THE ECONOMIC IMPACTS OF BUSINESS SUCCESSION

Estimation of the phantom threat and the spectre of closure stemming from SME business transfer intentions

IN QUÉBEC AND IN CANADA, 2007-2017





INSTITUT DE RECHERCHE SUR LES PME





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ESTIMATION OF THE PHANTOM THREAT AND THE SPECTRE OF CLOSURE STEMMING FROM SME BUSINESS TRANSFER INTENTIONS IN QUÉBEC AND IN CANADA, 2007-2017¹

Marc Duhamel, Ph.D.²

Département de finance et économique École de gestion and Institut de recherche sur les PME Université du Québec à Trois-Rivières Trois-Rivières (Québec) G9A 5H7 CANADA marc.duhamel@ugtr.ca

Louise Cadieux, DBA

Département de management École de gestion and Institut de recherche sur les PME Université du Québec à Trois-Rivières Trois-Rivières (Québec) G9A 5H7 CANADA Louise.cadieux@uqtr.ca

François Brouard, DBA, FCPA, FCA

Accounting and Taxation Department Sprott School of Business Carleton University Ottawa ON K1S 5B6 CANADA and Institut de recherche sur les PME Francois.brouard@carleton.ca

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SUMMARY OF MAIN FINDINGS

The intentions of business owners to transfer their firms over the next five years have increased significantly since 2007 in Québec and Canada overall. Between 2007 and 2017, such intentions increased from 18% to 23% in Québec and from 16% to 19% for all Canadian SME owners. In 2017, annualized averages represented approximately 7,000 intentions to transfer SMEs in Québec and 25,000 in Canada overall. These business transfer intentions have risen sharply during the COVID-19 pandemic. According to the *Canadian Survey on Business Conditions* conducted by Statistics Canada in 2020, it is estimated that between 13,000 and 15,000 Québec business owners intend to transfer by the end of 2021, whereas in Canada as a whole, this number varies between 45,000 and 51,000. In short, business transfer intentions have doubled between 2017 and 2020. *What will be the economic impact of this pandemic tsunami of business transfer intentions for Québec and Canada?*³

This study is the third⁴ in an ambitious multidisciplinary research project funded by the Centre de transfert d'entreprise du Québec (CTEQ) that brings forth original and compelling evidence to quantify the economic and tax impacts of business transfer intentions in Québec and Canada. This study complements the first two, as it estimates the short- and long-term economic impacts of the transfer intentions of SME owners in Québec and Canada on employment, annual revenues, profitability, capitalization and taxable capital gains of their businesses. Using propensity score matching, an empirical methodology that provides for a conclusive causal interpretation of economic impacts, our findings make it possible for us to draw three main conclusions.

Main Findings

1. Transfer intentions are codetermined by a cap on the growth ambitions of owners and the number of years of experience at the helm of their firm.

A detailed statistical analysis of several characteristics of SMEs and their owners has revealed that transfer intentions are codetermined by a cap in the growth ambitions of the owners after more than 20 years of experience at the helm of their firm, rather than by their age. More specifically, our findings show that the growth intentions of SMEs are declining and that the proportion of SMEs that are entering a decline in sales is higher among owners who wish to transfer than those who do not wish to transfer their firms within the next five years.

³ In this report, the expression Québec and Canada refers to the Province of Québec and Canada as whole, including Québec.

⁴ Duhamel, M., L. Cadieux, F. Brouard, and F. Laurin (2019). Portrait du repreneuriat de PME au Québec en 2017. Study report, Montréal: Centre de transfert d'entreprise du Québec and Duhamel, M., F. Brouard and L. Cadieux (2020). The Influence of Tax Factors on Québec and Other Canadian SME Transfers. Institut de recherche sur les PME, Université du Québec à Trois-Rivières. Montréal: Centre de transfert d'entreprise du Québec. May.





2. Transfer intentions do not threaten the economic vitality of Québec and Canadian SMEs.

Based on the results of this study, we can reject the hypothesis of a *phantom threat* stemming from transfer intentions regarding the economic impacts of SMEs, a hypothesis according to which such intentions would paralyze certain SME activities and negatively influence their economic impacts. Whether in terms of jobs, revenues, profitability, capitalization or taxable capital gains, SMEs run by owners who intend to transfer are statistically similar in terms of economic impact to those whose owners do not intend to transfer.

3. Transfer intentions increase the likelihood of voluntary or involuntary SME closures.

Our results cannot reject the hypothesis of a *spectre of closure*, a hypothesis according to which transfer intentions reduce survival rates and increase the likelihood of voluntary or involuntary firm closure. Controlling for 48 characteristics of SMEs and their owners, our findings reveal a statistically significant 2.5 percentage point decrease in SME survival rates as of the second year, and that this trend grows to 12.4 percentage points after 10 years.

Thus, in the absence of a phantom threat, our findings show that the spectre of closure alone can decrease the economic impacts of an SME whose owner reports an intention to transfer over the next five years. *The anticipated economic impacts of a business succession would therefore stem directly from the sustainability of SMEs that report an intention to transfer.* Our estimate of a 12.4 percent decrease in survival rate after ten years is significant given the magnitude of business transfer intentions revealed by the *Canadian Survey on Business Conditions* issued by Statistics Canada in August 2020. The spectre of closure thus represents the premature closure of approximately 2,200 additional businesses in Québec and 5,000 businesses elsewhere in Canada over the next ten years. These closures represent a loss of approximately \$20.1 billion in annual business sales in Québec and \$65.7 billion in Canada overall after ten years. In terms of employment, our estimate of the spectre of closures represents a direct loss of approximately 84,000 jobs in Québec and 276,000 in Canada overall after ten years.

These main findings underscore the significant economic potential that could be associated with programs and policies that support business succession. Given the high number of economic studies that show that nearly all of the growth in productivity among Canadian SMEs is generated from their internal growth, our findings support the establishment of two fundamental principles that should guide the development of public programs and policies to deal with this tidal wave of business transfer intentions observed in both Québec and Canada.

- Supporting the sustainability and maintaining the productive capacity of existing SMEs, regardless of their size, industry or region, throughout the period prior to the transfer of the business; and
- Fulfilling the hidden economic potential of a strategic renewal of the business, which can be carried out within the framework of a business transfer.

In conclusion, the implementation of public programs and policies based on these two principles is the most compelling way for Québec and Canada to avoid mirroring the experience of Japan, which posted a 21% decrease in the number of SMEs in only 15 years (1999-2014).





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We would also like to thank the Centre de transfert d'entreprise du Québec (CTEQ), and particularly its President and CEO, Vincent Lecorne, for supporting us throughout this research project, the scope of which far exceeded our expectations. His interest and passion for entrepreneurship are an inexhaustible source of motivation and resilience. His comments and suggestions helped us clarify and reframe some of the findings to make them more relevant. We also wish to thank Jean-Pascal Dumont with the CTEQ for his comments and suggestions, which have helped us enrich the presentation of the results.

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TABLE OF CONTENTS

INTRODUCTION	.1
1. THE PHANTOM THREAT AND THE SPECTRE OF CLOSURE STEMMING FROM TRANSFER INTENTIONS	.6
Hypothesis 1: Transfer intentions may pose a phantom threat to the firm's activities.	6
Hypothesis 2: Transfer intentions may represent a spectre of closure of the firm.	6
2. ECONOMIC IMPACT DATA AND ESTIMATES	.7
2.1 The data	7
2.2 Economic impact estimates	8
3. ANALYSIS AND RESULTS	.9
3.1 Control variables and the quality of propensity score matching	9
3.2 Codetermined variables of transfer intentions1	15
3.3 The economic impact of transfer intentions1	6
4. DISCUSSION	22
CONCLUSION	24
REFERENCES	26
APPENDIX 1 - ESTIMATION OF ECONOMIC IMPACTS USING THE PROPENSITY SCORE MATCHING PROCEDURE: THE CASE OF SME TRANSFER INTENTIONS	32
APPENDIX 2 - SUMMARY OF THE SAS PSMATCH PROPENSITY SCORE MATCHING PROCEDURE	36





INTRODUCTION

For several years, public authorities have been wondering about the economic consequences of the predicted wave of an aging population in developed economies (Beaudry, Collard and Green, 2005; Bloom, Canning and Fink, 2010; Ragan, 2010; Rheault and Poirier, 2012). In particular, the accelerated aging of business owners in Québec and Canada threatens not only the sustainability of Québec and Canadian SMEs, but also the vitality of entrepreneurial ecosystems (Bruce and Wong, 2012; Cadieux, Lecorne, Gratton and Grenier, 2020; Cossette and Mélançon, 2010; Lecorne, Duhamel and Dumont, 2021). The situation extends to several developed countries (Chand and Tung, 2014; Kurek and Rachwal, 2011; Lévesque and Minniti, 2006; Liang, Wang and Lazear, 2018; Tourdjman and Le Dret, 2019). For example, the aging of Japanese business owners between 1999 and 2014 was accompanied by a 21 percent decline in the total number of SMEs, according to the *National Association for Trade Promotion for Small and Medium Enterprises* (2016).

As is the case in Japan, the aging of business owners is accelerating in Québec and Canada. According to Statistics Canada's *Survey on Financing and Growth of Small and Medium Enterprises*, 14.5% of SME owners in 2014 were over the age of 65 in the Atlantic provinces, compared to 9.7% in Québec and 12.7% in Ontario. In 2017, the same survey revealed that in the Atlantic provinces, 16.6% of SME owners were over 65, compared to 11.0% and 14.2% in Québec and Ontario, respective. If Québec and Canada were to repeat the Japanese experience, such a scenario would represent the closure of 53,475 SMEs with at least one employee in Québec and 203,455 SMEs in the other Canadian provinces and territories over a 15-year period.⁵ The consequences of the closure of 256,930 SMEs in Canada could be devastating to the Canadian economy.

But the accelerated aging of business owners does not appear to influence the closure intentions of business owners in Québec and Canada. According to Duhamel, Cadieux, Brouard and Laurin (2019), closure intentions of SME owners were relatively stable in Québec and Canada in 2017. As in 2007, 7% intended to close their business within the subsequent five years, which is comparable to the proportion observed in Ontario. In Canada overall, there was a slight drop in closure intentions, from 9% to 8%, between 2007 and 2017.

On the other hand, the intentions of SME owners to transfer have increased significantly both in Québec and elsewhere in Canada. According to Duhamel *et al.* (2019), in 2017, 23% intended to transfer their SME over the subsequent five years in Québec and 19% in Canada. Barely ten years earlier, intentions to transfer SMEs were 18% in Québec and 16% in Canada. Among SME owners aged 65 and over in Québec, 39% were planning to transfer in the five subsequent years in 2017. Furthermore, according to Duhamel (2020), the COVID-19 pandemic caused transfer intentions to double in Québec. Based on data from the *Canadian Survey on Business Conditions* conducted by Statistics Canada during the COVID-19 pandemic, it is estimated that approximately 15,000 SMEs, of all sizes combined, intended to transfer *by the end of 2021*.

⁵ Here we apply the historical decline estimate observed in Japan to the number of Québec and Canadian SMEs from Statistics Canada's Table 33-10-0222-01 – Canadian Business Counts, with employees, December 2019, for a period of fifteen years from 2019.





In light of these observations, it appears important to establish a compelling empirical link between business transfer intentions and their economic impact on entrepreneurial ecosystems. Could a lack of successors lead to the closure of 5.6% of all businesses in Québec and 3.9% in Canada by the end of 2021?⁶ In order to support the development of public programs and policies focused on economic growth and prosperity, it is important to assess the extent of the short- and long-term economic impacts of business transfer intentions.

Our research questions are the following:

- What are the short- and long-term economic impacts of transfer intentions over the coming years? Or, in other words, do transfer intentions represent a phantom threat to businesses?
- Are transfer intentions a precursor to the sustainability or closure of SMEs? Or, alternately, do transfer intentions carry a spectre of business closures?

This study is the third⁷ in a research project that focuses on SME transfers in Québec and Canada. This current study complements the first two as it focuses on estimating the short- and long-term economic impact of intentions to transfer over the next five years among SME owners in Québec and Canada. To do so, we used a unique database from the 2007 *Survey on Financing and Growth of Small and Medium Enterprises* (SFGSME) matched with administrative data from Statistics Canada's 2007-2017 *Linkable File Environment* (LFE). Our sample includes 4,608 Québec and Canadian SMEs in 2007, in which the owners of 1,078 SMEs reported their intention to transfer in the next five years. This database has two advantages. The first is that it makes it possible to study the economic impact of five-year transfer intentions in 2007 on employment, annual revenue and profitability of SMEs over a ten-year period (2007-2017). The second is that it allows us to draw a parallel between the challenges of SME transfer intentions on the cusp of a major economic crisis: the Great Recession of 2008 and 2009, as well as the COVID-19 pandemic.

To estimate the short- and long-term economic impacts of the stated intention to transfer, we conducted a propensity score matching of each of the 1,078 SMEs that reported an intention to carry out a business transfer in the next five years. This technique allows for a compelling causal interpretation of economic impact estimates without requiring an experimental protocol with a random assignment of subjects (Imbens and Rubin, 2015). This estimation technique has been used in other studies that focus on the impact of business transfers in Japan (Tsuruta, 2020, 2021), France (Bastié, Cieply and Cussy, 2018; Palard, 2021) and Austria (Diwish, Voithofer and Weiss, 2009), among others. This methodology makes it possible to statistically infer the average (causal) impact of the stated intention to transfer over the next five years, technically referred to as *the average treatment effect on treated subjects* (*ATT*).

⁶ Source: Statistics Canada. <u>Table 33-10-0297-01Plans to transfer, sell, or close, by business characteristics, third quarter of 2020</u>. DOI: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3310029701&request_locale=en

⁷ Duhamel, M., L. Cadieux, F. Brouard and F. Laurin (2019). Portrait du repreneuriat de PME au Québec en 2017. Study report, Montréal: Centre de transfert d'entreprise du Québec and Duhamel, M., F. Brouard and L. Cadieux (2020). The Influence of Tax Factors on Québec and Other Canadian SME Transfers. Institut de recherche sur les PME, Université du Québec à Trois-Rivières. Montreal: Centre de transfert d'entreprise du Québec. May.





To measure the magnitude of the economic impacts of transfer intentions, our estimates focus on six dimensions of economic impact: number of employees, annual revenue, profitability, equity, eligibility for the capital gains tax exemption and SME survival rate. In addition, to distinguish between short- and long-term economic impacts, our economic impact estimates are based on a period of ten years following the owner's statement of intention to transfer the business.

The results lead us to three main observations.

Firstly, the owner's age, experience, and the firm's precarious situation are often raised as triggers of the intention to transfer. A detailed statistical analysis of more than four dozen variables associated with intention to transfer (Tables 1 to 5), including number of employees, industry, region, financing structure, start-up mode, life cycle, strategic direction, and legal status of the SME, reveals that owners' intentions to transfer are more likely to be co-determined by a certain capping of their ambitions or

The transfer intentions of owners are co-determined by a cap on their growth ambitions, rather than by their age.

disengagement from the SME's activities (e.g., Malone and Jenster, 1992), rather than by age. This finding underscores the economic benefits associated with strategic renewal during a transfer (Bégin, Chabaud and Hannachi, 2011; Chabaud, Hannachi and Yezza, 2021), which improve the long-term economic impact of the firm (Tsuruta, 2021).

Secondly, the results in Tables 6 to 11 allow us to reject the *phantom threat* hypothesis, according to which an SME led by an owner with transfer intentions would paralyze some of the firm's operations and negatively influence its short-term performance (Stiglbaeur and Weiss, 2000; Werner, Schnell and Haunschild, 2019). Statistically, these SMEs are similar to the control group (SMEs led by owners who do not intend to transfer) in terms of employment, annual revenue, profitability, productivity, equity, or taxable capital gains. In other words, no statistical differences were observed between these SMEs and those in the control group

Transfer intentions have no impact on the economic vitality of SMEs when compared to those for which owners do not report transfer intentions.

over a ten-year period. Our results are consistent with those of Diwisch *et al.* (2009) with regard to employment and confirm their findings for the other measures of short- and long-term economic impact.



Thirdly, we cannot reject the hypothesis of a *spectre of closure*, according to which transfer intentions increase the probability of SME closures and reduce their survival rate (Table 12). The negative impact of the spectre of closure is significant in both the short and long term. We observed a statistically significant decrease of 2.5 percentage points in the survival rate as of the second year that gradually progresses to decrease the survival rate by 12.4 percentage points after ten years. To our surprise, the spectre of closure operates in the short term for intentions that span a five-year period. Given our sample, this could be explained by the occurrence of the Great Recession in the year that followed the statement of intention to transfer the firm. Our findings suggest that a crisis, such as the Great Recession or the COVID-19



Our results suggest that a crisis, such as the COVID-19 pandemic, can overwhelm SME owners who were already considering a transfer, and that the impact is significant enough that an economic recovery is unable to correct the firm's trajectory.

pandemic, can overwhelm SME owners who were already thinking about transferring. In addition, the impact is significant enough that an economic recovery cannot correct the firm's trajectory. This finding is consistent with Tsurita (2020), who has demonstrated that voluntary or involuntary firm closure is significant in the absence of successors.

As a result, in the absence of a phantom threat from transfer intentions, only the spectre of closure can reduce the economic impact of SMEs for which the owners report an intention to transfer over the next five years.

Our findings clearly illustrate that the main economic benefits of business succession are associated with sustainable SMEs, since they maintain their productive capacity, and economic impacts of SMEs that can be amplified as part of a strategic renewal of the SME during a transfer (Bégin *et al.*, 2011; Cadieux *et al.*, 2020; Chabaud *et al.*, 2021; Tsuruta, 2021; van Teeffelen and Uhlaner, 2010).

Our findings clearly describe the main economic benefits associated with sustainable SMEs, insofar as they maintain their productive capacity, and the economic impact of SMEs that, in addition, could benefit from strategic renewal following a transfer.

In light of our results, we understand the positive impact of a culture of business succession, particularly for transferers and transferees, regardless of firm size, industry or the region in which a value-creating SME operates. Our results are consistent with studies that underscore the importance of firm sustainability, which extends beyond that of its founder or current owner, for productivity to be maintained, and even increased, in developed economies (Cadieux *et al.*, 2020; Mignon, 2009, 2013). Firm closures contribute relatively little to productivity growth, as is the case with new entries from elsewhere (Bérubé, Dostie and Vilhuber, 2013). Our results therefore suggest that an efficient business transfer market is a condition that is favourable to the growth of productivity among SMEs and, in turn, the regions in which they operate. We believe this conclusion to be an original one, as it appears to have been overlooked in the literature on business succession, mergers and acquisitions, and especially in the literature on entrepreneurship, which focuses almost exclusively on start-ups.



Our results also highlight the importance that the successor and the stakeholders must assign to the strategic renewal of the SME, whether it is a family, internal or external transfer. Thus, regardless of the sustainability strategy being considered, a value-creating SME can continue to contribute to economic wealth, particularly when the successor invests in its strategic renewal. This finding points to certain limitations of a large body of literature on managerial transfers and successions that overshadow the economic impact of family transfers, which represented 31% of transfer intentions in Québec and 27% in Canada overall in 2017 (Duhamel *et al.*, 2019).

Several widely cited research findings fail to consider strategic renewal as a determining factor of the economic impact of a



Our findings show that an efficient transfer market is a condition that is favourable to the growth of productivity among SMEs and, in turn, the regions in which they operate, regardless of the sustainability strategy under consideration (family, internal or external). or external).

business transfer (Bennedsen, Neilsen, Pérez-González and Wolfenzon, 2007; Cucculelli and Micucci, 2008; Pérez-González, 2006; Smith and Amoako-Adu, 1999). If certain types of transfers are positively or negatively correlated to strategic renewal, this omission could bias a simple comparison of the economic impact of a family, internal or external transfer. All types of business transfers can have a positive economic impact when a counterfactual group of firms is statistically selected. In this regard, Diwisch *et al.* (2009) have demonstrated that a family transfer can have a positive impact on employment. Bastié *et al.* (2018) have revealed that internal transfers outperform external transfers. More generally speaking, Tsuruta (2020) has indicated that the absence of a successor to a manager over the age of 60 hampers sustainability, reduces growth, and weakens the firm's credit rating. The ambiguity generated by all of these studies and others could be mitigated by a more explicit study of strategic renewal as part of a transfer.

In the pages that follow, we present the main hypotheses that emerge from the literature on the economic impacts associated with the intention of SME owners to transfer; an overview of the database and the methodology used to estimate the economic impacts of business transfer intentions; an analysis of the main statistical results; a general discussion of the results; and a conclusion that summarizes the main findings, highlights the limitations raised by our results, and identifies a few avenues for future research to gain a better understanding of the anticipated economic impacts of business succession.





1. THE PHANTOM THREAT AND THE SPECTRE OF CLOSURE STEMMING FROM TRANSFER INTENTIONS

Empirical research that focuses on the economic performance of firms following a transfer is multidisciplinary (Berns and Klarner, 2017; Ip and Jacobs, 2006). A large body of this research focuses on the short-term effects on corporate financial performance of a transfer of ownership or control of publicly traded firms, including the impact of family successions (Bennedsen *et al.*, 2007; Bertrand and Schoar, 2006; Cucculelli and Micucci, 2008; Molly, Laveren and Deloof, 2010; Pérez-González, 2006; Smith and Amoako-Adu, 1999; Tsoutsoura, 2015; Villalonga and Amit, 2006; Werner *et al.*, 2019). Unfortunately, these studies are of little use in understanding the short- and long-term economic impacts of transfer intentions of Québec and Canadian SMEs for two reasons.

Firstly, the gap between intentions and action can delay or derail the owner's intention to transfer the business (Väre, Weiss and Pietola, 2005). Secondly, even where intention transitions into action, the absence of successors or the failure of a negotiation can put an end to any business transfer plan (Parker, 2016; Tsuruta, 2021).

The empirical question therefore remains unanswered, according to the literature (Diwisch *et al.*, 2009): What are the short- and long-term economic impacts of transfer intentions? And, more specifically, are transfer intentions a precursor to the sustainability or closure of SMEs? Two empirical hypotheses emerge from the literature on the economic impacts of business transfers.

Hypothesis 1: Transfer intentions may pose a phantom threat to the firm's activities.

According to this hypothesis, the intention to transfer in the coming years would cripple some of the firm's activities and negatively influence its economic performance. For example, Stiglbaeur and Weiss (2000) and Werner *et al.* (2019) have shown that the threat of a business transfer negatively influences the investment of family-owned SMEs in the short term. Whereas for Diwisch *et al.* (2009), the phantom threat on employment growth is non-existent when intentions to transfer family SMEs are staggered over a ten-year period. The data from our study make it possible for us to test this hypothesis for a sample of all SMEs in Québec and Canada when transfer intentions are staggered over a five-year horizon, regardless of the transfer strategy (family, internal or external) under consideration by the SME owner.

Hypothesis 2: Transfer intentions may represent a spectre of closure of the firm.

According to this hypothesis, there are numerous cases where an intention to transfer may increase the probability of the firm closing and reducing its survival rate, particularly when a successor has not been identified (Kimhi and Nachlieli, 2001; Tsuruta, 2021). Given that the longitudinal data in our study concern intentions to transfer the firm over the subsequent five years, we can test this hypothesis over a ten-year period.

Both of these hypotheses are related to Griliches and Regev's (1995) *shadow of death* effect; a widely validated hypothesis according to which a firm's closure is preceded by a drop in productivity and economic impacts (Almus, 2004; Blanchard, Huiban and Mathieu, 2014; Carreira and Teixeira, 2011; Coad and Kato, 2020). Because of the "intention-action" gap, it is important to distinguish these two hypotheses and test them separately from the shadow of death hypothesis.





2. ECONOMIC IMPACT DATA AND ESTIMATES

The lack of longitudinal microdata on businesses matched to the characteristics of their owners has long limited the ability to understand the determinants and economic impacts of business transfer intentions in Québec and Canada. Access to new data makes it possible to address this shortcoming and helps gain a better understanding of the economic impacts of the observed increase in transfer intentions of SMEs in Québec and Canada since 2007.

2.1 The data

Statistics Canada's *Survey on Financing and Growth of Small and Medium Enterprises* (SFGSME) is the only survey to our knowledge that collects characteristics of Canadian and Québec small and medium-sized enterprises (e.g., region and sector of operations, number of employees, financing activities) and those of their owners' transfer intentions.⁸ For example, the SFGSME provides information on attempts to secure external financing and the socio-demographic profile of the owner (e.g., age, gender, mother tongue). Since we are interested in the short-and long-term economic impact of intentions to transfer a business over the subsequent five years, we used the 2007 survey that allows us to track business performance over a 10-year period by matching the SFGSME with the Linkable File Environment (LFE) on an experimental basis.⁹

The LFE is a database of administrative and survey data that is linked to the Business Register on an anonymized basis to supplement the SFGSME variables with other administrative variables, such as the value of business assets reported to the Canada Revenue Agency or the total value of annual exports.¹⁰ The LFE contains, among other things, administrative data on corporate taxes via the *General Index of Financial Information* (GIFI) and on payroll deduction accounts (PD7A). Matching of the 2007 SFGSME with the LFE on an experimental basis thus made it possible for us to obtain information on the number of employees and certain other characteristics of a given firm (e.g., assets, liabilities, equity, revenues) over a 10-year period following the owner's 2017 statement of intention to transfer the firm over the subsequent five years.

The target population for the 2007 SFGSME included businesses listed in the *Business Register* (BR) that had 499 or fewer employees and less than \$50 million in sales.¹¹ This version of the SFGSME includes a question that makes it possible to identify our two groups of businesses: '*In the next five years, do you intend to sell, transfer or close your business?*' The binary response (yes or no) resulted in 4,608 respondents, of which 1,078 answered 'Yes' (W_i = 1) and 3,530 answered 'No' (W_i = 0). Our 4,608 respondents to the intention to transfer question were thus matched by Statistics Canada with the LFE variables from 2007 to 2017. However, this sample does not make it possible to obtain complete information for all 4,608 businesses over the entire period. Some businesses disappear over time. In addition, missing values were observed for some firms, including a number of unincorporated firms.

⁸ Since August 2020, Statistics Canada's new *Canadian Survey on Business Conditions* (CSBC) has been administering a question on intentions to transfer a business, but only over a one-year horizon. Given that this occasional survey is underway, it does not currently allow for an analysis of the economic impacts of transfer intentions over the long term.

⁹ In 2007, the stratified sample of the SFGSME was 37,058 SMEs from a target population of 1,999,000 SMEs in Canada. According to the survey's weighted estimate tables, 15.8% of SMEs in Canada and 17.8% of SMEs in Québec reported that they intended to transfer their business in the next five years, regardless of the method of business transfer under consideration.

¹⁰ For more details on this business microdatabase, go to <u>https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=6000</u>.

¹¹ The following businesses were also excluded from the sample: Businesses coded as non-profit (schools, hospitals, charities), cooperatives, joint ventures, municipalities/federal government, and certain businesses in specific industry groups. These include: Utilities (22), Finance and Insurance (52), Management of Companies and Enterprises (55), Educational Services (61), Public Administration (91), Automotive Equipment Rental and Leasing (5321), Commercial and Industrial Machinery and Equipment Rental and Leasing (5324), Out-Patient Care Centres (6214), Medical and Diagnostic Laboratories (6215), Other Ambulatory Health Care Services (6219), General Medical and Surgical Hospitals (6221), Psychiatric and Substance Abuse Hospitals (6223), Specialty (Except Psychiatric and Substance Abuse) Hospitals (6223), and Community Food and Housing, and Emergency and Other Relief Services (6242).





2.2 Economic impact estimates

Two problems generally prevent authors of empirical studies from providing a "cause and effect" interpretation of economic impact results with observational data. First, SME owners who report an intention to transfer are different in several respects when compared to those who do not plan to transfer. Whereas certain characteristics can be observed (e.g., the owner's age), others cannot (e.g., the owner's health problems) and may or may not predispose some SME owners to plan for a transfer. Estimating the economic impacts of an intention to transfer may be subject to bias when the methodology does not make it possible to identify a comparable (or counterfactual) group of SMEs between those that report having the intention to transfer and those that report not having such an intention. Secondly, since we cannot observe how well an SME would have performed if its owner had not intended to transfer, a compelling statistical conjecture must be formulated concerning the potential performance of an SME that reports an intention to transfer in order to estimate its economic impact.

To get around these two problems, we used Rubin's *causal inference model* (terminology proposed by Holland, 1986) to answer the following question: Does the intention to transfer a business have an economic impact on the performance of SMEs in Québec and Canada?

By using propensity score matching (Imbens and Rubin, 2015), we could build a control (or counterfactual) group of 1,078 SMEs from the 3,530 in our sample that did not intend to transfer but that shared the same characteristics in terms of size, industry, province, financing structure, initial start-up mode, maturity, strategic direction, and legal status, as well as socio-demographic characteristics of its owner such as age, gender, immigration status, personal wealth, and mother tongue.¹²

The compelling quality of the control group of SMEs identified via the propensity score matching method was measured by the statistical equivalence of the observed characteristics between the two groups of firms.¹³ We could then estimate the average economic impacts of the intention to transfer through the *average treatment effect on treated subjects (ATT)*, a measure of the average causal impact of the intention to transfer, on one of the six measures of economic impact selected, which were: number of employees, annual revenue, profitability, equity, eligibility for the capital gains tax exemption, and SME survival rate.¹⁴ All of these results, estimated over a ten-year period, make it possible to determine conclusive estimates of the short- and long-term economic impacts of business transfer intentions in Québec and Canada.

In this study, we compared 1,078 SMEs whose owners intend to transfer with 1,078 SMEs led by owners who do not intend to transfer. By using propensity score matching, both groups shared the same organizational characteristics in terms of size, industry, province, financing structure, start-up mode, maturity, strategic direction and legal status, and the same socio-demographic characteristics of their owners, such as age, gender, immigration status, personal wealth and mother tongue.

 $^{^{\}rm 12}$ The detailed methodology is technically described in Appendix 1 of this report.

¹³ We provide this analysis in the next section. The procedure does not allow us to consider characteristics that are not included in the SFGSME or the LFE. A summary of the results of the SAS PSMATCH matching procedure can be found in Appendix 2.

¹⁴ Due to changes in access arrangements at Statistics Canada's Research Data Centres in Ottawa during the COVID-19 pandemic, some of which resulted from directives issued by federal and provincial health authorities in Ontario and Québec, we are unable to report our estimates of the average treatment effect on treated subjects of transfer intentions on SME productivity.





3. ANALYSIS AND RESULTS

In this section, we first present the results of the statistical analysis of the two groups of SMEs in terms of the control variables (or covariates) that are independent of the intention to transfer under the unconfoundedness assumption.

Tables 1 through 4 present the similarities between the two groups of SMEs based on a broad set of characteristics associated with a performance differential. The characteristics considered in this analysis were: industry, region, financing structure, start-up mode, life cycle, strategic direction and legal status.¹⁵ In addition to these covariates that characterize the firm, we also included socio-demographic characteristics of the owner, including his or her mother tongue.

Table 5 reports the results for characteristics that are potentially strongly codetermined with the intention to transfer a business, such as the owner's age. Given that these variables are not independent of the reported intention to transfer, they cannot be used to balance the two groups of firms based on intention to transfer because they would violate the unconfoundedness assumption.

Lastly, Tables 6 through 11 present our estimates of the causal economic impact of five-year intentions to transfer over a 10-year period. We present results regarding number of employees, total annual revenue, annual net profits (or losses), productivity, capitalization, taxable capital gains and survival rate.

3.1 Control variables and the quality of propensity score matching

Several factors can influence the economic impact of an SME based on its intention to transfer. For example, the owner of a family business that is in a mature and stable growth phase may report that he or she intends to transfer once he or she has already identified a potential family, internal or external successor, whereas another may report that he or she does not intend to transfer, insofar as he or she has not yet identified a successor (Bastié *et al.*, 2018; Kimhi and Nachlieli, 2001; Tsuruta, 2021). Given our data, we initially focused on the SME's characteristics and the owner's socio-demographic characteristics that can be observed from the 2007 SFGSME. In a nutshell, we hoped to see that after matching, there were no longer any statistically significant differences between the two groups of SMEs in order to validate the quality of the match.¹⁶

In Tables 1-4, column [A]-[B] reports the difference in means of characteristics observed between SMEs that intended to transfer and those that did not <u>prior to matching</u>. In these tables, column [A]-[C] also reports the differences observed <u>after propensity score matching</u> among the 1,078 SMEs that reported an intention to transfer ($W_i = 1$) and the 1,078 matched SMEs ($W_i = 0$). These tables reveal a certain degree of heterogeneity between the two groups. The objective of the methodology was to obtain two statistically similar groups of SMEs, commonly referred to as the treatment group ($W_i = 1$) and the control group ($W_i = 0$), which have no statistical differences after matching.

¹⁵ The variables used to represent these characteristics are described in each table.

¹⁶ Characteristics that were not statistically equivalent prior to matching were added to the propensity score calculation. To assess the effectiveness of the matching procedure, we analyzed the differences in standardized means of the variables between the treated and control group SMEs. As recommended by Rubin (2001, p. 174) and Stuart (2010, p. 11), differences in standardized means are reduced for matched observations.





The characteristics we considered are presented in Tables 1 through 4. Several of these variables are used in the literature as control variables or in the matching procedure (Bastié *et al.*, 2018; Diwisch *et al.*, 2009; Tsuruta, 2020; Werner *et al.*, 2019). The majority of the characteristics are expressed as a proportion (%) to meet Statistics Canada's residual confidentiality non-disclosure criteria.¹⁷ The number of employees, average interest rate, and number of years the SME has been making sales were the only continuous variables that were kept. For the continuous variables, the statistical tests comparing the means were tests of equality of means between the two groups under the null hypothesis, or Student's *t-statistic*. Only the *p-value* of Student's *t-statistic* is reported for the null hypothesis of equality of the means between the two groups under the assumption that the sample has an approximately normal distribution considering the relatively high number of observations.

This *p*-value is reported in column [Pr > |t|] and represents the probability that the null hypothesis cannot be rejected. When the Pr > |t| value associated with Student's *t*-*test* is small according to the conventional thresholds of statistical significance, generally when p < 0.05, the null hypothesis is deemed to be rejected. We can then conclude that the difference between the means of the two groups of SMEs does not equal 0. For the variables representing proportions, the same principle applies, except that this time, we performed tests of equality of two Wald proportions with the *Z* score. The null hypothesis this time was H₀: π_1 - π_0 = 0 (vs. H_A: π_1 - π_0 \neq 0), i.e., the difference in proportions is equal to 0. When the probability Pr > |Z| exceeds the conventional thresholds for statistical significance, the null hypothesis that the two proportions are statistically equal can be rejected. In all of the tables, the results of these tests are indicated by asterisks at the conventional thresholds for statistical significance of 1% (***), 5% (**) and 10% (*) in the interest of readability.

Table 1 reports the variables for which there is consensus in the literature to identify the control group SMEs that share similar characteristics (Bastié *et al.*, 2018; Diwisch *et al.*, 2009; Kimhi and Nachlieli, 2001; Molly *et al.*, 2010; Palard, 2021; Tsuruta, 2020, 2021; Werner *et al.*, 2019). These variables are the number of employees, industry and region in which the SME operates.¹⁸ Prior to matching, only SME size, their proportion in the industry, and proportion in the Prairie provinces appeared to be significantly different for the group with no transfer intentions ($W_i = 0$). Table 1 reveals that SMEs belonging to owners who reported having transfer intentions were on average smaller in terms of number of employees than the other SMEs prior to matching. The SMEs that intended to transfer ($W_i = 1$) were smaller on average, with 25.55 employees, than those in the group that did not intend to transfer ($W_i = 0$), with 33.69 employees on average. The difference of slightly more than 8 employees in favour of the SMEs that did not intend to transfer is statistically significant at the conventional threshold of significance of 1% before matching.

Thus, if employment is a normal input to an SME's activities, it would be inappropriate to assign a causal interpretation to the economic impact of transfer intentions with a group of similar SMEs. We would find that the group of SMEs (W_i = 0) would be likely to have higher sales on average. This difference could not be attributed to the intention to transfer but rather to the number of employees, which is generally correlated with the volume of sales given that the number of employees is an input in the SME's operations. We included these variables in the calculation of the propensity score for matching.¹⁹

¹⁷ These criteria are particularly restrictive in the case of business administrative data used in Statistics Canada's Research Data Centres program (e.g., see Tambay and Gonthier, 2012).

¹⁸ We used a revised version of Pavitt's (1984) taxonomy covering manufacturing and services based on correspondence with NAICS codes to account for the heterogeneity of innovative behaviour and economic performance across the various economic sectors. This taxonomy is better suited to observational empirical studies of firms than NAICS codes, the purpose of which is to produce statistics for national economic accounts (Gotkis, Pugliese and Vezzani, 2018).

¹⁹ In other words, these three variables are included in the PSMODEL statement of the SAS PSMATCH procedure. See the technical discussion of the methodology in Appendix 1 and the summary of the procedure in Appendix 2 for more details.





		Intentions to Transfer							
		Yes (W _i =1)		No (W _i =0)					
			Before Matching			After Matching			
Sam	pple Size	1,078		3,530			1,078		
		Mean	Mean	Diffe	erence	Mean	Diffe	rence	
Cha	racteristics	[A]	[B]	[A] - [B]	Pr > t	[C]	[A] - [C]	Pr > t	
	Number of employees (N)	25.55	33.69	-8.14	0.0006(***)	25.67	-0.12	0.9633	
	Labour intensive (%)	32.56	32.46	0.1	0.9532	31.45	1.11	0.5795	
	Resource intensive (%)	11.69	11.56	0.13	0.9072	11.6	0.09	0.9465	
stry	Return to scale intensive (%)	7.42	6.71	0.71	0.4333	8.91	-1.49	0.208	
Indu	Specialization intensive (%)	1.48	1.3	0.18	0.6624	1.02	0.46	0.3328	
	Science intensive (%)	7.51	9.46	-1.95	0.0387(**)	8.16	-0.65	0.5748	
	Sales intensive (%)	20.04	18.13	1.91	0.1673	17.35	2.69	0.1089	
	Professional services intensive (%)	19.29	20.37	-1.08	0.4367	21.52	-2.23	0.1995	
	Atlantic (%)	11.41	13.65	-2.24	0.466	10.95	0.46	0.7325	
	Québec (%)	22.54	23.26	-0.72	0.6233	22.36	0.18	0.9178	
_	Ontario (%)	24.77	24.19	0.58	0.7011	23.93	0.84	0.6515	
legior	North (%)	4.08	3.29	0.79	0.2373	4.36	-0.28	0.7479	
~	Prairies (%)	9.09	7.08	2.01	0.0396(**)	7.79	1.3	0.278	
	Alberta (%)	15.31	16.09	-0.78	0.5323	16.05	-0.74	0.6356	
	British Columbia (%)	12.8	12.44	0.36	0.7527	14.56	-1.76	0.2336	
Note	· Asterisks refer to the conventional thresh	olds of significan	ce for a statistica	l test of differen	ce of means of 1%	(***) 5% (**) a	nd 10% (*)		

TABLE 1. SME INDUSTRIAL AND PROVINCIAL PROFILES

After matching, the difference between the SMEs that intend to transfer and the 1,078 that made up the control group was still negative, but no longer significant at the conventional thresholds of statistical significance. The same observation can be made with regard to the two other characteristics that distinguish SMEs that report an intention to transfer. After matching, the number of employees, industry and province of the two groups of SMEs were statistically similar. In other words, the 1,078 SMEs in the group that reported an intention to transfer ($W_i = 1$) was the same before and after matching; the matching procedure selected a group of 1,078 control SMEs that share a comparable size, industry and province profile among the 3,530 SMEs in the sample.





Table 2 reports the statistical analysis of the matching of twelve other selected variables of SME financing structure. We wanted both groups to be comparable in order to avoid inferring differences in performance that are primarily attributable to the structure and financing activities of an SME.

				Inte	entions to Tran	sfer		
		Yes (W _i =1)			No (V	V _i =0)		
			B	efore Match	ing	Ļ	After Matching	
Sam	ple Size	1,078	3,530				1,078	
		Mean	Mean	Diffe	erence	Mean	Diffe	rence
Cha	racteristics	[A]	[B]	[A] - [B]	Pr > t	[C]	[A] - [C]	Pr > t
	Average interest rate (percentage points)	7.66	7.69	-0.03	0.295	7.66	0	0.4802
	Applied for external financing in the past (%)	68.65	73.14	-4.49	0.0049(***)	66.14	2.51	0.2146
	Applied for external financing in the last 12 months (%)	29.87	38.78	-8.91	<.0001(***)	26.81	3.06	0.1146
	Other credit applications in the last 12 months (%)	23.01	29.43	-6.42	<.0001(***)	21.15	1.86	0.2989
Ire	Type of bank credit for other applications (%)	85.89	90.76	-4.87	0.0411(**)	90.35	-4.46	0.1304
Structu	Credit application for working capital (%)	54.44	57	-2.56	0.3499	56.44	-2	0.5644
ancing	Government guaranteed financing (%)	30.93	34.22	-3.29	0.3289	0.3254	30.6046	0.7169
Ë	Small business financing programs (%)	17.16	24.39	-7.23	<.0001(***)	16.7	0.46	0.7740
	Never applied for lease financing (%)	26.25	31.7	-5.45	0.0004(***)	25.14	1.11	0.5542
	Never applied for equity financing (%)	38.13	47.42	-9.29	<.0001(***)	36.55	1.58	0.4490
	Applied for government assistance in the past (%)	64.94	58.47	6.47	<.0001(***)	67.07	-2.13	0.2956
	Plans to apply for a loan in the next 12 months (%)	21.71	23.31	-1.6	0.2653	20.13	1.58	0.3679
Al - t-					6 6 10/	(***) 50/ (**)	- 1 100((*)	

TABLE 2. SME FINANCING STRUCTURE

We noted statistically significant differences between the two groups prior to matching on eight of the twelve variables. In particular, we observed that the proportion of SMEs that applied for external financing in the previous twelve months was higher among those who reported they did not intend to transfer, 38.8% for those who reported $W_i = 0$ versus 29.9% for those who reported $W_i = 1$. Generally speaking, we noted that the historical or recent financing activities of SMEs that reported an intention to transfer their business were proportionally less significant than among those who reported $W_i = 0$.





In addition, a higher proportion of SMEs reporting an intention to transfer had applied for government assistance. Conversely, SMEs that reported never having applied for lease or equity financing were proportionately more likely to be among those that reported not wanting to transfer. These differences could lead to a (mis)interpretation of the presence of the phantom threat.

Although an SME's financing activities may be influenced by the owner's intentions to transfer, the literature does not allow us to lean one way or the other (Diwisch *et al.*, 2009; Werner *et al.*, 2019). Certain SMEs that intend to transfer may actually decrease the scope of expansion projects and external funding applications in the short term (Werner *et al.*, 2019). Whereas others, who also intend to transfer, may increase short-term financing applications in order to signal their profitability to a successor to make it more attractive (Leland and Pyle, 1977; Myers and Majluf, 1984; Ross, 1977). Thus, in order to obtain a similar control group, it is *a priori* difficult to exclude these variables from the propensity score matching procedure. We opted to include recent and historical financing activities in the calculation of the propensity score given that some of these activities may be related to other unobservable SME factors, such as the prior identification of a successor (Tsuruta, 2021).²⁰ Other variables related to the financing structure of SMEs that were included in the calculation of the propensity score were: participation in the Canada Small Business Financing Program, having never applied for lease or equity financing, and having previously applied for government assistance. As shown in the last column in Table 2, there was no longer any statistical difference between the groups in terms of characteristics related to financing structure after matching.

Table 3 examines other categories of characteristics associated with the start-up (or acquisition) mode, life cycle, strategic direction and legal status of the SME that could have an influence on the estimated economic impact of transfer intentions. We noted that in 2007, 69.9% of SMEs founded from scratch belonged to owners who were planning to transfer ($W_i = 1$), whereas the proportion was 68.0 percent for the others ($W_i = 0$). However, this difference was not statistically significant between the two groups.

We noted that the proportion of SMEs acquired by family members increases slightly after matching for the group that reported no intention to transfer (10.2% versus 8.75%), but the difference is not statistically significant. This suggests that the family mode of SME transfer should not have a statistically significant impact on the economic impact estimate of SME transfer intentions. With regard to the other SME characteristics, we included characteristics of the SME's life cycle phases. Thus, prior to matching, there was a higher proportion of mature SMEs among the group that intended to transfer, and proportionately fewer start-up, early commercialization, or high-growth SMEs.

This latter characteristic appears particularly important to us because if one group had proportionally more highgrowth SMEs, this could explain faster sales growth for the group with more of these high-growth SMEs. The difference in sales growth between the two groups could therefore not be attributed to the intention to transfer, but rather to the fact that one group had proportionally more high-growth SMEs. After matching, the proportion of high-growth SMEs was not statistically different between the two groups (10.48% vs. 10.76%). Lastly, we also took recent export activity into account, as the literature suggests that on average SMEs that export have higher sales volumes and also post better performance (e.g., Melitz and Trefler, 2012; Moen *et al.*, 2016).

²⁰ Among the businesses that had made other credit applications in the previous 12 months, we wanted to look at the types of financing and the reason for it, i.e., the type of credit (banks vs. credit unions or other), whether the credit application was for working capital and whether the financing was guaranteed by the government. It should be noted that these variables are only available for firms that had applied for credit in the 12 months prior to the SFGSME. As a result, the number of observations is not the same for these variables and we did not include these variables in the propensity score. However, we find that after matching, these characteristics between the two groups remain statistically similar.





TABLE 3. SME CHARACTERISTICS

		Intentions to Transfer							
		Yes (W _i =1)		No (W _i =0)					
			В	Before Matching			After Matching		
Sample Size		1,078		3,530			1,078		
		Mean	Mean	Diffe	erence	Mean	Diffe	rence	
Cha	racteristics	[A]	[B]	[A] - [B]	Pr > t	[C]	[A] - [C]	Pr > t	
a	Property acquired from the family	8.35	8.75	-0.4	0.676	10.2	-1.85	0.137	
poM qu	Property not acquired from the family	19.85	20.62	-0.77	0.580	19.11	0.74	0.664	
tart-t	Property built from scratch	69.94	67.99	1.95	0.222	68.74	1.2	0.544	
Ň	Property acquired otherwise	1.86	2.63	-0.77	0.113	1.95	-0.09	0.875	
	Start-up	17.07	21.64	-4.57	0.001(***)	16.98	0.09	0.954	
e	Early commercialization	4.92	8.33	-3.41	<.0001(***)	5.38	-0.46	0.626	
e Cyc	Strong growth	10.48	17.93	-7.45	<.0001(***)	10.76	-0.28	0.834	
1	Maturity	32.84	29.72	3.12	0.055(*)	31.54	1.3	0.519	
	Number of years making sales	16.45	14.7	1.75	0.139	15.51	0.94	0.267	
E	Family property	34.23	39.32	-5.09	0.002(***)	33.86	0.37	0.856	
rectio	Conducts R&D	25.42	26.06	-0.64	0.671	24.86	0.56	0.766	
ō	Exported in the last 12 months	12.52	15.13	-2.61	0.027(**)	12.71	-0.19	0.897	
Legal Status	Incorporated	64.66	66.97	-2.31	0.163	63.08	1.58	0.446	

Lastly, Table 4 examines the socio-demgraphic characteristics of owners that may influence results and measures of performance. We included in the calculation of the propensity score the proportions of SMEs owned in whole or in part by women, given that this proportion was greater among SMEs that wanted to transfer before matching, at 50.3% vs. 45.2%. After matching, these two variables were similar between the two groups. Matching slightly inflated the proportion of Aboriginal owners who did not intend to transfer. Since the difference is not statistically significant and the proportions remain small, this suggests that differences in performance measures between the two groups are not substantially influenced by the difference in the proportions of Aboriginal owners. The remaining characteristics, such as owner's mother tongue or wealth, were similar before and after matching.





				Inte	entions to Trar	sfer			
		Yes (W _i =1)	No (W _i =0)						
			B	efore Matchi	ing	After Matching			
Sample Size		1,078		3,530			1,078		
		Mean	Mean	Diffe	erence	Mean	Diffe	rence	
Cha	racteristics	[A]	[B]	[A] - [B]	Pr > t	[C]	[A] - [C]	Pr > t	
	Immigrant for fewer than 5 years	2.32	2.29	0.03	0.963	1.95	0.37	0.551	
iphic	Firm partly or wholly owned by a woman	50.28	45.16	5.12	0.003(***)	49.63	0.65	0.763	
nogra	Owner has a disability	1.67	1.53	0.14	0.751	1.67	0	1.000	
-Den	Owner is Aboriginal	2.23	2.75	-0.52	0.322	3.43	-1.2	0.091(*)	
Socie	Owner is a member of a visible minority	8.53	8.75	-0.22	0.822	8.44	0.09	0.938	
	Owner is worth over one million	30.52	31.33	-0.81	0.613	29.13	1.39	0.480	
gue	Anglophone	64.19	64.79	-0.6	0.721	64.75	-0.56	0.787	
:her Ton	Francophone	21.52	21.84	-0.32	0.823	20.13	1.39	0.466	
Mot	Other	14.29	13.37	0.92	0.225	15.12	-0.83	0.584	
Noto	Actoricky refer to the conventional thresh	olds of significan	o for a statistica	I tost of differen	co of mogne of 1%	(***) 50/ (**) a	nd 10% (*)		

TABLE 4. SME MAJORITY OWNER CHARACTERISTICS

3.2 Codetermined variables of transfer intentions

A detailed statistical analysis of firm and owner characteristics has revealed that some variables were strongly codetermined with the owner's intention to transfer. As the literature suggests, the owner's age, experience, and the precarious situation of the SME may influence the owner's intention to transfer (Kimhi and Nachlieli, 2001; Tsuruta, 2020). For these variables, the matching procedure was expected to be difficult, if not impossible, and ineffective.

Table 5 reports the statistical analysis of the variables that are strongly codetermined with the intention to transfer. Given that these variables are not independent of reporting the intention to transfer, they cannot be used to balance the two groups of SMEs based on transfer intention. This would violate the unconfoundedness assumption. These variables were therefore excluded from the matching procedure.





We observed that the average number of years of experience of the owner reaches 22.3 years where $W_i = 1$ and is statistically higher than for those who did not intend to transfer their business ($W_i = 0$) before and after matching. However, we noted that the average age of owners who reported an intention to transfer (53.4) is not statistically different from those who stated they did not intend to transfer after matching (49.5), a difference of just under 4 years that is not significant at the conventional statistical significance threshold of 10%. It thus appears that the owner's experience is a statistical determinant of intentions to transfer, whereas age is not.

		Intentions to Transfer						
		Yes (W _i =1)			No (\	N _i =0)		
		Before Matching After Matching			iing			
Sam	ple Size	1,078		3,530		1,078		
		Mean	Mean	Dif	ference	Mean	Dif	ference
Chai	racteristics	[A]	[B]	[A] - [B]	Pr > t	[C]	[A] - [C]	Pr > t
Age	Average age of owner	53.36	48.84	4.52	<.0001(***)	49.48	3.88	0.1104
ience	Average number of years of owner's experience	22.32	18.8	3.52	0.0037(***)	19.12	3.2	0.0076(***)
Exper	Owner's experience > 16 years (%)	64.29	53.54	10.75	<.0001(***)	54.92	9.37	<.0001(***)
lation	Intends to grow over the next 2 years	37.38	54.82	-17.44	<.0001(***)	49.07	-11.69	<.0001(***)
In decline (declining sales)		19.67	4.33	15.34	<.0001(***)	6.12	13.55	<.0001(***)
Note:	Asterisks refer to the conventional thresh	olds of significand	e for a statistica	test of differe	ence of means of 1%	(***), 5% (**) c	and 10% (*).	

TABLE 5. CODETERMINED CHARACTERISTICS OF SME TRANSFER INTENTIONS

In the same vein, the proportion of owners who said they intended to grow in the subsequent two years was lower among those who do not intend to transfer, at 37.4% versus 49.1%. At the same time, the proportion of SME owners who reported a decline in sales was substantially and significantly higher among those who reported an intention to transfer, at 19.7% versus only 6.1% In other words, these two findings support the widely held belief that SME owners' transfer intentions may be associated with a phantom threat, or rather co-determined, at least in part, with a self-selection effect stemming from some form of cap on the owner's ambitions and a decrease in sales (e.g., Malone and Jenster, 1992), rather than his or her age *per se*.

3.3 The economic impact of transfer intentions

Once the matching was completed to obtain two statistically comparable groups, we could estimate the average performance of SMEs that report an intention to transfer over the next five years ($W_i = 1$) over those that do not have such intentions ($W_i = 0$) and infer the presence of economic impacts through a statistical test between the two groups of SMEs.





Tables 6 through 12 present our estimates of the economic impact of intentions to transfer over the next five years on measures of economic performance over a 10-year period. Given that the treatment variable is the five-year intention to transfer, rather than the fulfillment of that intention, analyzing the economic impact over a relatively long period gives us confidence that reporting an intention to transfer is independent of economic impacts, whether or not they are conditional on covariates.²¹

Since we were interested in the economic impacts of transfer intentions, we mainly compared measures of the economic impacts of SMEs related to inputs (e.g., number of employees, equity) and outputs (e.g., annual sales). We were also interested in comparing the economic impact of financial performance measures associated with the short- and medium-term prosperity of the economy through SME profitability. We also considered the economic impact of transfer intentions on the proportion of SMEs whose fair market value exceeds the capital gains exemption threshold to indirectly measure the economic impact of transfer intentions on government revenues. Lastly, we estimated the impact of transfer intentions on the survival rate of SMEs.

Our results regarding the economic impact on SME inputs and outputs are largely consistent with each other in both the short and long term. Tables 6 to 10 require relatively little discussion given the consistency and robustness of the results. First, the results show that there is no economic impact associated with the intention to transfer over a 10-year period in terms of number of employees (Table 6), annual revenue (Table 7), profitability (Table 8), equity (Table 9), and the capital gains tax treatment of SMEs (Table 10).

In other words, intentions to transfer do not influence the potential performance of SMEs in the short or long term. This suggests that when owners report their intention to transfer over the next five years, the economic potential of the SMEs is According to our estimates, the economic potential of SMEs that report an intention to transfer in the next five years is statistically comparable to that of the control group. Our findings suggest that intentions to transfer do not influence the short- and longterm performance of SMEs.

statistically comparable to that of the control group, even though the results in Table 5 suggest that the ambitions or commitment of owners in the former group have reached a cap or ceiling and that the latter group is in a more favourable position.

As with Diwisch *et al.* (2009), the intention to transfer does not influence the number of employees. Our results complement their findings with other measures of economic impact such as annual income, profitability, productivity, equity, and the tax treatment of capital gains for SMEs. The hypothesis of a phantom threat stemming from transfer intentions is therefore largely rejected by these results. Since there is no economic impact of transfer intentions in the short and long term, these results also suggest that the economic impact of business succession is mainly concentrated in its strategic renewal potential, which will primarily be implemented by the successors.

²¹ There is some controversy in the economics literature associated with the assumption of independence between choices and potential impact in the case of the behaviour of economic agents for which the decision cannot be separated from the consequences or outcomes. As Imbens and Wooldridge (2007) have suggested, analysis of the results over a ten-year horizon gives us confidence that the observed differences in economic impact are mainly driven by factors that are unobservable (e.g., health of the owner, identification of a successor) and conditionally independent.





However, even if SMEs run by owners who report an intention to transfer show the same potential for performance as the others over the short and long term, this does not suggest that they have the same drive, motivation or determination to ensure the sustainability of their SMEs. Given that the results in Table 5 suggest that the intention to transfer is related to a cap in ambition or disengagement of owners from SME activities, transfer intentions could project the *spectre of closure* in the short or long term. To test this hypothesis, we therefore compared SME survival rates between the two groups of SMEs over a 10-year period.

	Number of Employees							
	Intentions	to Transfer						
	Yes (W _i =1)	No (W _i =0)	Economi	c Impact				
Year	Mean	Mean	Difference	Prob > t				
2007	29.2	29.5	-0.3	0.91				
2008	28.2	30	-1.8	0.543				
2009	27.4	29.1	-1.7	0.585				
2010	30.8	30.3	0.5	0.901				
2011	32.0	31.7	0.3	0.943				
2012	31.8	33.1	-1.3	0.747				
2013	32.1	33.8	-1.7	0.686				
2014	32.4	35.2	-2.8	0.558				
2015	35.6	35.7	-0.1	0.988				
2016	36.9	37.6	-0.7	0.908				
2017	38.3	40.5	-2.2	0.721				

TABLE 6. ESTIMATED CAUSAL ECONOMIC IMPACT OF TRANSFER INTENTIONS ON THE AVERAGE NUMBER OF SME EMPLOYEES

Note: Asterisks refer to the conventional thresholds of significance for a statistical test of difference of means of 1% (***), 5% (**) and 10% (*).





TABLE 7. ESTIMATED CAUSAL ECONOMIC IMPACT OF TRANSFER INTENTIONS ON AVERAGE SME REVENUES

Annual Revenue							
	Intentions	to Transfer					
	Yes (W _i =1)	No (W _i =0)	Economi	ic Impact			
Year	Mean	Mean	Difference	Prob > t			
2007	4,427,170\$	4,335,177\$	91,993\$	0.86			
2008	4,429,782\$	4,874,156\$	(444,374)\$	0.47			
2009	5,039,102\$	4,515,342\$	523,760\$	0.56			
2010	5,454,710\$	4,858,863\$	595,847\$	0.60			
2011	5,791,657\$	5,283,587\$	508,070\$	0.64			
2012	6,340,932\$	5,391,570\$	949,362\$	0.47			
2013	6,712,046\$	5,574,364\$	1,137,682\$	0.43			
2014	7,847,445\$	5,987,134\$	1,860,311\$	0.34			
2015	8,230,377\$	6,161,530\$	2,068,848\$	0.32			
2016	8,732,503\$	6,114,550\$	2,617,953\$	0.28			
2017	9,128,136\$	6,757,131\$	2,371,004\$	0.33			
Note: Asterisks refer to the conventional	thresholds of significance for a	statistical test of difference of I	means of 1% (***), 5% (**) and	10% (*).			

TABLE 8. ESTIMATED CAUSAL ECONOMIC IMPACT OF TRANSFER INTENTIONS ON AVERAGE SME PROFITABILITY (BOOK)

Book Profits (Losses)							
	Intentions						
	Yes (W _i =1)	No (W _i =0)	Economi	ic Impact			
Year	Mean	Mean	Difference	Prob > t			
2007	1,433,183\$	1,563,863\$	(130,680)\$	0.510			
2008	1,546,326\$	1,657,545\$	(111,219)\$	0.626			
2009	1,423,497\$	1,579,366\$	(155,869)\$	0.503			
2010	1,492,712\$	1,554,194\$	(61,482)\$	0.803			
2011	1,573,297\$	1,725,606\$	(152,309)\$	0.612			
2012	1,648,556\$	1,756,398\$	(107,842)\$	0.739			
2013	1,606,066\$	1,730,298\$	(124,232)\$	0.720			
2014	1,875,253\$	1,846,901\$	28,352\$	0.946			
2015	1,817,424\$	1,980,394\$	(162,970)\$	0.687			
2016	1,793,960\$	1,854,840\$	(60,880)\$	0.888			
2017	1,908,407\$	2,065,424\$	(157,017)\$	0.746			
Note: Asterisks refer to the conventional	I thresholds of significance for a	statistical tast of difference of	means of 1% (***) 5% (**) and	10% (*)			





TABLE 9. ESTIMATED CAUSAL ECONOMIC IMPACT OF TRANSFER INTENTIONS ON AVERAGE SME EQUITY

	Equity							
	Intentions	to Transfer						
	Yes (W _i =1)	No (W _i =0)	Economi	ic Impact				
Year	Mean	Mean	Difference (τ _{s,τ})	Prob > t				
2007	1,355,851\$	976,653\$	379,198\$	0.451				
2008	1,826,915\$	1,068,859\$	758,056\$	0.294				
2009	1,591,878\$	1,036,041\$	555,837\$	0.402				
2010	1,638,225\$	1,192,898\$	445,327\$	0.553				
2011	2,435,994\$	951,178\$	1,484,816\$	0.181				
2012	3,259,759\$	1,623,158\$	1,636,601\$	0.187				
2013	3,780,352\$	1,649,744\$	2,130,608\$	0.129				
2014	3,827,778\$	1,802,261\$	2,025,517\$	0.558				
2015	3,225,983\$	1,801,053\$	1,424,930\$	0.191				
2016	3,017,456\$	2,003,963\$	1,013,493\$	0.299				
2017	3,085,168\$	2,229,834\$	855,334\$	0.398				
Note: Asterisks refer to the conventional	thresholds of significance for a	statistical test of difference of I	means of 1% (***), 5% (**) and	10% (*).				

TABLE 10. ESTIMATED CAUSAL ECONOMIC IMPACT OF TRANSFER INTENTIONS ON AVERAGE SME TAXABLE CAPITAL GAINS

	Exceeds Tax Exemption Threshold (%)							
	Intentions	to Transfer						
	Yes (W _i =1)	No (W _i =0)	Economi	ic Impact				
Year			Difference (T _{s,T})	Prob > t				
2007	26.56	27.13	-0.6	0.798				
2008	24.97	27.06	-2.1	0.349				
2009	24.97	25.24	-0.3	0.095				
2010	26.68	27.03	-0.4	0.879				
2011	28.81	27.02	1.8	0.460				
2012	30.63	29.84	0.8	0.756				
2013	29.43	30.94	-1.5	0.562				
2014	31.64	32.41	-0.8	0.774				
2015	31.65	32.48	-0.8	0.765				
2016	32.93	33.5	-0.6	0.842				
2017	35.41	36.67	-1.3	0.449				
Note: Astericks refer to the conventiona	I thresholds of significance for a	statistical tast of difference of	means of 1% (***) 5% (**) and	10% (*)				



To compare SME survival rates between the two groups of SMEs over a 10-year period, an SME was deemed to have survived if it was still in operation in the subsequent 10 years. SMEs that did not survive are those that went bankrupt, were dissolved or ceased operations in accordance with Statistics Canada's classification.²² This classification made it possible for us to compare the survival rates of both groups, taking into account mergers or acquisitions for the group of SMEs that reported an intention to transfer.

The results of our study do not allow us to reject the hypothesis of a spectre of closure hovering over SMEs when their owners report an intention to transfer in the next five years. In the very short term, the survival rates between the two groups of SMEs are comparable at the conventional statistical significance level of 10%. As of the second year, we see that the survival rate of these SMEs is 2.5 percentage points lower than that of the control group and that this difference is significant at the conventional statistical significance level of 1%.

According to our estimates, the spectre of closure decreases the survival rate of SMEs by 2.5 percentage points as of the second year relative to the control group, and gradually increases to 12.4 percentage points after 10 years.

In addition, we observed that the gap between the survival rates gradually widens to a difference of 12.4% after 10 years. In other

words, after 10 years, nearly three out of ten SMEs will not have survived the spectre of closure stemming from intentions to transfer, whereas for the control group, fewer than two out of ten SMEs will have ceased their operations.

Survival Rate (%)						
	Intentions	to Transfer				
	Yes (W _i =1)	No (W _i =0)	Economi	ic Impact		
Year			Difference (τ _{s,τ})	Prob > t		
2007						
2008	98.33	98.88	-0.5	0.269		
2009	94.98	97.49	-2.5	0.002 (***)		
2010	91.53	96.65	-5.1	<0.0001 (***)		
2011	88.00	94.98	-7.0	<0.0001 (***)		
2012	85.77	93.49	-7.7	<0.0001 (***)		
2013	82.51	91.73	-9.2	<0.0001 (***)		
2014	79.26	89.59	-10.3	<0.0001 (***)		
2015	75.35	87.17	-11.8	<0.0001 (***)		
2016	73.12	85.32	-12.2	<0.0001 (***)		
2017	71.44	83.83	-12.4	<0.0001 (***)		
Note: Asterisks refer to the conventional	thresholds of significance for a	statistical test of difference of r	means of 1% (***), 5% (**) and	10% (*).		

TABLE 11. ESTIMATED CAUSAL ECONOMIC IMPACT OF TRANSFER INTENTIONS ON SME SURVIVAL RATE



²² We used the LFE administrative termination code from the Business Registry. The administrative code does not make it possible to determine whether the business closure is voluntary or involuntary.



4. DISCUSSION



In the absence of a phantom threat from transfer intentions by SME owners, our results show that the main economic impact of a tidal wave of transfer intentions is the spectre of SME closures. These findings highlight the main anticipated economic benefit of efforts to support entrepreneurship: the survival of value-creating SMEs.

Our estimate of a 12.4% decrease in the survival rate after ten years is significant given the magnitude of business transfer intentions revealed by Statistics Canada's August 2020 *Canadian Survey on Business Conditions*. According to this Survey, we can estimate that between 13,000 and 15,000 business owners with at least one employee of all sizes in Québec, and between 45,000 and 51,000 in Canada overall, intend to transfer their business by the end of 2021.²³

Taking the median of these intervals, the spectre of closure associated with business transfer intentions then represents the premature closures of more than 2,200 additional businesses in Québec, and approximately 5,000 businesses elsewhere in Canada over the next ten years. This number could be much higher since the reported horizon of business transfer intentions is only one year in this survey.

The magnitude of the economic impacts associated with the spectre of closure stemming from transfer intentions would, as a result, be substantial, given that ten years later, the average annual revenue of an SME led by an owner who intended to transfer was \$9,128,136 in 2017 (Table 7) and the average annual net (book) profit was \$1,908,407 (Table 8). The spectre of closure therefore represents a roughly \$20.1 billion decrease in annual sales for Québec businesses and \$4.2 billion in net profits after 10 years. In Canada as a whole, the spectre of closure stemming from SME transfer intentions is equivalent to an approximate decrease of \$65.7 billion in annual sales after 10 years and \$13.7 billion in net profits. In terms of jobs (Table 6), the spectre of closure represents a direct loss of approximately 84,000 jobs in Québec and 276,000 in all of Canada after 10 years in 2017.

It is important to note, however, that this economic impact does not necessarily correspond to a dead economic loss for the The magnitude of the economic impact of the spectre of closure stemming from business transfer intentions after 10 years is estimated at a \$20.1 billon decrease in the annual sales of SMEs in Québec and \$65.7 billion in all of Canada in 2017. In terms of jobs, the spectre of closure represents the loss of 84,000 jobs in Québec and 276,000 jobs across Canada.

economy. To estimate the dead economic loss of the spectre of SME closures, the impact of closures on the reallocation of activities across all SMEs would have to be assessed; from those that close to those that are born and those that continue to operate. Nevertheless, two reasons suggest that the impact of the spectre of closure may be negative and substantial.

²³ The CSBC target population excludes businesses in the following NAICS sectors and subsectors: 22, 523990, 55, 611, 6214, 6215, 6219, 622, 814 and 91. Public data from the June 2020 Business Register allow us to subtract from the total count of all businesses with at least one employee those in sectors 22, 55, 61, 62 and 91 only. This count produces a total number of 239,733 businesses in Québec and 1,163,871 in Canada overall. If we exclude only businesses with at least one employee from the public sectors (22, 61), we find 269,895 businesses in Québec and 1,310,681 businesses in Canada overall. Given that intentions to transfer businesses by the end of 2021 are respectively 3.9% and 5.6% in Canada overall and Québec according to the August 2020 CSBC, we can estimate an approximate total number of businesses that reported an intention to transfer in 2020.





First, a portion of the losses in revenue and net profit associated with the spectre of closure will eventually be redistributed to other SMEs, all of which will be equally successful, according to our estimates. However, this reallocation of economic activities among SMEs is not necessarily zero on net. For example, Bérubé, Dostie and Vilhuber (2013) estimate that, for the period from 2004 to 2007, the reallocation of activities among SMEs (both existing and new) made a marginal contribution to the growth of sales per employee among Canadian SMEs.²⁴ In fact, these authors have shown that the vast majority of the growth in productivity of Canadian SMEs stems from their internal growth (92% for the period from 2004 to 2007). The economic impact of the spectre of closure may thus be negative because the potential for productivity growth generated by their sustainability is greater than that of the reallocation of activities among SMEs.

Secondly, even if the activities associated with these closures can partly be recovered by other firms, the spectre of closure can also foster increased concentration within an industry. Recent studies have expressed concern about increasing industrial concentration in developed countries and its long-term effects on productivity and prosperity (De Loecker, Eeckhout and Unger, 2020). Given that an increase in concentration can make competition less intense, the negative economic impact of the spectre of closure could be amplified by a decrease in competition.

Our results therefore suggest the importance of ensuring the sustainability of SMEs, regardless of their size, industry or region. As the studies mentioned above have shown, closures (and new entries from elsewhere) contribute relatively little to the growth of SME productivity in Canada. This finding is consistent with studies that show the importance of SME sustainability in growing corporate productivity.

Our results also point to some of the main economic benefits of public policies on business succession. For example, according to some literature, business succession carries a hidden economic potential of strategic renewal, once the new owner (successor) takes over the SME (Bégin *et al.*, 2011; Chabaud *et al.*, 2021; van Teeffelen and Uhlaner, 2010; Tsuruta, 2021). As such, providing business succession support for SME owners (who will eventually transfer their business) and successors can not only ensure a firm's sustainability, but also promote the development of its hidden economic potential.

Ensuring the sustainability of an SME is a complex challenge for its owner, just as it is for the successor. Transferring an SME goes far beyond a mere transaction. The emotional burden associated with the transfer is often heavy for the protagonists. There are still too few studies on the short- and long-term impacts of support for business succession and its effects on strategic renewal, regardless of whether or not a firm is transferred to family members.

²⁴ Tables A1 and A2 in Clark, Dostie and Fakih (2009) can be consulted for a summary of empirical studies that address this issue.





CONCLUSION

This study estimates the short- and long-term economic impacts of intentions to transfer a business over the next five years. Using a longitudinal database from the 2007 SFGSME matched with administrative LFE data of 4,608 SMEs from Statistics Canada, of which 1,078 are led by owners who have stated their intention to transfer in the next five years, we estimated the economic impacts of intentions to transfer on the number of employees, annual revenue, profitability, equity, eligibility for the capital gains tax exemption and survival rate of SMEs in Québec and across Canada. The results of this study can be summarized in three main findings.

Firstly, a detailed statistical analysis of four dozen (48) characteristics of SMEs and their owners shows that transfer intentions are codetermined with a cap on the owners' growth ambitions and their number of years of experience, rather than their age. Our results show that SME growth intentions decline among SME owners who wish to transfer their business, as opposed to the others. As a result, it would be important for this study to be repeated in the future as the cohorts of SME owners become more advanced in age and experience. The experience of SME owners may prove to be a better leading indicator of business transfer intentions in Canada.

Secondly, our results allow us to reject the hypothesis that transfer intentions carry a *phantom threat* to the economic impacts of SME activities. Whether in terms of jobs, revenues, profitability, capitalization or taxable capital gains, these SMEs are statistically similar in terms of economic impacts to those with no transfer intentions. Since there is no economic impact of transfer intentions in the short to long term, these results suggest that the economic impacts of business succession are mainly concentrated in the sustainability and strategic renewal potential of SMEs.

Thirdly, our results cannot reject the hypothesis of the presence of a *spectre of closure*. They show a statistically significant decrease in the survival rate of SMEs whose owners intend to transfer, which increases over the years as of the second year. Since this phenomenon affects SMEs that are initially just as successful as those in the control group, the economic impact of the spectre of closure stemming from intentions to transfer may be negative and substantial. We believe it is important to conduct further research in this area in order to minimize the magnitude of the spectre of closure. It is important for public authorities to provide the means to avoid repeating the Japanese experience that witnessed a 21% decrease in the number of SMEs in just 15 years (1999-2014).

To our knowledge, this is the only study to test the phantom threat and spectre of closure hypotheses separately. The studies that come closest to this one are those conducted by Bastié *et al.* (2018), Diwisch *et al.* (2009), Tsuruta (2020), and Werner *et al.* (2019) to a lesser extent. We believe our findings to be compelling, as our results are largely consistent with those of these studies conducted with French, Austrian, Japanese and German SME samples, and especially with those using propensity score matching methodologies. Our study thus contributes to the literature by complementing the statistical analysis on a broader range of economic impact measures than the number of employees or the survival rate. In addition, our sample was not exclusively limited to family-owned SMEs. Lastly, our study appears to be the first to formally test the spectre of closure from business transfer intentions hypothesis separately from the phantom threat. This contribution is important because it allows us to better pinpoint the economic impacts of business succession and to better identify the expected benefits of policies and programs to support business succession.





More specifically, our results suggest two fundamental principles that should guide the development of public programs and policies to deal with the pandemic tsunami of business transfer intentions observed both in Québec and across Canada. Firstly, support for business succession must focus on the sustainability and maintenance of the productive capacity of SMEs whose owners are considering a business transfer, regardless of size, industry or region. Secondly, support for business succession should promote and facilitate the strategic renewal that can occur as part of an SME transfer.

Unfortunately, current data make it difficult to distinguish between actual and intended transfers. The literature suggests that the economic impacts of a business transfer are different from those of intentions. Several events and factors can facilitate or prevent the transition from intention to action. An important factor to consider in explaining this difference is the time horizon contemplated by the owners to transfer their business. The longer the time horizon, the more likely the owner will be able to identify a successor that is capable of strategically renewing the SME to create value. In the future, it would be interesting to incorporate these various aspects of the spectre of closure and the shadow of death to gain a better understanding of the economic spinoffs of business succession for developed economies, and to foster the development of effective public business succession policies.





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Appendix 1

Estimation of Economic Impacts Using the Propensity Score Matching Procedure: The Case of SME Transfer Intentions by Charles Bérubé, Ph.D. and Marc Duhamel, Ph.D.

Assessing the causal, rather than correlational, economic impact of a firm owner's transfer intentions with observational data necessarily requires inferring a *potential* level of performance that the firm would have had *as if* its owner had not intended to transfer the firm in the subsequent years.

In this study, we used the causal inference model developed by Donald B. Rubin to answer our fundamental statistical inference question.²⁵ This statistical inference requires identifying a group of firms for which the owner reports an intention to transfer (in other words, the *treatment* group we identify with the binary variable $W_i=1$, hereinafter) from those whose owner reports <u>**no**</u> such intentions, i.e. a group of firms that we identify as the control group with the binary variable $W_i=0.^{26}$

To measure the economic impact of transfer intentions, let us define the measure of *potential* impact on a performance measure of a firm *i* whose owner reports an intention to transfer as Y_i (1) (i.e., if W_i =1); and, as Y_i (0) the measure of *potential* impact on firm performance in the case where the owner does not intend to transfer the firm (if W_i =0).²⁷ Of course, each firm also has a set of other attributes (or characteristics) that are intimately related to the firm's potential performance, such as its geographic location, industry, financing structure, strategic direction, research and development activities, position in the firm's life cycle, and other socio-demographic characteristics of its owners, managers and employees.²⁸ For the time being, we will denote these firm attributes by X_i . For the purposes of this study, the important thing to remember is that these various attributes (e.g., age of owner) are predetermined (or fixed) at the time the owner reports his or her intention to transfer.

²⁶ Although many of the statistical concepts and methodological notions presented in this section have been known for some time (e.g. Neyman, 1923), their applications in some disciplines are rather recent so that terminology and notation frequently differ (e.g., statistics, epidemiology, economics). In this section, we adapt Rubin's (1974 and 1977) representation of the causal inference model by Imbens and Wooldridge (2009).

²⁵ Imbens and Rubin (2015) provide a more detailed presentation of Rubin's statistical inference model described by Holland (1986).

²⁷ We therefore distinguish between two groups of firms: those whose owners report that they intend to transfer the firm within 5 years of the 2007 SFGSME. Technically, we coded W_i = TRE = 1 for firms that intended to transfer and W_i = TRE = 0 for firms that did not intend to transfer, where TRE is the mnemonic variable coded for "Transfer Enterprise" (TRE). In our sample from the 2007 SFGSME matched with the Linkable File Environment (LFE), we retained 1,078 firms without missing variables with TRE=1 and 3,530 firms without missing variables with TRE=0.

²⁸ In economics, these characteristics are often referred to as exogenous or control variables, even though this common practice is not consistent with the statistical definitions of exogeneity and control in the methodological framework used. We used the terminology set forth by Imbens and Wooldridge (2009).





The causal economic impact in Rubin's model is quantitatively measured by the simple difference $\Delta_i \equiv Y_i(1) - Y_i(0)$ for each firm. If the potential economic impact was observable in both situations for the same firm, the economic impact of reporting an intention to transfer the firm ($W_i=1$) was equal to the conditional expectation $E[\Delta_i | W_i=1]$. The economic impact of intending to transfer on the sample of firms that intend to transfer the firm ($W_i=1$) was estimated by:

$$\tau_{S,T} = \frac{1}{N_1} \sum_{i \mid W_i = 1} [Y_i (1) - Y_i (0)] \quad (1)$$

where $\tau_{S,T}$ measures the average economic impact of the intention to transfer for the owners of these firms (or more commonly referred to as the average treatment effect on treated subjects, or ATT) and N_1 is the number of firms whose owners report an intention to transfer the business.²⁹

But for each firm *i* in a sample of *N* firms, where $N = N_1 + N_2$, either $Y_i(1)$ is observed for $i=\{1, 2, ..., N_1\}$ or $Y_i(0)$ for $i=\{1, 2, ..., N_0\}$ based on the owner's intentions, but never both. In other words, where $Y_i(1)$ is observed, $Y_i(0)$ is not (and vice versa for those who report no intention to transfer, $W_i=0$). In other words, for firms whose owners report an intention to transfer, it is impossible to observe the potential performance of that same firm in a fictitious *counterfactual* situation where the owner of that same firm would not have intended to transfer the firm.

Since we can only observe the measure of potential performance $Y_i(0)$ for each firm for $i=\{1, 2, ..., N_1\}$ in (1), we face a problem of missing data (Heckman, Ichimura and Todd, 1997). Unless we use random assignment to transfer intentions, a simple comparison of the average economic impact between the two groups of firms is potentially fallacious and biased, because certain attributes that are observable (e.g., owner's age) or unobservable (e.g., owner's state of health) may lead some owners to report an intention to transfer. This reflects the well-known adage that "correlation does not imply causation." We therefore needed to find an unbiased and effective estimator of the counterfactual performance measure for each firm that reports an intention to transfer the firm ($W_i=1$) and $i=\{1, 2, ..., N_i\}$.

Since the average effect ($\tau_{S,T}$) of the performance measure related to the intention to transfer firms is likely to depend on firm-specific characteristics (e.g., region, industry and owner's age), it is necessary to estimate the average effect conditional on the observable characteristics of the firm.

For example, we can reasonably assume that the number of employees in the firm has a positive influence on a performance measure such as annual sales. A naive estimator may conclude that sales are higher on average among owners who do not intend to transfer, when in fact much of the explanation would be that firms where there is no intention to transfer are simply larger in size.

²⁹ The estimator $\tau_{S,T}$ is better known by the acronym SATT for "sample average treatment effect on the treated." See Imbens (2004) for more details.





Since we initially had little information on the set of characteristics that influence firm performance, it was important to include a certain number of characteristics of behaviours, strategies or decisions that are cited in the literature as having an impact on firm performance. For example, a firm owner's age can be expected to be higher on average for firms that report an intention to transfer than for those that do not.

The methodology we used identified the firms among those whose owner does not intend to transfer ($W_i=0$) that are statistically most comparable to those whose owner reports an intention to transfer the firm ($W_i=1$). Our methodology identified these SMEs as the so-called *control group*. To create the control group, we used the matching estimators procedure. In what follows, we will refer to the observable characteristics of a firm by the vector of variables X_i . It should be noted that these characteristics (X_i) are often called control variables because they are characteristics that we want to be statistically similar in both groups, such as region, industry or number of employees. It is important that these characteristics not be influenced by the statement of intention to transfer. In other words, it is important that these control characteristics influence the performance indicators, but not the statement of intention to transfer (or more commonly referred to as the treatment).

This methodology identifies for each firm that reports an intention to transfer (i.e., $W_i=1$, $i=\{1, 2, ..., N_1\}$) and has a set of characteristics X_i , another firm that does not report an intention to transfer (i.e., $W_k=0$, $k=\{1, 2, ..., N_0\}$) and whose characteristics X_k are statistically similar. The performance of the control group firm is then used to estimate the potential performance $Y_i(0)$ of firm *i* that reports an intention to transfer. We are thus able to overcome the problem of missing data for each firm for which $W_i=1$, $i=\{1, 2, ..., N_1\}$.

The matching method should yield two statistically similar groups of firms that only differ in their statement as to whether or not they intend to transfer. In practice, therefore, the matching method should yield a statistically similar proportion of firms that share the same characteristics; the goal being to attribute causality of a difference in performance to the mere fact of reporting an intention to transfer. However, two important assumptions are required to identify the causal effect and obtain a consistent and effective estimate of $\tau_{S,T}$ (Rosenbaum and Rubin, 1983):

(i) Unconfoundedness: W_i is independent of $[Y_i(1), Y_i(0)]$ conditional on $X_i = x_i$; and, (ii) Common support: $0 < \Pr[W_i = 1 | X_i = x_i] < 1$, for all x in X.

Condition (i) stipulates that the attribution to treatment W_i is independent of the outcomes that are conditional on covariates X. The observable covariates X must therefore not be affected by the treatment. If the treatment <u>perfectly</u> explains a characteristic, then that variable should not be part of the matching selection criteria. For example, a variable that indicates the death of the owner would automatically imply an intention to transfer the firm. Condition (ii) stipulates that an overlap between those that received the treatment and those that did not is necessary. Each firm will *a priori* have a positive probability of being treated.





In other words, common support ensures that firms sharing the same characteristics (i.e., values of X) have a positive probability of being in both the treated and untreated samples (see Heckman, LaLonde and Smith, 1999). Under these assumptions, equation (1) can be rewritten as the mean difference of the matched samples:

$$\tau_{S,T} = \frac{1}{N} \sum_{i=1}^{N} [(Y_i \ (1) | \mathbf{W}_i = 1, \mathbf{X}_i = \mathbf{x}_i) - (Y_i \ (0) | \mathbf{W}_i = 0, \mathbf{X}_i = \mathbf{x}_i)]$$
(2)

Heckman, Ichimura and Todd (1997) point out that to identify the equation (2), the assumption (i) can be relaxed to mean independence. In other words, the statement of whether or not to transfer is independent of the means of the values (and not the values as such) of the measures of potential performance $Y_i(1)$ and $Y_i(0)$ conditional on X_i . The matching process then consists of selecting for each treated firm its nearest neighbour in the population of untreated firms. The conditioning on X takes into account the selection bias due to observable differences between treated and untreated firms.³⁰

Traditionally, the mean treatment effect is measured using covariate adjustment and various parametric and nonparametric matching algorithms to reduce potential bias in the mean treatment effect. Different types of matching estimators exist, with various properties (Stuart 2010). As with Diwisch *et al.* (2009), we chose to use propensity score matching. The propensity score is calculated from a logistic regression that is defined as the conditional probability of wanting to transfer the firm (W_i =1) versus the counterfactual situation (W_i = 0), given the characteristics (or covariates) X_i of the firms.

There are several methods for matching firms in the treatment group ($W_i=1$) to those in the control group ($W_i=0$). Since Rosenbaum and Rubin (1983), the matching procedure that uses propensity scores has attracted considerable interest in the economics literature.³¹ In this case, the value of the propensity score is calculated from a logistic regression and the matching is carried out by the optimal matching method with a fixed ratio.³²

Optimal propensity score matching selects all matches simultaneously and without replacement to minimize the total absolute difference in propensity scores across all matches. Some methods allow more than one firm in the control group to be matched to one firm in the treatment group. However, we opted for fixed-ratio matching, which simply means that the firms in the control group were selected only once for matching.

In Section 3 of this study, we provide a more detailed analysis of the quality of the matching based on the main characteristics that were selected.

³⁰ The risk of selection bias potentially due to *unobservable* differences (e.g., owner's state of health) remains present regardless of the model chosen. ³¹ See Imbens and Wooldridge (2009) and Imbens (2004). In 2021, several statistical software packages (e.g., SAS, STATA, R, Python) have matching procedures that incorporate propensity score calculations. In this study, we used the PSMATCH procedure in SAS. For more information, see the "SAS/STAT® 14.2 User's Guide."

³² We also tried matching using the Greedy Nearest Neighbor Matching method and various options with replacements, but the method chosen was the most effective in terms of matching.





Appendix 2

Summary of the SAS PSMATCH Propensity Score Matching Procedure

The SAS System

The PSMATCH Procedure

Data Information				
Data Set	RD.S2007			
Output Data Set	RD.OUTGS			
Treatment Variable	sellint5y			
Treated Group	1			
All Obs (Treated)	1078			
All Obs (Control)	3530			
Support Region	Extended Common Support			
Lower PS Support	0.064672			
Upper PS Support	0.473451			
Support Region Obs (Treated)	1078			
Support Region Obs (Control)	3526			

Propensity Score Information													
Treated (sellint5y = 1)						Control (sellint5y = 3)						Treated - Control	
Observations	N	Weight	Mean	Standard Deviation	Minimum	Maximum	N	Weight	Mean	Standard Deviation	Minimum	Maximum	Mean Difference
All	1078		0.2576	0.0725	0.0715	0.4468	3530		0.2267	0.0723	0.0576	0.4761	0.0309
Region	1078		0.2576	0.0725	0.0715	0.4468	3526		0.2268	0.0720	0.0651	0.4548	0.0308
Matched	1078		0.2576	0.0725	0.0715	0.4468	1078		0.2574	0.0721	0.0719	0.4548	0.0002
Weighted Matched	1078	1078.00	0.2576	0.0725	0.0715	0.4468	1078	1078.00	0.2574	0.0721	0.0719	0.4548	0.0002

Matching Information					
Distance Metric	Logit of Propensity Score				
Method	Optimal Fixed Ratio Matching				
Control/Treated Ratio	1				
Caliper (Logit PS)	0.107142				
Matched Sets	1078				
Matched Obs (Treated)	1078				
Matched Obs (Control)	1078				
Total Absolute Difference	3.752634				