another variable, denoted by y_i , which is 1 if the application was approved and 0, otherwise. This binary variable indicates in which category y_i^* falls:

$$y_i = \begin{cases} 1 & \text{if } y_i^* > 0; \\ 0 & \text{if } y_i^* \leq 0. \end{cases}$$

A logit model was used to estimate the probability that the firm's loan application would be approved:

$$P(y_i = 1 \mid x_i) = \frac{\exp(\beta x_i)}{1 + \exp(\beta x_i)}.$$

The second stage of the analysis used the resulting model to classify CSBFP loans as to whether or not the applications would have been rejected in the absence of the CSBFP. At the extreme, if the guaranteed loans were incremental and the model is reliable, the model would predict that all of the CSBFP loans would have been turned down. The proportion of such loans that the model predicts as being rejected is, under this logic, a direct measure of incrementality.

11. Many models have been experimented with to obtain the best credit scoring model. For example, we tried a Heckman model in the case of a possible sample selection bias. The Mill's ratio was not significant. We also tried a model with several variables related to owner's characteristics, such as majority female ownership, majority visible minority ownership and majority aboriginal ownership. All of these variables were strongly non-significant in the model. Thus, we report only the reduced model.

6. VARIABLES

For the dependent variable, we used a dummy variable of 1 if the debt financing request for a mortgage or term loan was approved¹² and 0, otherwise. In this case, a request is said to be approved if the partial or full amount was authorized.

The variables included in the logit regression are presented in Table 4. They are related to the firm's characteristics, such as age and size, or the firm's performance metrics, represented by debt ratio or net income or loss. The model also contains control variables such as province or territory and industry sector.

Table 4: Definition of Variables

Variable	Definition
Age (lnage)	Number of years, until 2014, since the firm was first established. The natural logarithm is used in the model. ¹³
Size (lnsize)	Average number of employees in 2014 as reported to the Canada Revenue Agency (Payroll Deductions and Remittances, PD7). The natural logarithm is used in the model.
Debt ratio (log_debt_assets)	Total liabilities in 2013 divided by total assets in 2013.
Net income or loss (net_income)	Net income or loss reported in 2014, in 100,000 dollars.
Province (Reference: Alberta)	=1 if the firm is located in the province, group of provinces and/or territories and 0, otherwise; Atlantic (at) [New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador], Quebec (qc), Ontario (ont), Manitoba (man), Saskatchewan (sas) and British Columbia and Territories (bct).
Industry sector (Reference: retail trade)	=1 if the firm is in the industry sector or group of industry sectors and 0, otherwise; Agriculture, forestry, fishing and hunting (agr), mining, quarrying and oil and gas extraction (mining), manufacturing (manuf), construction (construc), wholesale trade (whole), transportation and warehousing (transp), professional, scientific and technical services (prof), accommodation and food services (accom), other services (other) [except public administration], all other (all_other) [information and cultural industries, finance and insurance, real estate and rental and leasing, management of companies and enterprises, administrative and support services, waste management and remediation services, health care and social assistance, and arts, entertainment and recreation].

All the variables used in the model were from 2014, except for debt ratio (total liabilities over total assets). This variable is lagged one year in order to avoid endogeneity caused by the simultaneity effect. The dependent variable, which is related to the approval or rejection of the firm's debt financing request, could have a causal effect on total liabilities, and therefore, on the debt ratio. This could

12. For businesses that applied for a mortgage and term loans, we used the largest request amount and the outcome of the request related to it. Only a small proportion of firms applied for both in the sample.

13. In fact, we use the transformation $\ln(x + 0.5)$ in order to keep observations that are born in 2014, because $\ln 0 = -\infty$, i.e., the function is not defined at zero.

be explained by the fact that because the request was approved, the total amount of liabilities subsequently increased. Table 5 shows the mean values of the explanatory variables that appear in the logit model.

Table 5: Mean Values of Explanatory Variables by Type of Borrower—Approved, Rejected and CSBFP

Variable		Approved	Rejected	CSBFP
Business Characteristics	Age (years)	24.59	17.12	13.03
	Size (number of employees)	41.27	14.91	13.33
Performance Metrics	Debt ratio	0.73	1.13	0.83
	Net income (\$)	274,558.01	61,583.55	11,928.97
Industry Sector ¹⁴ (%)	Accommodation and food services	9.26	13.46	14.23
	Construction	12.44	13.46	15.06
	Manufacturing; agriculture, forestry, fishing and hunting; mining, quarrying, and oil and gas extraction	24.96	15.38	15.48
	Wholesale trade; professional, scientific and technical services; other services	21.27	18.27	15.06
	Retail trade	11.23	13.46	13.60
	Transportation	10.98	10.58	14.44
		9.86	15.38	12.13
Regional Distribution ¹⁵ (%)	Quebec; Atlantic	38.59	31.73	47.07
	Ontario	26.24	30.77	19.67
	Manitoba; Saskatchewan; Alberta	25.90	24.04	24.06
	British Columbia; Territories	9.26	13.46	9.21
Number of observations		1,166	104	478

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; Canada Revenue Agency, *General Index of Financial Information 2013–2014, Payroll Account Deduction (PD7)*; and author's calculations.

It is interesting to see that there are some similarities between Figure 2 and Table 5. Indeed, businesses whose debt financing requests were approved are older and larger than those whose requests were rejected.

Table 6 shows the distribution of debt financing request outcome by industry sector. With the exception of the "All other" industry sectors category, accommodation and food services has the lowest approval rate for debt financing requests. This is also in line with Figure 2.

14. Some industry sectors have been aggregated to meet confidentiality requirements of the *Statistics Act*.

15. Some regions have been aggregated to meet confidentiality requirements of the *Statistics Act*.

Table 6: Distribution of Industry Sector by Debt Financing Request Outcome (approved/rejected)

Industry Sector	Approved	Rejected
Accommodation and food services	88.52	11.48
Construction	91.19	8.81
Manufacturing; agriculture, forestry, fishing and hunting; mining, quarrying, and oil and gas extraction	94.79	5.21
Wholesale trade; professional, scientific and technical services; other services	92.88	7.12
Retail trade	90.34	9.66
Transportation	92.09	7.91
All other*	87.79	12.21
Number of observations	1,166	103

* "All other" includes information and cultural industries, finance and insurance, real estate and rental and leasing, management of companies and enterprises, administrative and support services, waste management and remediation services, health care and social assistance, and arts, entertainment and recreation.

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; Canada Revenue Agency, *General Index of Financial Information 2013–2014, Payroll Account Deduction (PD7)*; and author's calculations.

Overall, firms that were approved were in a better position in terms of performance metrics, in comparison with firms that were rejected. Indeed, the debt ratio in 2013 was lower for businesses with approved loans than for those with denied loans. This shows that the former were in a better position to borrow, with less debt per asset. Also, net income was greater for businesses whose loan requests are approved than for businesses whose loan requests are rejected. Higher net income suggests to lenders that borrowers are in good position to pay back their loans.

7. RESULTS

In this section, we will show the estimated results (Table 7) obtained by the logit model.¹⁶ This is the first step of our methodology, i.e., estimating a credit score model for non-CSBFP borrowers.

Table 8 presents the average marginal effects associated with the model. These are useful in assessing the extent of the impact of a variation in the corresponding explanatory variable on the firm's probability of being approved or rejected. We know that the estimated coefficients (as in Table 7) do not say anything about the extent of the impact of the explanatory variable on the dependent variable, but only the direction of the effect (Wooldridge, 2009). For that reason, we will consider only the average marginal effects in the analysis of the results of the credit scoring model.

16. The model presented here is a reduced model. Many other variables similar to those used by Seens and Song (2015) in their model were added, particularly in the performance metrics category, as well as other variables related to owner's characteristics such as level of education, ownership gender (majority female or male owner), number of years of experience, and aboriginal and visible minority ownership status. However, none of these variables were significant. In the case of owner's characteristics, this means that lenders may not take into account those parameters in their evaluation of a debt financing request.

Table 7: Estimation Results of the Logit Model (approval/rejection of loan requests)

Variable		Estimated Coefficient	p-value
Business Characteristics	lnage	0.230**	0.041
	lnsize	0.447***	0.000
Performance Metrics	lag_debt_assets	- 0.515***	0.001
	net_income	0.050**	0.034
Industry Sector Dummy (Reference: Retail trade)	agr	+**	X
	mining	-	X
	construc	0.251	0.580
	manuf	+	X
	whole	+	X
	transp	0.511	0.270
	prof	0.760	0.205
	accom	- 0.169	0.706
	other_services	+	X
	all_other	0.168	0.703
Regional Dummy (Reference: Alberta)	bct	0.209	0.640
	sask	+*	X
	man	+*	X
	ont	0.097	0.783
	qc	0.589	0.109
	at	0.560	0.211
Constant	c	0.378	0.508
Number of observations	1,270		
Pseudo R2	0.129		
Log likelihood	-313.302		

Note 1: Coefficients significant at * 10%, ** 5%, *** 1%.

Note 2: Standard errors were estimated using the bootstrap method (5,000 replications).

Note 3: "X" indicates that data were suppressed to meet confidentiality requirements of the *Statistics Act*. Some estimated coefficients are missing for this reason; however, their significance and sign appear.

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises, 2014*; Canada Revenue Agency, *General Index of Financial Information 2013–2014, Payroll Account Deduction (PD7)*; and author's calculations.

All of the variables related to business characteristics are positive and significant, which means that older and larger businesses have a greater chance of having their debt financing request approved. Also, average marginal effects show that firm size has a greater impact on the firm's probability of being approved. Regarding performance metrics, Table 8 reveals that debt ratio (i.e., total liabilities divided by total assets) has a negative impact.¹⁷ Thus, a higher debt ratio decreases the firm's probability of having a debt financing request approved. This shows that firms with a larger amount of liabilities than assets in

17. We added the squared debt ratio in the model in order to determine if there was a non-linear relationship between the dependent variable and the debt ratio, such as an inverted-U relationship. In this case, the interpretation could have been that the debt ratio has a positive impact on the firm's probability of being approved up to a certain threshold and a negative impact thereafter. On the one hand, debt ratio could also be interpreted as the capacity of a firm to borrow and have access to external financing. On the other, too many liabilities compared to assets show that a firm has reached its capacity to borrow. However, the quadratic term was not significant in the logit model.

2013 had a lower chance of getting approved for their loans in 2014. Indeed, firms with a large amount of debt but fewer assets may signal to lenders that they have fully reached their borrowing capacity.

Table 8: Average Marginal Effects

Variable		Estimated Average Marginal Effects	p-value
Business Characteristics	lnage	0.016**	0.042
	lnsize	0.031***	0.000
Performance Metrics	lag_debt_assets	- 0.035***	0.001
	net_income	0.003**	0.043
Industry Sector Dummy (Reference: Retail trade)	agr	+***	X
	mining	-	X
	construc	0.016	0.552
	manuf	+	X
	whole	+*	X
	transp	0.030	0.208
	prof	0.042	0.103
	accom	- 0.012	0.713
	other_services	+	X
	all_other	0.011	0.689
Regional Dummy (Reference: Alberta)	bct	0.013	0.607
	sask	+***	X
	man	+***	X
	ont	0.007	0.772
	qc	0.037	0.070
	at	0.033	0.134
Number of observations		1,270	

Note 1: Coefficients significant at * 10%; ** 5%; *** 1%.

Note 2: Standard errors were estimated using the bootstrap method (5,000 replications).

Note 3: "X" indicates that data were suppressed to meet confidentiality requirements of the *Statistics Act*. Some estimated coefficients are missing for this reason; however, their significance and sign appear.

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises, 2014*; Canada Revenue Agency, *General Index of Financial Information 2013–2014, Payroll Account Deduction (PD7)*; and author's calculations.

Net income has a positive impact on the firm's probability of being approved for loans. Firms with a higher net income are in a better position to borrow, as lenders would see them as being able to repay the loans. However, the impact of this variable is smaller (i.e., the average marginal effect is smaller in absolute value) compared with firm age, firm size and debt ratio. Therefore, net income has less impact than the previous variables on the firm's probability of having its debt financing request approved.

The next step is to apply the estimated coefficients obtained in the previous model to the business variables of CSBFP borrowers. The calculations lead to an estimation of the binary variable on the status of the debt financing request (approved/rejected) or, in other words, of the credit scoring result obtained.

Since the variable estimated is continuous, we transformed it into a dummy variable (0 or 1) by classifying firms into two categories. A CSBFP borrower is “approved” (=1) if the estimated dependent variable is greater than 0.925, and “rejected” (=0) otherwise.¹⁸ It should be noted that Seens and Song (2015) also used this method to classify businesses in the CSBFP. The results are presented in Table 9.

Table 9: Approved/Rejected CSBFP Borrowers Based on the Logit Model, 2014

Total Number of Borrowers	Approved	Rejected
478	147 (30.75%)	331 (69.25%)

Sources: Statistics Canada, *Survey on Financing and Growth of Small and Medium Enterprises*, 2014; Canada Revenue Agency, *General Index of Financial Information 2013–2014, Payroll Account Deduction (PD7)*; and author’s calculations.

Approximately 69 percent of CSBFP borrowers would not have been approved for debt financing by a financial institution in 2014 if the CSBFP did not exist. Therefore, the CSBFP is incremental and the measure of incrementality of the program is 69 percent.

8. CONCLUSION

The aim of this paper was to measure the level of incrementality of the Canada Small Business Financing Program (CSBFP). The CSBFP is a statutory loan loss-sharing program governed by the *Canada Small Business Financing Act* (CSBFA) and administered by Innovation, Science and Economic Development Canada (ISED). Under the CSBFP, the Government of Canada and the private lenders share the burden of risk on loans in order to facilitate access to financing for small and medium enterprises (SMEs). Data suggest that SMEs that are young, smaller in size and in some specific industry sectors such as accommodation and food services, may suffer from credit rationing.

A program is said to be incremental if a sufficient proportion of SMEs would have had their financing request denied if the program did not exist. In this study, the incrementality of the CSBFP was measured based on the following methodology, consisting of a two-step approach:

- (1) Estimating a model similar to a bank’s credit scoring model, applied to non-CSBFP borrowers. The model used is a logit model where the dependent variable is a binary variable that relates to the approval or refusal of a business’s debt financing request; and
- (2) Using the previous estimated model to predict which CSBFP borrowers would have had their debt financing request approved or denied. The estimated proportion of businesses that would have been denied is the level of incrementality for the CSBFP.

18. The value 0.925 is the mean of the predicted probability of the firms that were approved based on the logit model. Also, using this approach with the observations included in the model, 66 percent of firms were correctly classified. In particular, 75 percent of the rejected loans were attributed with an estimated value of 0 and 65 percent of the approved loans were attributed with an estimated value of 1.

Using the *Survey on Financing and Growth of Small and Medium Enterprises, 2014* linked to the Canada Revenue Agency General Index of Financial Information 2010–2014 and Payroll Account Deduction (PD7), we obtain a level of incrementality of 69 percent. Thus, the proportion of CSBFP borrowers whose debt financing requests would have been rejected is 69 percent if the program did not exist. Finally, if partial incrementality was included as part of this analysis, it is expected that almost all CSBFP loans would be considered incremental.

REFERENCES

- Banerjee, R. (2014). "SMEs, Financial Constraints and Growth." BIS Working paper No. 475, Bank for International Settlements.
- Coe, C. (2016). "SME Profile: Canada Small Business Financing Program Borrowers." Ottawa: Innovation, Science and Economic Development Canada.
- Equinox (2003). "Incrementality of CSBF Program Lending, Volume 1: Insights from SME FDI Data." Equinox Management Consultants Ltd.
- Industry Canada (2013a). "Financing Statistics—Special Edition: Key Small Business Statistics." Ottawa: Industry Canada.
- Industry Canada (2013b). "Key Small Business Statistics: August 2013." Ottawa: Industry Canada.
- Industry Canada (2014). "Evaluation of the Canada Small Business Financing Program." Ottawa: Industry Canada.
- Industry Canada (2015). "Comprehensive Review Report 2009–2014." Ottawa: Industry Canada.
- Innovation, Science and Economic Development Canada (2016a). "*Canada Small Business Financing Act*." Ottawa: ISED.
- Innovation, Science and Economic Development Canada (2016b). "Canada Small Business Financing Program Guidelines." Ottawa: ISED.
- Innovation, Science and Economic Development Canada (2016c). "Key Small Business Statistics." Ottawa: ISED.
- Leung, D., L. Rispoli, and R. Chan (2012). "Small, Medium-sized, and Large Businesses in the Canadian Economy: Measuring Their Contribution to Gross Domestic Product from 2001 to 2008." Statistics Canada.
- Organisation for Economic Co-operation and Development (2012). "*Financing SMEs and Entrepreneurs 2012: An OECD Scoreboard*." OECD Publishing.
- Organisation for Economic Co-operation and Development (2013). "SME and Entrepreneurship Financing: The Role of Credit Guarantee Schemes and Mutual Guarantee." OECD.
- Organisation for Economic Co-operation and Development (2015). "Project Outline for a Framework for Evaluating Credit Guarantee Schemes." OECD.
- Riding, A. (2009). "Canada Small Business Financing Program: Updated Analysis of Incrementality." Ottawa: Canada Works Limited.
- Riding, A., J. Madill, and G. Haines Jr. (2007). "Incrementality of SME Loan Guarantees." *Small Business Economics*, 29(1), 47–61.
- Seens, D., and M. Song (2015). "Requantifying the Rate of Incrementality for the Canada Small Business Financing Program." Ottawa: Industry Canada. Available online on the *SME Research and Statistics Website* ([https://www.ic.gc.ca/eic/site/061.nsf/vwapj/RRI_CSBF-NQTA_PFPPEC_eng.pdf/\\$file/RRI_CSBF-NQTA_PFPPEC_eng.pdf](https://www.ic.gc.ca/eic/site/061.nsf/vwapj/RRI_CSBF-NQTA_PFPPEC_eng.pdf/$file/RRI_CSBF-NQTA_PFPPEC_eng.pdf))

Wagenvoort, R. (2003). "Are finance constraints hindering the growth of SMEs in Europe?" European Investment Bank. *EIB Papers*, 8(2), 23–50.

Wooldridge, J. M. (2009). *Introductory Econometrics: A Modern Approach*. South-Western CENGAGE Learning.