

Why Did the Private Business Equity Share Fall in Canada?

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Abstract

Using surveys on family assets and debts in Canada, we document a significant decline in the private business equity share of total assets and net worth between 1984 and 1999 for households and entrepreneurs. We propose an explanation based on recent financial developments that allow financial intermediaries to better screen and monitor private business borrowers. We also study an incentive model of financial intermediation. The model relies on three key factors: risk aversion, moral hazard, and monitoring. We show that as monitoring costs decrease due to financial developments, entrepreneurs will commit less of their own wealth to private business, and the debt ratio of private business increases.

Keywords: household portfolios; private business equity; financial intermediation

JEL: G11; G21

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INTRODUCTION

How households allocate their portfolios has been an important question for economists and policymakers. Recently, the interest in studying household portfolio composition has increased due to the availability and sophistication of micro-data sets that offer estimates of asset holdings of households. Most empirical studies have been conducted about household portfolios in the United States and European countries.¹ In this paper we look at recent Canadian data.²

Using the 1984 and 1999 surveys on family assets and debts in Canada, we find that the private business equity share of total assets and net worth declined significantly over the period for all households and entrepreneurs (households that participate in private business). We define private business as privately owned and non-publicly traded firms.³ The private business equity share of total household assets fell from 21% in 1984 to 11% in 1999. For households with at least \$5000 (in 1999 Canadian dollars) private business equity, the private business equity share of total assets dropped from 54% to 39%, and the private business equity share of net worth fell from 58% to 44%.⁴ When we look at households with similar wealth levels in the surveys, the private business equity share was also lower in 1999 than in 1984. These observations suggest that Canadian households with private business equity have somehow diversified their portfolios.

What accounts for this diversification? Potential answers may include the decline in the private business sector, lower returns to private business, and changes in the composition of households with private business equity. However, these factors, as we discuss below, cannot fully explain the decrease in the private business equity share.

We propose an alternative explanation based on recent financial developments. Pri-

vate business borrowing/lending has historically been very costly because of the paucity of information on borrowers. With recent financial developments, particularly technological progress, financial intermediaries (such as banks) can better screen and monitor private business borrowers. This may allow financial intermediaries to increase private business lending. Thus, households with private businesses will commit less of their own wealth as equity to private businesses. We believe that this explanation is complementary to those mentioned above.

For the purpose of this paper we use the term “entrepreneur” to refer to a household that participates in private business.⁵ We employ an incentive model of financial intermediation where entrepreneurs can hold both risky (i.e., entrepreneurial projects) and riskless assets (which we interpret as financial assets since, generally speaking, financial assets are safer than private business) when they borrow money to finance their businesses. Entrepreneurs are risk averse, and financial intermediaries are risk neutral. However, there is a moral hazard problem in the sense that an entrepreneur can influence the riskiness of a project undertaken. He/she may choose a project with a low success probability because of the existence of private benefits that stem from such a project. In order to minimize the moral hazard problem, financial intermediaries must monitor borrowers’ activities (with a cost) so that borrowers do not engage in behaviors that are undesirable from financial intermediaries’ point of view. The level of costs associated with monitoring activity can be interpreted as an indicator of the efficiency of the financial system. We show that as monitoring costs decrease, entrepreneurs will invest a smaller amount of their own wealth in similar sized private business, financial intermediaries will charge a lower interest rate, and the debt ratio of private business increases.

Economists have conducted a substantial amount of empirical research on entry into entrepreneurship — who becomes an entrepreneur and under what conditions [Evans and Jovanovic 1989; Evans and Leighton 1989; Holtz-Eakin, Joulfaian, and Rosen 1994]. We do not model occupational choice here; we are interested in how entrepreneurs allocate their wealth between risky projects and riskless investments. Other studies have explored the interdependence between entrepreneurs’ investment and saving decisions [Quadrini 2000; Gentry and Hubbard 2004]. These papers have a common assumption of maximum self-finance that indicates entrepreneurs will only hold risky assets (private business equity) if they borrow money to finance the entrepreneurial venture.⁶ In this paper, we allow entrepreneurs to hold both risky and riskless assets. Banerji and Van Long [2007] also study a partial self-finance case. However, their paper focuses on the occupational choice between an entrepreneur and a pure lender.

Previous studies have also paid extensive attention to the asymmetric information and agency problems in the entrepreneurial setting [Leland and Pyle 1977; Bitler, Moskowitz, and Vissing-Jorgensen 2005] and made significant progress in understanding the effect of financing constraints on firm dynamics [Albuquerque and Hopenhayn 2004].⁷ In this paper, we study the moral hazard problem in the spirit of Holmstrom and Tirole [1997] where financial intermediaries must monitor borrowers.

The paper is organized as follows. The next section describes the data and provides evidence on household portfolio composition and portfolio changes in Canada. In particular, we document the fact that the share of private business equity dropped for entrepreneurs. The section after that provides some potential explanations. The subsequent section presents an incentive model of financial intermediation. The penultimate section discusses the pre-

diction of the model and finally the last section concludes the paper.

CHANGES IN PRIVATE BUSINESS EQUITY SHARE

Data description

Statistics Canada has conducted several large-scale surveys on family assets and debts. The sources used for this study are the public files of two recent surveys, the 1999 Survey of Financial Security (SFS) and the 1984 Survey of Consumer Finances (SCF).⁸ The survey data include detailed information on household characteristics, family income, portfolio composition, and net worth. The overall sample sizes in the 1984 and 1999 surveys are 14029 and 15933, respectively.⁹

The following discussion focuses on the measure of wealth, which we refer to as “net worth.” Net worth (or marketable wealth) is defined as the difference between the value of total assets and the amount of total debts.¹⁰ Because of differences in definitions and procedures between surveys, comparison over time must be done with caution. In this case it is necessary to adjust the 1999 estimate of net worth to make it comparable to the definition and measure of net worth used in 1984. Following the advice of Statistics Canada, we remove the following items from the 1999 estimates because they were not included previously: (1) contents of the home; (2) collectibles and valuables; (3) annuities and Registered Retirement Income Funds (RRIFs).¹¹ After making the data comparable, we classify total assets into nine broad categories (see the detailed definition in Appendix): (1) Registered Retirement Saving Plans (RRSPs); (2) deposits; (3) bonds; (4) stocks and mutual funds; (5) other financial assets; (6) principal residence (home); (7) other real estate owned by the household; (8) vehicles; and (9) equity in business. Total debt is the sum of:

(1) mortgage debt; (2) consumer debt; and (3) other debt.

Portfolio composition for all households

Our summary of household portfolio composition for the whole sample begins with Table 1. Throughout the period, the most important type of asset is the principal residence, which accounted for 46% of total assets in 1999. The relative importance of financial assets increased over time, rising from 22.02% in 1984 to 29.02% in 1999, while equity in business declined from 21.38% to 10.93%. Other non-financial assets, such as other real estate and vehicles, did not change much over the period.

[Table 1 here]

Among financial assets, perhaps the most dramatic change over time in the table is the sharp increase in the share of RRSPs in total assets. Another notable change is that the share of stocks and mutual funds rose from 2.22% in 1984 to 6.70% in 1999. The period also saw a declining share of several types of assets. Deposits dropped from about 10% to 6.41%. Bonds accounted for 0.86% of total assets in 1999, while they represented 3.11% in 1984. The share of other financial assets had also edged down.¹²

Private business equity share

After looking at the general picture of household portfolio composition, we move to the specific aspect of the share of private business equity. Private business equity share of total assets declined significantly for all households, falling from about 21% in 1984 to 11% in 1999. What is the case for households that participate in private business? We follow Gentry and Hubbard [2004] and focus on those households owning private business equity

of at least \$5000 (in 1999 Canadian dollars).¹³ We define as entrepreneurs those households with positive net worth and private business equity of at least \$5000.

Table 2 reports the statistics for entrepreneurs. We find that between 1984 and 1999: (1) the median net worth of entrepreneurs increased slightly; (2) the median value of private business equity dropped one-third in 1999 compared to that in 1984; and (3) both the mean and median value of business equity share of total assets (net worth) fell sharply. For example, the average business equity share of total assets was 43.47% in 1984. This percentage fell to 32.08% in 1999. The average business equity share of net worth dropped from 56.20% to 44.52% over the period.

[Table 2 here]

Table 3 considers entrepreneurs with the same levels of net wealth in the two surveys. With the exception of very rich entrepreneurs whose net wealth is no less than five million Canadian dollars, the mean (median) private business equity share of total assets (net worth) was lower in 1999 compared to that in 1984. For example, the entrepreneurs whose net worth belongs to the range from 0.5 million to one million Canadian dollars allocated on average 52.29% of their assets to private business in 1984, while the share was only 33.50% in 1999. The average business equity share of net worth for these entrepreneurs also dropped from 54.62% in 1984 to 35.96% in 1999.

[Table 3 here]

POSSIBLE EXPLANATIONS

There are a number of possible explanations for the decline in private business equity share of Canadian household portfolios. Before we propose our explanation we discuss some

factors that may influence private business equity share.

Relative size of the private business sector

We begin with the relative size of the private business sector. A decline in the private business sector between 1984 and 1999 would provide a potential explanation for the decline in private business equity share over the same period. Because private business includes both non-corporate business and non-publicly traded corporations, we look at them separately.

First, from the National Income and Expenditure Accounts we find that the GDP share of farm and non-farm unincorporated business was roughly stable (about 6%) in Canada between the early 1980s and the late 1990s. Second, the GDP share of corporation profits before taxes was similar in the early 1980s and the late 1990s (the share was lower in 1991-1992 due to the recession).¹⁴ Corporations include firms whose ownership shares are both publicly and non-publicly traded. Although we cannot distinguish non-publicly traded corporations from publicly traded corporations, it is unlikely that non-publicly traded corporations shrank as much as suggested by Table 1.

Returns to private business

A related issue is the returns to private business. If the relative returns to private equity dropped over time, entrepreneurs might choose to invest less in their private businesses, which would cause a decline in the private business sector and private equity share of net worth. However, we are not aware of any study that shows such evidence in Canada. Moskowitz and Vissing-Jorgensen [2002] provide estimates of private equity returns and public equity returns using U.S. data. The authors do not find that the returns to private equity dropped over time. Whether the same conclusion holds for Canada is an interesting

topic for future research.

Changes in the composition of entrepreneurs

Another possible explanation is changes in the composition of entrepreneurs. However, we find that the average age and education level for entrepreneurs are similar in both surveys. How about the distribution of entrepreneurs' net worth? Table 4 divides entrepreneurs into five groups according to their net worth (in 1999 Canadian dollars). It is clear that the percentage of entrepreneurs with different levels of net worth did not change much over time. More than half of the entrepreneurs have a net worth between \$100,000 and \$500,000. Moreover, this explanation cannot explain the data shown in Table 3 which indicate that private business equity share of total assets (net worth) was lower in 1999 for those entrepreneurs who had similar net wealth in the two surveys.

[Table 4 here]

Stock price

The price of publicly traded stocks may also be a factor that affects private business equity share. An increase in publicly traded stock prices drives up the total value of financial assets and may lower the business equity share of total assets (net worth). However, this effect is small. Between 1984 and 1999, the Consumer Price Index (CPI) increased about 50% in Canada, and the Toronto Stock Exchange (TSE) 300 composite index rose about 200%. Thus, the real price of stocks doubled. A reasonable estimate of the stock share of total household assets was 5% in 1984.¹⁵ Everything else being equal, a 100% increase in the real price of stocks will make the business equity share of total assets only drop about one percentage point. This is small compared to the decline we observe in Table 1.

Financial developments

We suggest an alternative explanation based on recent financial developments.¹⁶ Although their own equity in private businesses dropped by 1999, due to financial developments, entrepreneurs could borrow more from financial intermediaries to maintain similar sized private businesses.

The financial landscape in which private business operates has changed markedly in Canada since the early 1980s [Freedman and Goodlet 1998, 2002; Calmès 2004]. This is likely due to two factors. First, policy changes such as bank deregulation have allowed banks to offer a wider range of services. Second, technological progress has taken place, including (1) improvements in information processing and telecommunication allowed by computer networking and the Internet; and (2) improvements in financial technology, such as Small Business Credit Scoring (SBCS) and the new products of financial engineering. Freedman and Goodlet [1998, 2002] note that banks have been undergoing significant technological changes in Canada which affect the way services are provided and the instruments used to provide services. Berger [2003] and Berger and De Young [2006] examine technological progress and its effects on the banking system in the United States. Unlike large firms, small and private business borrowing/lending has historically been very costly because of the paucity of information about the firms and the high costs of personnel required to obtain it. These studies suggest that technological progress may allow financial intermediaries (banks) to better screen and monitor small business loan customers.

As in Di Giorgio [1999] and Huang [2003], the level of costs associated with monitoring activity can be interpreted as an indicator of the efficiency of the financial system. Financial developments may imply that monitoring costs are decreasing over time. This is consistent

with the following evidence:

(1) The portfolio share of small business loans has increased for big banks.¹⁷ Frame, Srinivasin, and Woosley [2001] examine the effect of credit scoring on small business lending. They find that credit scoring is associated with an 8.4% increase in the portfolio share of small business loans and \$4 billion per institution. The authors conclude that credit scoring lowers information costs between borrowers and lenders. Berger, Frame, and Miller [2005] also show that a dominant effect of SBCS is a reduction in lending costs and/or improved accuracy of credit assessments.

(2) Recent research has found that the physical distance between financial intermediaries and their small business loan customers is increasing over time. Petersen and Rajan [2002] find that on average the distance increased from 92 miles in the 1980s to 161 miles in the early 1990s (the median number increased from seven miles to 15 miles). Financial intermediaries and their customers are communicating in more impersonal ways. Petersen and Rajan demonstrate that this does not arise from small firms locating differently, consolidation in the banking industry, changing distribution of loan type, or biases in the sample. Instead, they attribute this phenomenon to improvements in lender labor productivity due to financial developments (particularly, technological progress). The increased availability of reliable hard information (for example, when and to whom the borrower had, or had not, made payments in the past and to whom the borrower has applied for credit) has allowed loan officers to cut down on their own monitoring. Other studies also find that the lending distance increased [Wolken and Rohde 2002].

(3) İmrohoroglu and Kumar [2004] provide evidence that intermediation costs are higher in poorer countries and lower in richer countries, which may suggest that intermediation

costs will decrease as an economy grows. Indeed, the ratio of operating expenses to total loans and mortgages decreased in the last twenty years for credit intermediation in Canada.¹⁸

In the next section we present our model and show how the decline in monitoring costs can cause the drop of private business equity share in entrepreneurs' portfolios.

MODEL

The model has two types of agents: entrepreneurs and financial intermediaries. Entrepreneurs are risk averse. For financial intermediaries, we assume that they are risk neutral and perfectly competitive. There are two periods. In the first period financial contracts between entrepreneurs and financial intermediaries are signed, and investment decisions are made. In the second period investment returns are realized, and claims are settled. We distinguish two types of investments. One is risky (i.e., entrepreneurial projects), and the other is riskless investment with a constant rate of return (i.e., financial assets). Financial contracts only apply to risky projects. We assume that assets related to the risky project are of the limited liability type. We are interested in how entrepreneurs allocate their wealth between risky projects and riskless investments.

Entrepreneurs

We consider a representative entrepreneur. His/her initial wealth is denoted by w . The entrepreneur can carry out only one risky project, which requires fixed i units of investment. He/she will invest $k \leq \min\{i, w\}$ of his/her own wealth in the project and borrow $i - k$ from a financial intermediary to finance the project. The entrepreneur deposits the remaining

$w - k$ at a financial institution that gives the safe gross rate of return R . The project can turn out to be a success or a failure, which is public information. In the case of a success, the pay-off of the project is $a > i$; in the case of a failure, the pay-off is zero.

There is a moral hazard problem in the sense that the entrepreneur can influence the riskiness of the project undertaken. He/she may choose a project with a low success probability because of the existence of private benefits that stem from such a project. For example, the entrepreneur may mis-allocate funds for his/her own personal use or undertake investments in an unprofitable project that increases his/her own power or stature. In order to minimize the moral hazard problem, the financial intermediary must monitor the borrower's activities so that the entrepreneur does not engage in behaviors that are undesirable from the financial intermediary's point of view. To have a sufficiently rich way of modelling monitoring, we follow the formulation of Holmstrom and Tirole [1997] and Chen [2001] and assume that the entrepreneur can privately choose among three versions of the project as described in Table 5, each carrying a different mix of public returns and private benefits. The *good* project involves a high probability of success (denoted by p) and zero private benefits. The *average* project, while associated with a lower probability of success q , is associated with private benefits proportional to the investment size and equal to bi . The *bad* project, while also associated with the low probability of success q , brings to the entrepreneur even higher private benefits Bi , with $B > b$. Note that the *average* and the *bad* projects have the same probability of success. The entrepreneur would prefer the *bad* project (which has higher private benefits) over the *average* project regardless of the financial contract. We further assume that only the *good* project is economically viable.¹⁹

[Table 5 here]

The entrepreneur has the following utility function

$$U = V(c) + A \tag{1}$$

where c is the entrepreneur's consumption at the end of the second period, and A is the total private benefits that stem from the entrepreneurial project. The function $V(c)$ is increasing and strictly concave, indicating risk aversion. We assume that $V'(0) = \infty$.

Financial intermediary

A financial intermediation sector exists in the economy. The role of financial intermediaries is to monitor projects and make loans to entrepreneurs asking for funds.²⁰ If there are no financial intermediaries, the risk averse entrepreneur will bear all the risk because direct borrowing and lending is too costly due to the moral hazard problem.²¹ Note that financial intermediaries will bear a cost R for each dollar they lend, where R is the riskless gross rate of return.

Hereafter we use the term “bank” to denote a financial intermediary. A bank has access to a monitoring technology that can limit the extent to which the entrepreneur is able to engage in a risky project. We interpret the monitoring activities of a bank as inspecting firms' cash flows, balance sheet position, their management, and so on or verifying that borrowers conform with the covenants of a loan.²² Specifically, monitoring entrepreneurs can detect whether they have taken the *bad* project, but cannot distinguish between the *good* and the *average* projects. This implies that if the bank monitors, the entrepreneur can only choose the *average* or the *good* project. Monitoring costs, μi , are assumed to be proportional to the size of the project. The details of the financial contract are discussed below.

Financial contract

We take the riskless gross interest rate R as given and concentrate on the financial contract that leads the entrepreneur to undertake only the *good* project. We now describe the contract: an entrepreneur with wealth w contributes an amount $k \leq \min\{i, w\}$ as “equity” in the project, deposits $w - k$ to earn the safe rate of return, and borrows $i - k$ from the bank; the entrepreneur will be asked to pay an amount M to the bank if the outcome is a “success” and N if the outcome is a “failure”, where M and N are nonnegative numbers.

It follows that if the entrepreneur chooses the *good* project, his/her expected utility is

$$EU = pV(c_s) + (1 - p)V(c_f) \quad (2)$$

where

$$c = \begin{cases} c_s = (w - k)R + a - M & \text{if success;} \\ c_f = (w - k)R - N & \text{if failure;} \end{cases} \quad (3)$$

and $c_s > c_f$. If the entrepreneur chooses the *average* project, his/her expected utility is

$$EU = qV(c_s) + (1 - q)V(c_f) + bi \quad (4)$$

The expected revenue of the bank that lends the amount $i - k$ to the entrepreneur who chooses the *good* project is $pM + (1 - p)N$. The costs of the bank include two parts: opportunity costs and monitoring costs. The total costs can be expressed as $(i - k)R + \mu i$. We adopt a simplified assumption that there is a competitive financial market. Thus, the bank will earn zero expected profit in equilibrium (if the *good* project is chosen).

Perfect competition in the financial intermediation sector implies that, for given R , the financial contract will choose k , M , and N to maximize the entrepreneur’s expected utility, subject to a number of constraints. At the same time, it provides enough incentive for the

entrepreneur to choose the *good* project. More precisely, an optimal contract is given by the solution to the following optimization program:

$$\max pV(c_s) + (1 - p)V(c_f) \quad (5)$$

subject to:

$$pM + (1 - p)N \geq (i - k)R + \mu i \quad (6)$$

$$pV(c_s) + (1 - p)V(c_f) \geq qV(c_s) + (1 - q)V(c_f) + bi \quad (7)$$

where c_s and c_f are specified in equation (3). Equation (6) is the participation constraint for the bank. It states that the expected return of the bank must cover its costs. Given that the bank monitors, the entrepreneur cannot choose the *bad* project. The incentive compatibility of the entrepreneur, equation (7), induces the entrepreneur to choose the *good* project instead of the *average* one.

Characterization of optimal contract

For given R and w , we have the following properties of the optimal contract:

Proposition 1. *Given a competitive financial market and the concavity of V , $N = 0$ in the optimal contract.*

Proof: Given that there is a competitive financial market and banks earn zero expected profit, equation (6) holds with equality in the optimal contract. Thus,

$$M = \frac{(i - k)R + \mu i}{p} - \frac{1 - p}{p}N \quad (8)$$

Let $L = pV(c_s) + (1 - p)V(c_f)$. From equation (3) and (8), we can show that

$$\frac{dL}{dN} = (1 - p)(V_{c_s} - V_{c_f}) \quad (9)$$

Given $c_s > c_f$, $\frac{dL}{dN} < 0$. Thus, $N = 0$ (since N is nonnegative). \square

Proposition 2. *In the optimal contract, the pair $(k(w), M(w))$ satisfy the following equations*

$$M = \frac{R}{p}(i - k) + \frac{\mu i}{p} \quad \text{for } 0 < k < i \quad (10)$$

and

$$V[(w - k)R + a - M] - V[(w - k)R] = \frac{bi}{p - q} \quad (11)$$

Proof: Since $N = 0$ and equation (6) holds with equality in the optimal contract, the optimization program can be rewritten as

$$\max_{k, M} pV[(w - k)R + a - M] + (1 - p)V[(w - k)R] \quad (12)$$

subject to:

$$pM = (i - k)R + \mu i \quad (13)$$

$$V[(w - k)R + a - M] - V[(w - k)R] \geq \frac{bi}{p - q} \quad (14)$$

In the (k, M) space, the feasible set is the intersection of the line

$$M = \frac{R}{p}(i - k) + \frac{\mu i}{p} \quad (15)$$

with the area below the curve defined by (14). The slope of line (15) is negative and the absolute value is $\frac{R}{p}$. Let function (14) hold with equality. We can show that its slope is positive by applying the implicit function theorem, and its intercept depends on other parameters. The intercept can be above $\frac{\mu i}{p}$ and below $\frac{(R + \mu)i}{p}$, given proper parameters. We assume this is satisfied. Thus, the two curves will have an intersection $(k(w), M(w))$ with $i > k(w) > 0$ and $M(w) > 0$. This is the case we are interested in.

Next, we show that the maximum of (12) occurs at the intersection point where both constraints hold with equality. It is easy to verify that the objective function of (12) is strictly concave and decreasing in (k, M) . Thus, the objective function has a negative slope in the (k, M) space, which is given by

$$\frac{dM}{dk} = -\frac{R[pV_{c_s} + (1-p)V_{c_f}]}{pV_{c_s}} \quad (16)$$

The absolute value of the slope is greater than $\frac{R}{p}$ because $V_{c_f} > V_{c_s}$. The slope of the objective function is steeper than the slope of line (15), the zero profit constraint. This implies that the maximum occurs at the intersection point. \square

Proposition 3. *As monitoring costs decrease, k will decrease.*

This proposition indicates that if μ decreases, the entrepreneur will commit less of his/her own wealth to the risky project and borrow more from the bank.

Proof: Substituting (10) into (11), we have

$$V \left[wR + a - \frac{R + \mu}{p}i + \left(\frac{R}{p} - R \right)k \right] - V[(w - k)R] = \frac{bi}{p - q} \quad (17)$$

From the above equation, we can show that

$$\frac{dk}{d\mu} > 0 \quad (18)$$

Given a fixed project size, if μ decreases, k will decrease, and the amount borrowed from the bank will increase. \square

Proposition 4. *As monitoring costs decrease, the bank will charge the entrepreneur a lower interest rate.*

Proof: From (10), the gross interest rate charged by the bank can be expressed as

$$\frac{M}{i - k} = \frac{R}{p} + \frac{\mu i}{p(i - k)} \quad (19)$$

Clearly there is a positive relationship between monitoring costs and interest rate charged by the bank, if the project is a success. \square

Proposition 5. *The entrepreneur with a higher w will borrow less and invest more of his/her own wealth in the risky project.*

Proof: From (17), we can show that

$$\frac{dk}{dw} > 0 \tag{20}$$

\square

DISCUSSION

The model in the last section predicts that as monitoring costs decrease due to financial developments, entrepreneurs will allocate less of their own wealth as equity and borrow more from the bank to finance their entrepreneurial projects. This implies that the debt ratio of those projects will increase. Next we look at the data for the debt ratio of non-publicly traded corporate business.

Studies have shown that corporate leverage increased considerably in the 1980s and 1990s [Bernanke 1993; Zybblock 1997; Teplin 2001]. The problem is corporate business used in those studies usually includes both publicly traded corporations and non-publicly traded corporations. We cannot obtain an estimate for non-publicly traded corporate business in these studies. Canada conducted a survey on Financing of Small and Medium-sized Enterprises in 2001. However, data on non-publicly traded corporations in the 1980s and 1990s are unavailable for Canada. One related data set available is the Survey of Small Business Finances. These surveys were conducted in 1987, 1993, and 1998 in the United States. The target population in these surveys is all for-profit, non-farm, non-financial

business enterprises that have fewer than 500 employees. The survey provides information about a nationally representative sample of small business. Most likely the corporations in the sample are non-publicly traded.²³ We find that the average debt ratio (the ratio of total credit to net worth) for those corporations with debt increased from 1.05 in 1987 to 1.32 in 1998. These data provide some supporting evidence for our model.

CONCLUSION

The analysis of survey data reveals substantial differences in asset holdings over time in Canada. Particularly, the share of private business equity in total assets and net worth dropped significantly during 1984-1999. For those entrepreneurs with similar net wealth in both surveys, private business equity share also fell in 1999 compared to that in 1984.

By explicitly modelling entrepreneurs' portfolio choice, we suggest an explanation based on recent financial developments. The reduction in monitoring costs due to financial developments can qualitatively account for the changes.²⁴ The key prediction of the model is that the private business equity share of net worth decreases and the debt ratio of private businesses increases.²⁵ This explanation should be regarded as a complement to other potential explanations discussed in the paper. A natural next step is to conduct an international comparison to determine whether, for example, the decline of the business equity share in entrepreneurs' portfolios is also found in the United States.

Acknowledgements

I would like to thank Audra Bowlus, John Burbidge, James Davies, Martin Gervais, Paul Klein, Igor Livshits, Jim MacGee, Manish Pandey, Peter Rupert, Stephen Sapp, Seung

Han Yoo, as well as conference participants at the 38th annual meeting of the Canadian Economics Association for their comments and suggestions. I am particularly thankful to an anonymous referee and the Editor, Gilbert Skillman, for their detailed and insightful comments that helped to improve the paper.

Appendix

We classify total assets into nine broad categories. The following is the definition of each category.

RRSPs: the total accumulated value (principal plus accrued interest) of amounts held by family members in Registered Retirement Saving Plans.

Deposits: the total amount, including interest, of all checking and savings accounts with a non-zero balance and of other deposits such as term deposits and Guaranteed Investment Certificates. These amounts would generally be held in financial institutions such as chartered banks, trust companies, and co-ops.

Bonds: the total value, including earnings, of federal and provincial savings bonds and other bonds issued by governments and corporations.

Stocks and mutual funds: the total value, including investment earnings, of all holdings in publicly-traded common and preferred shares, mutual and investment funds. Excludes the amount held within registered plans.

Other financial assets: the total value of the following types of assets: mortgage-backed securities, other loans to relatives or businesses, treasury bills, and other miscellaneous financial assets. It also includes financial assets held in registered plans other than RRSPs and RRIFs.

Principal residence (home): the market value, estimated by the respondent, of the respondent's residence. If the respondent has two residences, this would be the one where the respondent most often resides. If the respondent shares ownership of the home with someone outside the family, only the family's share is included.

Other real estate: the estimated market value of real estate other than the respondent's home. Included would be second homes, vacation homes, rental property or vacant lots.

Vehicles: the estimated value of cars, trucks, vans, and other sport utility vehicles and recreational vehicles.

Equity in business: the estimated amount the respondent would receive if the business were sold, after deducting any outstanding debts to be paid. The business, which we label private or non-publicly traded business, includes farms or non-farm businesses or professional practices conducted either as sole proprietorships or partnerships.

Notes

1. These studies include Wolff [1994, 1998], Poterba and Samwick [2003], Vissing-Jorgensen [2002], and papers in Guiso, Haliassos, and Jappelli [2002].
2. Statistics Canada has conducted several large-scale surveys on family assets and debts. See Davies [1993] and Statistics Canada [2001].
3. Private business includes farms or non-farm businesses or professional practices conducted either as sole proprietorships or partnerships. It can be corporate or non-corporate.
4. The share reported is the aggregate number, which is the total business equity held by those households divided by their total assets (net worth). We report cross household mean in section 2, which also shows a significant decline.

5. Two definitions of entrepreneurial families can be adopted. According to the first definition, entrepreneurs are families that own a business or have a financial interest in some business enterprise. The second definition says that entrepreneurs are families in which the head of the household is self-employed in his or her main job. We adopt the first definition and focus on those households with private business equity of no less than \$5000.
6. See Evans and Jovanovic [1989], Quadrini [2000], and Gentry and Hubbard [2004].
7. See Hubbard [1998] and Stein [2003] for excellent surveys.
8. The last survey conducted before 1984 is the 1977 Survey of Consumer Finances. We do not include the 1977 survey because the overall household portfolios are similar in the 1977 and 1984 surveys [Davies 1993]. After 1999, Statistics Canada conducted one more survey in 2005. According to Statistics Canada (2006, Table 4), household portfolio composition does not change much in 1999-2005. Thus, this paper only focuses on 1980s and 1990s.
9. In the 1999 survey, we deleted 505 records which are missing important data such as total income, total assets, total debts, and net worth.
10. The human capital component is excluded in all the surveys and, of course, not included in total assets. Also excluded from the concept of net worth is the value of work-related pension plans and/or entitlements to future social security provided by government in the form of Canada or Quebec Pension Plan or Old Age Security payments. An estimate of the value of employer pension plan benefits is included in the 1999 survey for the first time.
11. We removed the variables “WASTONOF” and “WARRIF” for the 1999 survey. In the public file, annuities are included in the variable “WASTOINP” (i.e., other financial assets) which also includes other items. As it is impossible to isolate annuities from other items, they are included in net worth in the 1999 survey. Since the total value of “WASTOINP”

is very small, the effect of including annuities should be negligible.

12. Several factors underlie these trends. The first important consideration is the popularity of RRSPs. Active government promotion has induced more households to participate in this tax-favorable account. Second, mutual funds provide an easier and less costly investment instrument for investors to acquire a diversified portfolio of stocks. Stock and mutual funds ownership broadened in the last two decades.

13. We set this cutoff to deal with incidental holdings of private business equity.

14. For these GDP shares, see National Income and Expenditure Accounts, CANSIM II, Table 3800016.

15. Stocks and mutual funds accounted for 2.22% of total assets in 1984, and RRSPs represented 3.84% of total assets. Because both bonds and stocks can be held in RRSPs, we assume a 50-50 split. Thus, the total stock share of total assets is likely below 5%.

16. Financial development is defined as a process that marks improvement in quantity, quality, and efficiency of financial intermediary services.

17. Small businesses are those firms having fewer than 500 employees.

18. Balance Sheet and Income Statement, CANSIM II, Table 1870001.

19. To make the *good* project economically viable, we assume $pa - Ri - \mu i > 0 > qa + Bi - Ri$, where μi is the monitoring cost of the financial intermediary (see next sub-section). The equilibrium contract will have the following property: entrepreneurs are sufficiently rewarded that they find it is in their interest to choose the *good* project.

20. Financial intermediaries monitor borrowers on behalf of other investors, see Diamond [1984] and Williamson [1986]. Financial intermediaries emerge to avoid the duplication of monitoring activities and perform a “delegated monitoring” role.

21. Note that our assumption here is restrictive. Calmès and Liu [2009] find that the relative importance of direct financing has increased for Canadian firms.
22. Mester, Nakamura, and Renault [2007] describe in detail how banks use transaction accounts to monitor firms.
23. For example, 85 percent of corporations in the 1998 survey have fewer than 20 employees. Only two percent have at least 100 (and fewer than 500) employees. For 88 percent of all corporations, the owner (partner or stockholder) is responsible for the day-to-day management of the firm.
24. We do not consider the situation that an increase in firms' idiosyncratic risk could put a pressure on banks' monitoring costs. We also do not model entry into entrepreneurship in the analysis. We expect that wage, initial wealth, entrepreneurial ability, and other factors will affect occupational choice.
25. We note that the trend in the Canadian financial structure is towards a more market-based system and there has been a shift towards direct financing for Canadian firms [Calmès 2004]. These changes may have important impact on firms' capital structure.

References

- Albuquerque, Rui, and Hugo A. Hopenhayn. 2004. Optimal Lending Contracts and Firm Dynamics. *Review of Economic Studies*, 71(2): 285-315.
- Banerji, Sanjay, and Ngo Van Long. 2007. Moral Hazards, Bankruptcy Costs, and International Financial Capital Mobility. *Review of Development Economics*, 11(2): 369-384.
- Berger, Allen N. 2003. The Economic Effects of Technological Process: Evidence from the Banking Industry. *Journal of Money, Credit, and Banking*, 35(2): 141-176.

- Berger, Allen N., and Robert De Young. 2006. Technological Process and the Geographic Expansion of the Banking Industry. *Journal of Money, Credit, and Banking*, 38(6): 1483-1513.
- Berger, Allen N., W. Scott Frame, and Nathan H. Miller. 2005. Credit Scoring and the Availability, Price, and Risk of Small Business Credit. *Journal of Money, Credit, and Banking*, 37(2): 191-222.
- Bernanke, Ben S. 1993. Credit in the Macroeconomy. *Federal Reserve Bank of New York Quarterly Review*, 18(1): 50-70.
- Bitler, Marianne P., Tobias J. Moskowitz, and Annette Vissing-Jorgensen. 2005. Testing Agency Theory with Entrepreneur Effort and Wealth. *Journal of Finance*, 60(2): 539-576.
- Calmès, Christian. 2004. Regulatory Changes and Financial Structure: The Case of Canada. *Swiss Journal of Economics and Statistics*, 140(1): 1-35.
- Calmès, Christian, and Ying Liu. 2009. Financial Structure Change and Banking Income: A Canada-U.S. Comparison. *Journal of International Financial Markets, Institutions and Money*, 19(1): 128-139.
- Chen, Nan-Kuang. 2001. Bank Net Worth, Asset Prices, and Economic Activity. *Journal of Monetary Economics*, 48(2): 415-436.
- Davies, James B. 1993. The Distribution of Wealth in Canada. *Research on Economic Inequality*, 4: 159-180.
- Diamond, Douglas W. 1984. Financial Intermediation and Delegated Monitoring. *Review of Economic Studies*, 51(3): 393-414.
- Di Giorgio, Giorgio. 1999. Financial Development and Reserve Requirements. *Journal of Banking and Finance*, 23(7): 1031-1041.

- Evans, David S., and Boyan Jovanovic. 1989. An Estimated Model of Entrepreneurial Choice under Liquidity Constraints. *Journal of Political Economy*, 97(4): 808-827.
- Evans, David S., and Linda S. Leighton. 1989. Some Empirical Aspects of Entrepreneurship. *American Economic Review*, 79(3): 519-535.
- Frame, W. Scott, Aruna Srinivasan, and Lynn Woosley. 2001. The Effect of Credit Scoring on Small-Business Lending. *Journal of Money, Credit, and Banking*, 33(3): 813-825.
- Freedman, Charles, and Clyde Goodlet. 1998. The Financial Services Sector: Past Changes and Future Prospects. Bank of Canada Technical Report No. 82, Bank of Canada.
- . 2002. The Financial Services Sector: An Update on Recent Developments. Bank of Canada Technical Report No. 91, Bank of Canada.
- Gentry, William M., and Glenn Hubbard. 2004 Entrepreneurship and Household Saving. *Advances in Economic Analysis & Policy*, 4(1): Article 8.
- Guiso, Luigi, Michael Haliassos, and Tullio Jappelli, ed. 2002. *Household Portfolios*. Cambridge, MA.: MIT Press.
- Holmstrom, Bengt, and Jean Tirole. 1997. Financial Intermediation, Loanable Funds, and the Real Sector. *Quarterly Journal of Economics*, 112(3): 663-691.
- Holtz-Eakin, Douglas, David Joulfaian, and Harvey S. Rosen. 1994. Entrepreneurial Decisions and Liquidity Constraints. *RAND Journal of Economics*, 25(2): 334-347.
- Huang, Fu-Sheng. 2003. Inflation, Financial Development, and Economic Growth. *International Review of Economics and Finance*, 12(1): 45-67.
- Hubbard, R. Glenn. 1998. Capital-Market Imperfections and Investment. *Journal of Economic Literature*, 36(1): 193-225.
- İmrohoroglu, Ayse, and Krishna Kumar. 2004. Intermediation Costs and Capital Flows.

Review of Economic Dynamics, 7(3): 586-612.

Leland, Hayne E., and David H. Pyle. 1977. Informational Asymmetries, Financial Structure, and Financial Intermediation. *Journal of Finance*, 32(2): 371-387.

Mester, Loretta J., Leonard I. Nakamura, and Micheline Renault. 2007. Transactions Accounts and Loan Monitoring. *Review of Financial Studies*, 20(3): 529-556.

Moskowitz, Tobias J., and Annette Vissing-Jorgensen. 2002. The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle? *American Economic Review*, 92(4): 745-778.

Petersen, Michell A., and Raghuram G. Rajan. 2002. Does Distance Still Matter? The Information Revolution in Small Business Lending. *Journal of Finance*, 57(6): 2533-2570.

Poterba, James M., and Andrew A. Samwick. 2003. Taxation and Household Portfolio Composition: US Evidence from the 1980s and 1990s. *Journal of Public Economics*, 87(1): 5-38.

Quadrini, Vincenzo. 2000. Entrepreneurship, Saving, and Social Mobility. *Review of Economic Dynamics*, 3(1): 1-40.

Statistics Canada. 2001. The Assets and Debts of Canadians: An Overview of the Results of the Survey of Financial Security. Catalogue no. 13-595-XIE, Statistics Canada.

———. 2006. The Wealth of Canadians: An Overview of the Results of the Survey of Financial Security 2005. Catalogue no. 13F0026MIE-No.001, Statistics Canada.

Stein, Jeremy C. 2003. Agency, Information and Corporate Investment, in *Handbook of the Economics of Finance*, edited by George M. Constantinides, Milton Harris, and René M. Stulz. Amsterdam: North-Holland, 109-163.

Teplin, Albert M. 2001. The U.S. Flow of Funds Accounts and Their Uses. *Federal Reserve*

Bulletin, July 2001.

Vissing-Jorgensen, Annette. 2002. Towards An Explanation of Household Portfolio Choice Heterogeneity: Nonfinancial Income and Participation Cost Structures. NBER Working Paper No. 8884, Cambridge: National Bureau of Economic Research.

Williamson, Stephen D. 1986. Costly Monitoring, Financial Intermediation, and Equilibrium Credit Rationing. *Journal of Monetary Economics*, 18(2): 159-179.

Wolff, Edward N. 1994. Trends in Household Wealth in the United States, 1962 – 1983 and 1983 – 1989. *Review of Income and Wealth*, 40(2): 143-174.

———. 1998. Recent Trends in the Size Distribution of Household Wealth. *Journal of Economic Perspectives*, 12(3): 131-150.

Wolken, John, and Douglas Rohde. 2002. Changes in the Location of Small Businesses' Financial Service Suppliers between 1993 and 1998. Federal Reserve Board internal memorandum, Federal Reserve Board.

Zyblock, Myles. 1997. Corporate Financial Leverage: A Canada - U.S. Comparison, 1961-1996. Statistics Canada Analytical Studies Paper No. 111.

Table 1 Household portfolios in Canada, 1984-1999

	1984	1999
	Percentage of total assets	Percentage of total assets
Total assets	100.00	100.00
Total financial assets	22.02	29.02
RRSPs	3.84	13.60
Deposits	10.05	6.41
Bonds	3.11	0.86
Stocks and mutual funds	2.22	6.70
Other financial assets	2.79	1.46
Principal residence (home)	43.05	46.02
Other real estate	7.97	8.80
Vehicles	5.59	5.26
Equity in business	21.38	10.93
Total debts	12.34	19.08
Net worth	87.66	80.92
Average net worth per household (thousands of 1999 \$)	130.80	151.98

Table 2 Entrepreneurs, 1984-1999

	1984	1999
Median of Net Worth (thousands of 1999 \$)	255.25	262.00
Median of Business Equity (thousands of 1999 \$)	91.00	60.00
Business Equity/Total Assets (mean)	43.47%	32.08%
Business Equity/Total Assets (median)	38.96%	25.69%
Business Equity/Net Worth (mean)	56.20%	44.52%
Business Equity/Net Worth (median)	45.44%	33.84%

Table 3 Entrepreneurs with similar net worth in the 1984 and 1999 surveys

Net worth (in thousands of 1999 \$)	Business equity/Total assets (mean)		Business equity/Net worth (mean)		Business equity/Total assets (median)		Business equity/Net worth (median)	
	1984	1999	1984	1999	1984	1999	1984	1999
(0, 100)	0.4055	0.3230	0.9163	0.7545	0.3437	0.2234	0.4799	0.4334
[100, 500)	0.3853	0.2813	0.4326	0.3379	0.3438	0.2179	0.3876	0.2662
[500, 1000)	0.5229	0.3350	0.5462	0.3596	0.5348	0.3114	0.5554	0.3427
[1000, 5000)	0.6252	0.4852	0.6392	0.5020	0.7063	0.4539	0.7329	0.4808
≥ 5000	0.8096	0.8262	0.8116	0.8272	0.8280	0.8704	0.8280	0.8704
Total	0.4347	0.3208	0.5620	0.4452	0.3896	0.2569	0.4544	0.3384

Table 4 Composition of entrepreneurs by net worth, 1984-1999

Net worth of entrepreneurs (in thousands of 1999 \$)	Share of total number of entrepreneurs	
	1984	1999
(0, 100)	0.1880	0.2065
[100, 500)	0.5551	0.5187
[500, 1000)	0.1647	0.1702
[1000, 5000)	0.0879	0.1035
≥ 5000	0.0043	0.0012
Total	1.0000	1.0000

Table 5 Project versions

Project	Good	Average (low private benefit)	Bad (high private benefit)
Probability of Success	p	q	q
Private Benefit	0	b	B