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Abstract

Entrepreneurship and business ownership are important aspects of the economic contribution of immigrants. Much is known regarding the high self-employment rates and other characteristics of immigrant entrepreneurs. However, very little is known about the economic contribution of second-generation Canadians—individuals with immigrant parents—through the ownership of companies. This paper fills that void by using a novel dataset that links individual- and business-level administrative data to microdata from the 2016 Census of Population. The second generation's business ownership rates were lower than that of immigrants but higher than those of third plus generations—individuals with Canadian-born parents. This finding held for all three forms of business ownership investigated in this study: the ownership of (1) private incorporated firms with employees, (2) private incorporated firms in high-tech research and development (R&D)-intensive industries and (3) the primary self-employed (unincorporated). However, among private incorporated companies, notably among those in R&D-intensive industries, the intergenerational differences in ownership were caused mainly by differences in the characteristics of the owners. The probability of owning a private incorporated company was very small or non-existent once characteristics, such as education, age, place of residence and source country background, were accounted for. Among private incorporated companies, the “generational effect” was quite small after controls. By contrast, even after controlling for the observable differences, immigrants maintained a higher tendency to be primarily unincorporated self-employed, which may be related to their difficulty finding suitable paid employment. Higher educational attainment tended to increase the likelihood of owning a private incorporated company but decreased the probability of being primarily unincorporated self-employed for all generational groups. The industrial distribution of the businesses owned also varied among the three groups. Overall, ownership rates and types of businesses owned by the second generation more closely resembled those of third plus generations than those of immigrants.

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Introduction

Entrepreneurship and business ownership are important aspects of the economic contribution of immigrants. A substantial literature has developed regarding immigrant entrepreneurship in the United States and Canada (Fairlie and Lofstrom 2015; Green et al. 2016). Immigrants are usually found to have higher business ownership rates than the native-born population, although this difference may be partially attributed to the difficulty many immigrants confront in the labour market (Hou and Wang 2011). Multiple U.S. studies have concluded that immigrant entrepreneurs represent a major driving force in the technology sector and that immigrants played a disproportionate role in the development of places like Silicon Valley (Saxenian 2002; Wadhwa et al. 2008; Hunt and Gauthier-Loiselle 2010). Recent Canadian research shows that economic class immigrants are more likely to own technology-based companies than Canadian-born business owners, possibly because they are considerably more likely to have a science, technology, engineering or mathematics (STEM) university degree (Picot and Ostrovsky 2017).

This study looks beyond the business ownership and self-employment patterns of immigrants and focuses on Canadian-born business owners who have immigrant parents, or second-generation Canadians. The study is primarily motivated by the question of whether high levels of entrepreneurship generally observed among immigrants are also found among the second generation. There are reasons to believe that second-generation Canadians will approach entrepreneurship differently than both their immigrant parents and subsequent generations of Canadian-born individuals whose parents were also born in Canada (“third plus” generations).¹ For instance, most second-generation Canadians have a linguistic advantage over their immigrant parents: having been born in Canada, few face language difficulties and many are proficient in both official languages. Unlike most of their parents, second-generation Canadians are schooled in Canada and develop important social networks as young adults, which may give them entrepreneurial advantage over immigrant entrepreneurs later in life. The financial situation of second-generation Canadians is generally better than the financial situation of immigrants, which gives potential second-generation entrepreneurs an advantage in financing a new business. Compared with third plus generations, second-generation Canadians have the advantage of being exposed to the language, culture and social networks of their parents and may even establish ties with their ancestral countries that benefit the operation of their businesses.

The study has three essential, novel elements compared with the previous literature. First, it makes an important distinction between the ownership of incorporated and unincorporated businesses. Recent studies highlight a significant difference between immigrant owners of private incorporated companies and self-employed owners of unincorporated firms (Levine and Rubenstein 2017; Light and Munk 2018). For instance, the former are more likely to be employers while the latter rarely have any employees beyond the owner (Green et al. 2016). There are also important differences in the industrial distribution of incorporated and unincorporated businesses. As will be seen, the characteristics of the owners of these two types of companies are also quite different.

Second, this is the first study of this kind that combines the strength of administrative data with the richness of census microdata by linking nationally representative administrative tax records with records from the 2016 Census of Population. The census information is key to examining the impact of the differences in educational attainment on entrepreneurship. In Canada, Australia and New Zealand, the second generation typically outperforms both the first generation and third plus generations in terms of

1. Third plus generations in this study are treated as a single category that includes all Canadian-born individuals with Canadian-born parents.

education and often labour market outcomes (Chen and Hou 2019).² This occurs less in the United States (Picot and Hou 2011; Picot and Hou 2018b) and is typically not the case in Europe, where the educational and economic outcomes of second-generation, native-born individuals tend to be inferior. Hence, the economic contribution of the second generation likely varies significantly among countries.

Finally, using an Organisation for Economic and Co-operation and Development (OECD) taxonomy of research and development (R&D) intensity across different industries, the study highlights cross-generational differences in the ownership of firms in the “knowledge-based” sector of the Canadian economy. It also examines the relationship between holding a STEM degree and owning a firm in industries with high and medium levels of R&D intensity.

Brief literature review

The literature on second-generation entrepreneurship is sparse. Among studies conducted in Canada, Australia and New Zealand, countries whose second-generation individuals tend to have similar characteristics and outcomes, only one Canadian paper was found. Hou, Abada and Lu (2013) focused on self-employment among immigrants and their children in a longitudinal study covering the period from 1981 to 2006. They found that second-generation men had lower self-employment rates than their immigrant parents, and second-generation women had higher rates than their parents. A U.S. study found that second-generation Americans were less likely to become entrepreneurs (in this case self-employed) than the first generation, but those who did were very successful (Somashekhhar 2016). The study concluded that entrepreneurship was primarily a labour market strategy for the first generation in the United States. There was no information on the role of second-generation entrepreneurs in the technological or professional industries.

Among European studies, a Dutch study found that the second generation did start businesses in very different industries than immigrants, but in spite of their higher education and greater social integration, they displayed no greater success than first-generation businesses (Beckers and Blumberg 2013). A Swedish study found that over a four-year period, firms operated by second-generation individuals with a background from an OECD country registered higher revenue growth rates than those owned by the native-born population. However, second-generation firms owned by individuals with a background from a non-OECD country had lower revenue growth. They concluded that source country background was important and that there was a long-run segmented assimilation pattern observed in Sweden (Efendic, Andersson and Wennberg 2016). Several studies asked whether “transnational embeddedness,” a measure of international orientation, is greater in businesses owned by the first or second generations. This research found that such embeddedness was an important aspect of second-generation entrepreneurs, but its extent was less than that of first-generation entrepreneurs (Rusinovic 2008). No study appears to provide a broad perspective of the entrepreneurial activities of the second generation, or to specifically address the role of second-generation entrepreneurs in technological and professional sectors.

Based on the international evidence, the main hypothesis investigated in this study is that the prevalence of business ownership among second-generation Canadians is lower than that of the immigrant generation. The linguistic, cultural, material and educational advantages possessed by second-generation Canadians allow them to succeed in professional employment, which they may choose over

2. The differences in educational attainment can be quite striking. In Canada, 33% of second-generation males and 46% of second-generation females aged 25 to 44 held university degrees in 2016. This compared with 21% of men and 33% of women whose parents were born in Canada. Among some second-generation groups, the university completion rate is particularly high: up to 60% to 70% of young second-generation individuals with Korean and Chinese backgrounds obtain university degrees (Chen and Hou 2019).

business ownership. While many voluntarily choose entrepreneurship, as is the case among the immigrant population, far fewer turn to business ownership as a labour market strategy when confronted with poor employment opportunities. This study also looks into the proposition that those who become business owners are more likely to be in R&D-intensive industries, partly because of their educational background. Even though immigrants to Canada have high levels of educational attainment, many in STEM disciplines, degrees received in non-Western countries often do not provide the same benefits as degrees from Western countries (Boyd and Tian 2018; Picot and Hou 2020). Second-generation Canadians do not face the same difficulty, since their degrees are largely obtained in Canada.

Concepts and definitions

This study makes a broad distinction between ownership of incorporated and unincorporated companies. These two types of companies are very different from one another, as are the characteristics of their owners (Green et al. 2016; Levine and Rubenstein 2017). Apart from crown corporations, there are two main types of corporations in Canada: public and private. Shareholders of public corporations—corporations whose shares are listed on a designated Canadian stock exchange—are not entrepreneurs in any meaningful sense and are not considered business owners in this study. Among privately owned corporations, about half have no employees (first and second lines in the last column of Table 1) and are often “shell” companies with little economic activity. For this reason, analysis of the ownership of incorporated businesses focuses on the owners of private corporations with employees. Information about the owners of incorporated firms with employees is available from corporate tax returns.

Part of the analysis pertains specifically to the ownership of private incorporated businesses in R&D-intensive industries. The identification of R&D-intensive industries is based on the OECD taxonomy of industries according to their level of R&D intensity (Galindo-Rueda and Verger 2016). The taxonomy divides manufacturing and non-manufacturing industries into five clusters: high, medium-high, medium, medium-low and low R&D intensity industries. This study adapts the OECD taxonomy to examine the ownership of incorporated enterprises in industries with high and medium-high R&D intensity.³

This study also examines ownership of unincorporated businesses. The identification of unincorporated self-employed individuals is based on information about self-employment income reported on individual tax returns (Form T1). Self-employment income sources include professional, business and commission income as well as that from fishing and farming. For more than 40% of the unincorporated self-employed, self-employment is not the individual’s primary source of income and often generates little economic activity. Only the primarily self-employed—those whose net self-employment income exceeds that from paid work—are included in this study.

In line with previous studies, the second generation category includes Canadian-born individuals with at least one immigrant parent, and third plus generations include Canadian-born individuals with both parents born in Canada. There is a significant difference in the ethnic backgrounds of the first and second generations. Since immigration from China, India and the Philippines has been very high in recent decades, these are the top countries of origin for immigrants in the sample. The ethnic background of the second generation reflects those of immigrants from an earlier period. The top three countries of origin of the second generation’s parents are the United Kingdom, Italy and the Netherlands.

3. The original OECD classification is based on the International Standard Industry Classification. High-technology industries such as aerospace, information and communication equipment, semiconductors, computers and related high-tech instrumentation, pharmaceuticals transportation equipment, scientific research, software and information technologies and other related industries. The corresponding North American Industry Classification System industry codes were obtained using the Statistics Canada concordance tables (see Statistics Canada, n.d.a).

The unit of the analysis below is the individual owner. One company can have more than one owner and each individual can own more than one business. An individual can also own both incorporated and unincorporated businesses, although very few do. The population aged 25 to 69 are included in this analysis.

Data

The data come from three main sources. Combined, these data provide a novel and unique opportunity to produce 'first-of-its-kind' information on the entrepreneurial activities of second-generation Canadians. The first source is the Canadian Employer–Employee Dynamics Database (CEEDD), an administrative database linking data from multiple administrative sources, including individual (Form T1) and corporate (Form T2) tax returns. The CEEDD T1 files allow for the identification of unincorporated self-employed individuals based on information about their self-employment income. In this study, individuals with non-zero gross self-employment income are considered self-employed. It is also possible to identify the primarily self-employed by comparing the annual wages and salaries of self-employed individuals with their net self-employment income. The CEEDD T2 files are key to identifying owners of private corporations. Each private corporation that files a corporate tax return is also required to submit a Schedule 50 form, which lists all shareholders with shares equal to or larger than 10%. Ownership information from Schedule 50 forms is used to identify owners of private incorporated businesses in this study.

The second data source is the 2016 Census of Population microdata file. It is now possible to link administrative data to census microdata using linkage keys recently constructed by Statistics Canada.⁴ The 2016 Census microdata file allows the identification of immigrants as well as second-generation Canadians and third plus generation Canadians. It also provides detailed information on individual characteristics, including detailed educational attainment data and the source country background of immigrants and the second generation.

The third data source used in this study is the National Accounts Longitudinal Microdata File (NALMF). The NALMF is an enterprise-level dataset that covers all Canadian corporations and unincorporated businesses reporting employment. It is used in this study to identify incorporated firms with employees in 2016 using the business numbers (BN) from Schedule 50 forms. The industries with high and medium-high R&D intensity are identified through the six-digit North American Industry Classification System code attached to each enterprise in the NALMF.⁵

The analytical sample consists of about 4,612,700 observations corresponding to about 19.0 million weighed records, including 5.1 million immigrants, 2.7 million second-generation Canadians and 11.3 million Canadians in third plus generations. The average age in the sample is 47.3.

4. The linkage between 2016 Census and tax data is part of the Statistics Canada Social Data Linkage Environment. A detailed description of the linkage process and quality assessment details can be found at Statistics Canada (n.d.b).

5. Therefore, the R&D intensity indicator is available only for incorporated businesses with employees.

Results

Incidence of ownership by the three generations

Table 1 shows that the business ownership rate among second-generation Canadians is higher than that of third plus generations but lower than that observed among immigrants. Both immigrants and Canadian-born individuals with immigrant parents have higher ownership rates than Canadian-born individuals with Canadian-born parents. In 2016, 11.9% of immigrants aged 25 to 69 were either owners of an incorporated business with employees or primarily⁶ unincorporated self-employed, compared with 10.1% for the second generation and 8.4% for third plus generations.⁷

Table 1

The business ownership rate by type of business and generation, ages 25 to 69, 2016

	First generation	Second generation	Third plus generations	Overall
	percent			
Owners of incorporated businesses	9.8	10.3	8.1	8.8
Owners of incorporated businesses with employees	5.2	5.0	4.0	4.4
Unincorporated self-employed	10.6	9.5	8.2	9.0
Primarily unincorporated self-employed	6.9	5.3	4.6	5.3
	counts ¹			
Observations	1,209,900	634,000	2,777,800	4,621,700

1. The counts are rounded to the nearest hundred.

Note: The ownership rate is the number of owners aged 25 to 69 years divided by the population of the same age.

"First generation" refers to immigrants.

Source: Statistics Canada, Canadian Employer–Employee Dynamics Database–2016 Census, authors' calculations.

The difference in overall business ownership between immigrants and the second generation is mainly related to differences in the rate of primary self-employment (6.9% versus 5.3%, respectively). The higher rate of self-employment among immigrants is consistent with the view that self-employment is often a strategy that immigrants use to combat poor job opportunities in the Canadian labour market. Chen and Hou (2019) found that immigrants were more likely than the Canadian-born population to indicate that they entered self-employment because of difficulties locating employment. Hou, Abada and Lu (2013) also found that unemployment was more likely to "push" male immigrants into self-employment than was the case for Canadian-born men. They also found that higher earnings in self-employment than paid work was a more important factor for entry to self-employment among the Canadian-born population than immigrants.

There is little difference between immigrants and the second generation in the rate of ownership of private incorporated companies with employees (5.2% versus 5.0%, respectively). However, both groups have a greater tendency to own such companies than do third plus generations, at a 4.0% ownership rate.

Educational attainment and business ownership

Earlier studies suggest that educational attainment is correlated with the likelihood of business ownership (e.g., Green et al. 2016). The relationship between education and the likelihood of ownership distinguishes private incorporated companies from the primarily self-employed. The tendency to own a

6. An individual is "primarily" self-employed if their self-employment earnings exceed those from paid work.

7. These numbers are slightly lower than the combined numbers for the two categories in Table 1 because some individuals own both types of businesses.

private incorporated company generally increases with level of education, while the tendency to be primarily self-employed decreases (Table 2, upper panel). This holds true for all three generational groups. For example, among the second generation, 9.2% of individuals with a graduate degree owned a private incorporated business, compared with 4.4% of those with a high school diploma or less. Alternatively, among immigrants, 5.4% of those with a graduate degree were primarily unincorporated self-employed, compared with 8.0% of those with a high school diploma or less.

Table 2
The distribution of business owners by educational attainment, generation and type of business, 2016

	Owners of incorporated businesses with employees				Primarily unincorporated self-employed business owners			
	First generation	Second generation	Third plus generations	All	First generation	Second generation	Third plus generations	All
	percent							
Ownership rates by level of educational attainment								
High school or less	4.5	4.4	3.4	3.8	8.0	5.8	4.5	5.6
Some postsecondary	4.6	4.6	4.0	4.2	7.4	5.7	5.0	5.6
Bachelor's degree	5.4	4.8	4.3	4.7	5.6	4.3	3.8	4.5
Graduate degree	7.9	9.2	7.2	7.8	5.4	4.4	4.1	4.7
Distribution of businesses by owner's level of educational attainment (total: 100%)								
High school or less	28.9	26.8	32.2	30.3	38.6	33.4	37.7	37.5
Some postsecondary	25.1	33.4	40.7	34.7	30.3	38.8	43.8	38.3
Bachelor's degree	27.1	24.8	18.1	21.9	21.3	21.1	14.1	17.6
Graduate degree	18.9	15.0	9.0	13.1	9.8	6.7	4.4	6.6

Note: "First generation" refers to immigrants.

Source: Statistics Canada, Canadian Employer–Employee Dynamics Database–2016 Census, authors' calculations.

Educational attainment of immigrants and their children is higher than that of third plus generations, and immigrants in particular are much more likely to be educated in a STEM field than third plus generations (Picot and Hou 2018a). As a result, educational attainment of business owners is also higher among immigrants and the second generation. For example, 46.0% of immigrant owners of private incorporated companies had a university degree, compared with 39.8% of the second-generation owners and 27.1% of third plus generations (Table 2, lower panel). Furthermore, 36.7% immigrant business owners holding a university degree were STEM graduates, a much higher rate compared with their counterparts in the second generation (18.3%) and third plus generations (17.3%) (Table 3).

Table 3
The shares of STEM graduates among all tax filers and university graduates, by generation and type of business, 2016

	First generation	Second generation	Third plus generations	Overall
	percent			
All tax filers	18.4	11.5	8.7	11.7
Owners of incorporated businesses with employees	22.1	12.3	10.0	14.2
Primarily unincorporated self-employed	14.6	8.2	6.1	9.4
All university graduates	34.7	19.5	17.5	24.2
Owners of incorporated businesses with employees	36.7	18.3	17.3	26.0
Primarily unincorporated self-employed	35.7	17.5	16.5	25.3

Note: Not all science, technology, engineering and mathematics (STEM) graduates are university degree holders; college degrees are included. "First generation" refers to immigrants.

Source: Statistics Canada, Canadian Employer–Employee Dynamics Database–2016 Census, authors' calculations.

The same pattern holds true for the primarily self-employed, although educational attainment of the primarily self-employed was generally lower. However, immigrant university graduates were more likely to hold degrees obtained in non-Western countries than second-generation Canadians, and economic returns to such degrees are lower than to those obtained in Western countries (Boyd and Tian 2018; Picot and Hou 2020). Therefore, direct comparisons among generations of university-educated business owners can be misleading.

The industrial structure of businesses owned

Many immigrants open businesses in what may be perceived as traditional immigrant industries, such as restaurants, ethnic grocery stores, the taxi business, and janitorial or landscaping businesses. There can be many reasons for this outcome. Immigrants may have a comparative advantage in such businesses. More highly educated immigrants may find that their credentials do not receive the same kind of economic returns as credentials obtained in Canada, or it may be the difficulty immigrants have in the labour market that ‘pushes’ them into business ownership. This is particularly true for immigrants entering in the family or refugee classes. Picot and Ostrovsky (2017) found that immigrants in these classes were considerably more likely than Canadian-born business owners to open businesses in these traditional industries. Economic class immigrants, on the other hand, tend to be highly educated and, more often than the Canadian-born population, educated in an engineering, computer science or technology field. This could explain why economic class immigrants are more likely than Canadian-born individuals to own businesses in knowledge- or technology-based industries. So, earlier research suggests that immigrants are oriented toward both traditional immigrant industries as well as high-tech industries. Second-generation Canadians, being educated primarily in Canada, may more closely resemble individuals with Canadian-born parents in terms of the industries in which they tend to own a business.

The data suggest that this is the case. The differences between the industrial distribution of immigrant businesses and that of businesses with second-generation owners or owners in third plus generations are relatively large. These differences in industrial structure are larger than that between second-generation and third plus generation businesses. This result is based on the dissimilarity index, a measure of the difference between two distributions.⁸ The more dissimilar the two industrial distributions, the higher the index value. For private incorporated companies, the dissimilarity index was 16.7 when comparing the first and second generations, 21.0 comparing the immigrant generation and third plus generations, and 11.8 comparing the second generation and third plus generations. Therefore, businesses with second-generation owners and owners in third plus generations resemble one another regarding their industry more closely than do those owned by immigrants and other generations.

Compared with Canadian-born business owners, a greater percentage of immigrant-owned incorporated businesses tend to be in traditional immigrant businesses, notably transportation and warehousing (11.6%) and accommodation and food services (10.6%) (Table 4). However, a significant share of immigrant-owned incorporated businesses were also in the professional, scientific and technical services (18.1%) and health care and social assistance (11.7%). Private incorporated businesses owned by second-generation Canadians were more likely to be in the professional, scientific and technical services area (18.2%) or the health care and social assistance industry (13.6%) than the other generations. Third plus generations were more likely than the others to have an incorporated business in agriculture, forestry, fishing and hunting (8.8%) and construction (18.2%).

8. For generations a and b , $D_{ab} = 0.5 \sum_j^n |p_b^j - p_a^j|$, where p_i^j is the proportion of businesses in industry j among generation i . There are n industries. The dissimilarity index D can be interpreted as the share of businesses in one generation that would have to be in some other industry in order to make the two distributions equal.

Table 4
The distribution of business owners by industry, generation and type of business, 2016

	Owners of incorporated businesses with employees ¹				Primarily unincorporated self-employed business owners ²			
	First generation	Second generation	Third plus generations	All	First generation	Second generation	Third plus generations	All
	percent							
Unknown	...	...	...	...	10.8	5.9	5.7	7.5
Agriculture, forestry, fishing and hunting	1.6	5.1	8.8	6.0	0.7	1.8	3.0	2.0
Mining, quarrying and oil and gas extraction	0.2	0.7	1.6	1.0	0.2	0.3	0.4	0.3
Utilities	...	...	...	...	...	...	...	...
Construction	10.5	15.1	18.2	15.4	13.7	14.9	13.6	13.8
Manufacturing	3.9	4.5	4.4	4.2	2.8	2.7	2.9	2.8
Wholesale trade	4.4	4.1	4.0	4.2	1.6	1.6	1.4	1.5
Retail trade	10.5	8.0	9.3	9.5	6.3	5.3	5.0	5.5
Transportation and warehousing	11.6	3.4	5.4	7.0	13.4	3.9	4.5	7.5
Information and cultural industries	0.8	1.5	1.0	1.0	1.2	2.5	1.9	1.7
Finance and insurance	1.9	3.1	2.9	2.6	2.0	2.3	1.8	1.9
Real estate and rental and leasing	3.1	4.6	3.5	3.5	3.6	4.6	3.1	3.5
Professional, scientific and technical services	18.1	18.2	15.4	16.7	9.4	14.3	11.4	11.2
Management of companies and enterprises	0.1	0.2	0.2	0.2	...	...	...	...
Administrative and support, waste management and remediation services	3.9	4.8	4.5	4.4	8.0	8.3	8.9	8.5
Educational services	1.1	1.1	0.8	0.9	3.5	4.9	3.7	3.8
Healthcare and social assistance	11.7	13.6	8.3	10.2	8.2	9.7	13.1	10.9
Arts, entertainment and recreation	0.6	1.3	1.3	1.1	2.0	5.0	4.0	3.4
Accommodations and food services	10.6	4.8	3.7	6.0	3.5	2.2	2.1	2.6
Other services (except public administration)	5.7	5.7	6.6	6.2	8.5	9.1	12.6	10.7
Public administration	...	...	...	...	0.3	0.6	0.7	0.6
High R&D intensity	0.8	0.6	0.5	0.6	...	...	...	...
High and medium-high R&D intensity	9.9	6.4	5.3	6.9	...	...	...	...

... not applicable

1. Business industry code contained in the National Accounts Longitudinal Microdata File.

2. Industry of the owner's main labour market activity reported in the census.

Note: R&D: research and development. "First generation" refers to immigrants.

Source: Statistics Canada, Canadian Employer–Employee Dynamics Database–2016 Census, authors' calculations.

The results are similar for unincorporated self-employed owners.⁹ Compared with the other generations, a large percentage of primarily self-employed immigrants work in transportation and warehousing (13.4%) and, to a lesser degree, in retail trade (6.3%). The industrial distribution of second-generation self-employed individuals was more similar to the industrial distribution of third plus generations than to that of immigrants: the dissimilarity index was 16.9 between the first and second generations, 17.7 between the first and third plus generations, and 9.7 between the second and third plus generations.

9. The industry codes used in Table 4 for the primarily unincorporated self-employed originate with the census, since few unincorporated self-employed companies on the NALMF have an industry code. The census code refers to the industry of the "main activity" of the self-employed individual. Since this table refers to the primarily self-employed, this industry code likely refers to self-employment activity in most cases, rather than any paid employment the individual may have.

Rates of ownership of firms in R&D-intensive industries

Many western countries look to highly skilled immigrants to promote the development of high-tech industries. Several U.S. studies argue that the development of the high-tech sector in the United States was largely caused by the contribution of immigrant owners and entrepreneurs (Saxenian 2002; Wadhwa et al. 2008). This analysis is concerned with the extent to which the three generational groups participate in high-tech industries through ownership. Immigrants and their children may make a significant contribution because they are more likely than third plus generations to be educated in a science, engineering or technology field.

The analysis used an OECD classification of industries by R&D intensity (Galindo-Rueda and Verger 2016) to assess this. “Knowledge industries” are identified as manufacturing and service industries with a high and medium-high level of R&D intensity. These are industries that devote a high proportion of revenue to R&D. For owners of private incorporated firms with employees, immigrants are more likely to own a firm in a knowledge industry (9.9%) than second-generation (6.4%) or third plus generation owners (5.3%) (Table 4). Immigrants are also more likely to own a firm in a high R&D-intensity industry (0.8%) than either the second generation (0.6%) or third plus generations (0.5%), although for all generations the rates of owning a firm in an R&D-intensive industry are below 1%. Based on earlier research (Picot and Ostrovsky 2017), it is likely that the majority of immigrants owning such firms are economic class immigrants. Unlike family class immigrants and refugees, they have been shown to be almost twice as likely as the Canadian-born population to own a high-tech company.

Overall, Canadian-born business owners whose parents were immigrants more closely resembles third plus generations regarding their tendency to own high-tech businesses, although their share of high-tech firms is slightly higher than third plus generations.

Multivariate analysis

Econometric models

The results reported in Table 1 refer to the raw or unadjusted differences in ownership rates between the three generational groups. Some of these differences are caused by the variation in characteristics of the three groups, such as the differences in educational attainment discussed above. To adjust for cross-generational differences in key observed characteristics, the probability of being a business owner is estimated using multivariate probit models with generation dummy variables and a set of control variables on the right side. Importantly, the objective of the multivariate analysis is not to establish any causal links but only to adjust for differences in the characteristics of the generations. Differences between the adjusted and unadjusted results will shed light on the extent to which controls included in the model account for the observed differences in ownership rates across generations.

The models are estimated separately for the probability of owning any private incorporated business, owning a company in a high-tech R&D-intensive industry and being primarily self-employed. The main model specification is:

$$P(y_i = 1|X_i) = F\left(\alpha + \sum_{g=1}^2 \beta_g D_i^g + \gamma X_i + \delta L_i + \eta STEM_i + \sum_{k=1}^4 \theta_k M_i^k + \lambda P_i\right), \quad (1)$$

where F is the cumulative normal density function, y_i is a dichotomous ownership status variable, D_i^g is the generation indicator ($g = 1$ for the immigrant generation and $g = 2$ for the second generation), X_i is a set of individual and human capital characteristics such as age, sex, education and marital status,

L_i is the location of studies (same province as the province of residence, different Canadian province or outside Canada), $STEM_i$ is an indicator of being educated in a STEM field, M_i^k are dummy variables indicating residence in four major metropolitan areas (Montréal, Toronto, Calgary and Vancouver) and P_i is the province of residence. The generational variables, D_i^g , are the main variables of interest.

Separate models are estimated to determine the adjusted difference in the likelihood of owning a company between the first and second generation by excluding third plus generations from the analysis. This is done because the region of background can be used as a control variable in this case, in addition to the control variables mentioned above.¹⁰ The probit models estimated for just the first and second generations have the same set of control variables as in Equation (1), plus a set of dummy variables for nine broad regions of origin: English-speaking countries, Western and Eastern Europe, North Africa and the Middle East, Africa (except North Africa), India and the surrounding region, China and the surrounding region, Latin America and Southeast Asia.¹¹

Intergenerational differences in the likelihood of owning a company

Table 5 shows the key estimation results from the short models (models with no controls) and full models described by Equation (1). The predicted results in the short model, in essence, represent the actual observed ownership shares reported earlier. For example, the predicted probability of third plus generations owning a private incorporated company with employees¹² is identical to the ownership share for that same generation reported in Table 1 (at 4.0%). Estimated cross-generational differences in the short models also closely correspond to observed unadjusted cross-generational differences in the ownership rates in Table 1.

Table 5
Estimated average partial effects from probit models for all three types of businesses with sample including the first generation, second generation and third plus generations

	Owners of incorporated firms with employees		Owners of incorporated knowledge industry firms with employees		Unincorporated primarily self-employed	
	partial effects	standard errors	partial effects	standard errors	partial effects	standard errors
A. Short models (no controls)						
Generations (omitted: third plus generations)						
First generation	0.012 ***	0.00011	0.0030 ***	0.000033	0.023 ***	0.00013
Second generation	0.010 ***	0.00015	0.0010 ***	0.000036	0.007 ***	0.00015
Benchmark predicted probability of a positive outcome	0.040	0.00006	0.0020	0.000013	0.046	0.00006
B. Full models (with controls)						
Generations (omitted: third plus generations)						
First generation	0.005 ***	0.00014	0.0002 ***	0.000036	0.016 ***	0.00016
Second generation	0.007 ***	0.00015	0.0001 *	0.000038	0.005 ***	0.00016
Benchmark predicted probability of a positive outcome	0.042	0.00007	0.0028	0.000020	0.048	0.00007

* significantly different from reference category ($p < 0.05$)

*** significantly different from reference category ($p < 0.001$)

Note: Short probit model specifications include only generation dummy variables on the right side; full models include the full set of controls in addition to the generation dummy variables. "First generation" refers to immigrants.

Source: Statistics Canada, Canadian Employer–Employee Dynamics Database–2016 Census, authors' calculations.

10. The background variable represents the region of birth for immigrants and the region of birth of the parents of second-generation individuals; father's region of birth is used unless it is Canada, in which case the mother's region birth is used.

11. The English-speaking category consists of the United States, the United Kingdom, Ireland, Australia, New Zealand and South Africa.

12. Shown as the predicted probability of a positive outcome in Table 5.

The addition of the controls reduces the cross-generational differences in the probability of owning an unincorporated firm with employees by a substantial margin (Panel B, Table 5). The first generation is 0.5 percentage points more likely to own a private incorporated firm with employees than third plus generations, down from 1.2 points in the model with no controls. In other words, the differences in key human capital characteristics and geographic distribution between immigrants and Canadians in third plus generations largely explain the differences in ownership of private incorporated firms among these categories.

The situation for the primarily self-employed is somewhat different. Controlling for background characteristics reduced the differences among generations in the likelihood of being primarily self-employed, from 2.3 percentage points in the short model to 1.6 percentage points in the full model, but the remaining difference is still substantial. This result is consistent with previous evidence suggesting that immigrants often find it necessary to turn to self-employment when facing difficulties in finding a good job.¹³ The second generation and third plus generations have much better employment prospects and face this necessity less often. Second-generation Canadians are somewhat more likely to be unincorporated self-employed than third plus generations but the difference is relatively small (0.5 percentage points), albeit significant at the 0.1% level of significance.

Table 5 also shows that after accounting for differences in background characteristics, intergenerational differences in owning a firm with employees in a high-tech R&D-intensive industry become exceedingly small. The probability in the short model of third plus generations owning such a firm is itself quite small, around 0.2%,¹⁴ and the largest difference among generations is 0.3 percentage points between immigrants and third plus generations. After accounting for background characteristics, this difference is reduced to 0.02 percentage points. The adjusted differences between the second generation and third plus generations and between the first and second generations are only about 0.01 percentage points. Although some of these differences are statistically significant at conventional significance levels, these are very small values. They indicate virtually no intergenerational differences in the likelihood of owning a firm in an R&D industry among individuals with comparable levels of human capital and other control variables included in Equation (1).

One characteristic—ancestral background—is difficult to control for in Model (1). Immigrants and second-generation Canadians in the sample come from largely different backgrounds. The immigrant distribution of countries of origin is dominated by immigrants from India, China, the Philippines and other non-European countries. By contrast, second-generation Canadians had mostly European ancestry, with parents who arrived from the United Kingdom, Italy, Poland and other European countries. The inclusion of background characteristics in Equation (1) would make interpretation of the results difficult because of the presence of third plus generations. To explore the role of background characteristics in the ownership of incorporated and unincorporated businesses, the second part of the multivariate analysis is based on the sub-sample consisting of just the first and second generations. The set of controls is the same as in Equation (1) but with an important addition of the “background region” variable.

The results are shown in Table 6. The difference in the probability of owning a private incorporated company between the first and second generations is very small (0.043 percentage points), significant at the 5% but not the 1% level of significance. This is in line with previous results indicating that, controlling for important differences in owner characteristics, the differences in the probability of owning a private incorporated company with employees are quite small. By contrast, second-generation Canadians are considerably less likely than immigrants to be primarily self-employed even when the differences in their background are controlled for. This is also consistent with the view that self-employment, especially the ownership of unincorporated businesses, is related to employment prospects.

13. See, for instance, a recent study by Fairlie and Fossen (2020).

14. Presented as the benchmark predicted probability of a positive outcome.

Table 6
Estimated partial effects from probit models for three types of businesses with sample including the first and second generations

	Owners of incorporated firms with employees		Owners of incorporated firms with employees in industries with high and medium-high R&D intensity		Unincorporated primarily self-employed	
	partial effects	standard errors	partial effects	standard errors	partial effects	standard errors
Second generation	-0.00043 *	0.00021	-0.00078 ***	0.000062	-0.01300 ***	0.00023
Age (omitted: younger than 30)						
30 to 39	0.01600 ***	0.00027	0.00200 ***	0.000072	0.00990 ***	0.00034
40 to 49	0.03200 ***	0.00029	0.00390 ***	0.000079	0.01900 ***	0.00036
50 to 59	0.03400 ***	0.00030	0.00310 ***	0.000078	0.02000 ***	0.00036
60 and older	0.01800 ***	0.00029	0.00130 ***	0.000075	0.00530 ***	0.00036
Female	-0.03300 ***	0.00016	-0.00210 ***	0.000047	-0.02600 ***	0.00018
Family status (omitted: never married)						
Married or cohabiting	0.03400 ***	0.00027	0.00260 ***	0.000082	0.01100 ***	0.00038
Lone parent	0.01100 ***	0.00039	0.00045 ***	0.000110	0.01100 ***	0.00051
Other	0.00600 ***	0.00029	0.00081 ***	0.000090	0.00570 ***	0.00041
Education (omitted: high school or less)						
Some postsecondary	0.00440 ***	0.00020	0.00100 ***	0.000054	-0.00670 ***	0.00025
Bachelor's degree	0.01200 ***	0.00024	0.00310 ***	0.000068	-0.02200 ***	0.00027
Postgraduate degree	0.03400 ***	0.00034	0.00380 ***	0.000089	-0.02900 ***	0.00031
STEM degree	-0.00700 ***	0.00021	0.00630 ***	0.000087	-0.02000 ***	0.00023
Studies outside Canada	-0.00410 ***	0.00021	-0.00017 **	0.000058	0.01700 ***	0.00028
Large city (omitted: not a large city)						
Montréal	-0.00120	0.00065	0.00068 ***	0.000200	-0.01000 ***	0.00057
Toronto	0.00720 ***	0.00026	0.00250 ***	0.000078	0.01100 ***	0.00028
Calgary	-0.00340 ***	0.00039	0.00180 ***	0.000160	0.00390 ***	0.00059
Vancouver	-0.00850 ***	0.00034	-0.00013	0.000100	-0.00810 ***	0.00039
Province and territories (omitted: Ontario)						
New foundland and Labrador	-0.00700 ***	0.00150	-0.00340 ***	0.000270	-0.03100 ***	0.00150
Prince Edward Island	0.02400 ***	0.00250	0.00190 *	0.000850	-0.00370	0.00230
Nova Scotia	0.00087	0.00079	-0.00200 ***	0.000210	-0.00140	0.00094
New Brunswick	0.00850 ***	0.00110	-0.00290 ***	0.000220	-0.01400 ***	0.00110
Quebec	-0.00610 ***	0.00052	-0.00130 ***	0.000170	0.00510 ***	0.00065
Manitoba	0.00140 **	0.00048	-0.00170 ***	0.000140	-0.00800 ***	0.00051
Saskatchewan	0.00840 ***	0.00066	-0.00140 ***	0.000190	-0.01000 ***	0.00066
Alberta	0.03300 ***	0.00043	-0.00040 ***	0.000120	-0.01600 ***	0.00036
British Columbia	0.02400 ***	0.00042	0.00030 *	0.000140	0.02500 ***	0.00049
Territories	-0.00870 ***	0.00170	-0.00390 ***	0.000250	0.00790 **	0.00240
Background (omitted: English-speaking)						
Western Europe	0.01100 ***	0.00027	-0.00020 *	0.000095	0.00048	0.00031
Eastern Europe	0.01200 ***	0.00032	0.00130 ***	0.000110	0.02800 ***	0.00039
North Africa and the Middle East	0.01100 ***	0.00038	-0.00140 ***	0.000110	0.02200 ***	0.00046
Africa, except North Africa	-0.01800 ***	0.00039	-0.00210 ***	0.000120	-0.01200 ***	0.00049
China and the region	0.02000 ***	0.00035	0.00026 *	0.000110	0.00047	0.00037
India and the region	0.01400 ***	0.00035	-0.00034 ***	0.000100	-0.00360 ***	0.00037
Latin America	-0.01900 ***	0.00029	-0.00210 ***	0.000099	-0.00130 ***	0.00037
Southeast Asia	-0.01200 ***	0.00029	-0.00270 ***	0.000092	-0.02000 ***	0.00033
Unknown	-0.02500 **	0.00930	-0.00470 ***	0.000087	0.02900	0.01900
Benchmark predicted probability of a positive outcome	0.05125	0.00011	0.00437	0.000031	0.06771	0.00012

* significantly different from reference category (p < 0.05)

** significantly different from reference category (p < 0.01)

*** significantly different from reference category (p < 0.001)

Note: R&D: research and development; STEM: science, technology, engineering or mathematics. The first generation refers to immigrants.

Source: Statistics Canada, Canadian Employer–Employee Dynamics Database–2016 Census, authors' calculations.

The results in Table 6 also show that, in addition to age and education, background region is an important covariate of the ownership of a private incorporated company with employees. Immigrants and children of immigrants from China, India, North Africa and the Middle East, Western and Eastern Europe were 1.0 to 1.7 percentage points more likely to own a private incorporated company than comparable individuals with origins in English-speaking countries. This result did not hold for R&D-intensive industries, where immigrants and second-generation Canadians with a background of English-speaking countries and Eastern Europe were more likely than those from other regions to own such a company. Individuals with a background of Latin America, Africa, and Southeast Asia were the least likely to own a private incorporated company, whether in an R&D-intensive industry or not. Those with a background in Eastern Europe (0.028) and North Africa and the Middle East (0.022) were the most likely to be primarily self-employed.

Finally, the results in Table 6 confirm the importance of human capital characteristics. The adjusted results demonstrate that individuals with a postgraduate degree were 3.4 percentage points more likely to own an incorporated firm compared with those with a high school diploma or less. Those aged 40 to 59 years were also around 3.2 percentage points more likely to be owners than individuals aged 25 to 29 years. The relationship between education and ownership was negative for the primarily self-employed. The more highly educated were between 2.2 and 2.9 percentage points less likely to be self-employed than those with a high school diploma or less. In addition to education level and age, whether one was educated in a STEM discipline had a substantial effect on the likelihood of owning a firm in an R&D-intensive industry.

Conclusion

This paper provides some of the first information on the business ownership patterns of second-generation Canadians, which constitutes part of the economic contribution of that generation. A novel dataset linking business data with the 2016 Census was employed in this study, which focuses on the primarily self-employed and ownership of private incorporated companies, including companies in high-tech research and development (R&D)-intensive industries. In 2016, both immigrants and the second generation had higher business ownership rates than third plus generations (Canadian-born individuals with Canadian-born parents). Immigrants in particular had the highest business ownership rates. In 2016, 11.9% of immigrants aged 25 to 69 years owned either a private incorporated company or were primarily¹⁵ self-employed, compared with 10.1% of the second generation and 8.4% of third plus generations. The difference between immigrants and the other generational groups was largely related to immigrants' greater tendency to be primarily self-employed: 6.9% compared with 5.3% of second-generation Canadians and 4.6% of third plus generations. Differences in ownership rate for private incorporated companies with employees were smaller, with immigrants at 5.2%, the second generation at 5.0% and third plus generations at 4.0%. Ownership of companies in high-tech R&D-intensive industries, while small for all generational groups, was higher among immigrants and, to a lesser extent, among the second generation than third plus generations, possibly because of differences in the likelihood of being educated in a STEM field.

This study highlights the impact of the observed cross-generational differences in human capital characteristics and geographic location on the likelihood of owning a company. Once these differences were accounted for, the cross-generational differences in the probability of owning an incorporated business were very small or insignificant. This was particularly true regarding the ownership of businesses in R&D-intensive industries. The observed differences among generations in the ownership of private incorporated companies were largely caused by differences in human capital characteristics

15. An individual is primarily self-employed if their self-employment earnings exceed those of paid work.

and geographic location. This was not true for the primarily self-employed. The likelihood of being primarily self-employed was higher among immigrants than the other groups, even after controls. This may be related to their greater difficulty in finding appropriate employment.

Looking ahead, it is important to note that there will be a significant shift in the composition of the second generation, particularly among those in age groups with high business ownership rates (40 to 59 years). In 2016, second-generation individuals with European backgrounds were dominant, driven by immigration patterns of the more distant past. In the future, this will shift toward second-generation individuals with Asian backgrounds, more in line with recent immigration patterns. This may affect business ownership patterns.

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