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Interim Report 2:

**Hypothesized Gaps in SME
Financing: A Preliminary
Analytical Framework**

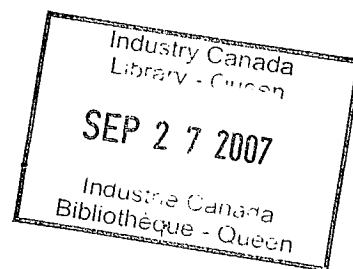
(For Discussion Purposes)

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Hypothesized Gaps in SME Financing: A Preliminary Analytical Framework

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Introduction

Canadian business owners, lobby groups and the popular media have suggested that deserving small businesses have been denied access to capital. Drawing on information-theoretic models, academic researchers have also suggested that imperfections in the capital markets can lead to businesses being refused capital. If the capital markets are subject to imperfections, it is argued that government intervention is required.

Others contend that the "capital gap", an inability of some businesses to acquire capital, effectively reflects a lack of human capital within the enterprise. For example, in his empirical investigation of the determinants of UK business startups and survival, Cressy (1995) finds that, "... the provision of finance itself is determined by the presence or absence of human capital, team size and other identified characteristics of the business." Therefore, to show that a capital gap exists, one must be able to demonstrate that firms that are unable to obtain financing merit financing.

The Financing Data Initiative (FDI) is currently being undertaken by Industry Canada, the Department of Finance, and Statistics Canada. The principal tasks of the research team were to (a) undertake a review of the empirical and theoretical literature on market failures, gaps, and imperfections and (b) to then advance an analytical framework, or research design, that will enable Industry Canada and its partners in the Financing Data Initiative to investigate empirically the potential existence of gaps in the Canadian capital marketplace. The outcome of these two tasks is a digest of research findings about particular factors affecting financing decisions and terms of financing. The report advances a series of research hypotheses that relate to various aspects of capital

market gaps and it presents recommendations regarding statistical modeling aspects of the gap analysis model. The final report associated with this project will outline further steps that might be undertaken in future stages of the Financing Data Initiative to further address the hypotheses and empirical issues described here.

What is a “Gap” in a Capital Market?

From a general methodological standpoint, the problem posed by the gap analysis is to determine the extent to which a particular variable, one across which a gap is hypothesized, affects financing outcomes or terms of financing. The empirical challenge is that the impact of the gap variable cannot be measured directly as there are numerous other variables that can legitimately affect financing-related outcomes, factors such as attributes of the firm or its management. Thus the problem at hand is to develop appropriate methods for arriving at an empirically-sound and plausible causal inference with respect to the impact of the gap variable

Before presenting the study objectives and findings, readers are cautioned that the analysis of issues pertaining to a capital market “gap” is also complicated by a number of conceptual and empirical challenges. These have been categorized as:

- actual versus perceptual market gaps;
- definitional challenges;
- suitability of capital;
- willingness or ability to pay; and,
- with respect to each of these issues, the perceived role of public policy.

Actual versus perceptual market gaps

According to Brierley (2001) it is essential to distinguish between actual gaps or imperfections, and perceptions of gaps. It is an accepted industry practice for suppliers of capital to refuse to sell to some potential buyers. Furthermore, a potential buyer of a loan must not only be willing to pay the going price of the loan (e.g., interest rates), but must also satisfy the bank that the capital loaned will be returned. For example, one can think of suppliers of capital as “the purchasers of risky promises to pay” (Hillier and Ibrahimo, 1993). This argument suggests that some firms will be, and should be, denied financing. The observation that some firms cannot obtain capital is therefore not *prima facie* evidence of a capital market gap. A market gap or imperfection may, however, be implied if firms that ought to receive financing are unable to obtain it.

Definitional Challenges

Within the literature, the word “gap” has no generally accepted meaning. One extreme definition of a gap in economic activity occurs when a market for a particular good or service does not exist. In such instances, the role of government has been the creation of institutions and structures to create certain capital markets where none previously

existed (e.g., publicly financed facilities for farmers' markets and initiatives undertaken by the Bank of Canada to facilitate a commercial paper market in Canada).

A related usage of the word gap refers to a *shortage*: a sense that the supply of the commodity in demand is insufficient and that the demand cannot be satisfied. Economic theory has straightforward meanings for the term shortage (gap) and its opposite, a surplus. A shortage (surplus) exists when the price for the product/service is too low (high). Taking the broad view, there is a "shortage" of everything good - there is just not enough to go around if everyone is to get the quantity each individual would like to have (at zero price).

Economic theory usually expresses the idea of a gap by the term "imperfection", a factor that impedes supply and demand from clearing, resulting in markets that do not function efficiently. For example, imperfections may be conceptualized as a physical (or administrative barriers) such as geography, laws, transactions costs, or regulations that impede supply and demand from clearing. Market imperfections can also be the lack of a central meeting place at which suppliers of capital can encounter those seeking financing. The literature postulates that such barriers can be overcome at a cost or that markets cease to function at all. For example, Chan (1983) shows that, in theory, the venture capital market may disintegrate if it is costly for venture capitalists to seek out deals.

The more usual imperfection discussed in economic theory are those that relate to *information asymmetry*. Informational asymmetry is usually theorized to occur when suppliers of capital have less access to salient information than the owners of the firms that are seeking financing. When this occurs, economic theory contends that either adverse selection or moral hazard problems can ensue and that, under some conditions, the market may disintegrate.

Finding appropriate types of capital

The type of financing needs to be suitable to that firm. For example, even rapidly growing firms may be turned down for a loan if equity financing is more appropriate or if their management is not up to the task of administering the growing enterprise. These events may be perceived as gaps but are often appropriate responses to the firms' situations. For example, Peter Brierley Head of the Domestic Finance Division of the Bank of England (2001) states that,

"debt finance ... is frequently not an available or appropriate source of funding for technology-based small firms at [early] stages of their life cycles ... public sector intervention should be targeted at those areas where market imperfections can be identified".

Willingness or ability to pay

Two related perspectives suggest that: (a) enterprises that need capital are unable and/or not willing to pay the current market price or (b) businesses are precluded from paying the higher price by some imperfection. The first situation is not a capital shortage (gap) in any economic sense but rather a pricing dilemma. The second scenario reflects

a capital shortage, as firms are not allowed to increase the price they pay for capital as much as they desire. These problems, when they exist, are real and significant, but using the terms "shortage" or "gap" can confuse the issue.

The role of public policy

Finally, there is a substantial debate about the role of public policy interventions particularly with respect to financial markets. For example, Lerner (1998, p. 773-774) notes that governments' efforts

"have been predicated on two shared assumptions: (i) that the private sector provides insufficient capital to new firms, and (ii) that the government can identify firms in which investments will ultimately yield high social and/or private returns or else encourage private sector parties who can do so."

It is argued that for public policy to be most effective, it is necessary to develop a widely accepted and empirically-supported framework around the notion of capital market imperfections. Otherwise, unfounded perceptions of specific types of financial market "gaps" may inappropriately drive public policy. Again, according to Brierley:

"Public sector initiatives to support the financing of technology-based small firms ... may be justified if market imperfections mean that the private sector does not provide capital to firms on competitive terms. ... [However] In the absence of market failure, such initiatives may themselves cause distortions by subsidizing, at considerable public cost, non-viable firms which are not attracting enough capital because they do not offer good investment opportunities. The information that is then conveyed to other potential investors may be misleading, either inducing wrong decisions or ... acting as a deterrent to the future provision of finance to all firms, regardless of viability."

Public policy initiatives are therefore best served when they are based on clear evidence of market imperfections, market imperfections that impede economic growth. Moreover, such interventions must specifically address a particular imperfection, or gap, that is identified (Vogel and Adams, 1997).

Scope and Objectives of the Work

Objectives of the Work

This interim report examines existing research to identify imperfections, discrepancies, and potential failures in the financial marketplaces in which SMEs must operate. The goals are to advise Industry Canada and its partners with respect to analyses of data collected under the terms of the FDI. To accomplish the objectives, each of the major sectors of the capital markets in which SMEs operate will be examined separately. For each segment, this study:

- 1) examines the research and professional literature to ascertain the extent to which imperfections in that segment of the market have been identified;
- 2) advances, based on the literature reviews, a series of hypotheses regarding gaps or imperfections in the various segments of the financial markets. The hypotheses are articulated to form a basis for empirical testing using data from the Financing Data Initiative.
- 3) designs a gap analysis framework and methodologies to ascertain the existence and importance of gaps, imperfections, and market failures in the Canadian context;
- 4) reviews the current state of the Financing Data Initiative to determine the extent to which the initiative is likely to be able to identify gaps in the particular segment; and,
- 5) suggests changes to aspects of the Financing Data Initiative that will more effectively document potential market gaps.

This study is organized around the two major capital market segments within which SMEs operate: *debt* and *equity financing*. Within each of these, the literature on gaps and market failures will be investigated for each of the primary subsegments.

On the equity side, these subsectors are:

- the market for informal capital;
- the market for institutional venture capital;
- the market for IPOs.

On the debt side, the study reviews research related to market failures and imperfections (along with the more important public policy initiatives currently in place) with respect to:

- the market for commercial loans;
- the market for non-bank debt (asset-based finance, factoring);
- the market for mezzanine financing (subordinated debt).

Suppliers of capital, both lenders and investors, have decried a "gap" in the form of a shortage of "investable" opportunities and "bankable" SMEs.¹ For each segment, therefore, the work includes a review of the literature that relates to perceived gaps. In addition, the work considers the perspectives of suppliers of capital and investigates potential gaps on the *demand side* of the marketplace.

The data collection is based on searches of the research literature. The work searched research databases such as ABI-Inform, Ingenta-Uncover, and others. Published proceedings of relevant conferences were examined and, through the good offices of the project authority, relevant government documents were identified and examined.

Report Framework

An important starting point for the report was recent work published by the Business Development Bank of Canada (BDC, 2001). This work postulates that there are four potential "gaps" in the market for *debt* capital for SMEs and four potential "gaps" in the market for *venture capital*. Table 1 presents the taxonomy for these two primary segments of the financial markets in which SMEs operate. This collection of widely-held understandings also provided the research team with an initial series of propositions or null hypotheses that could be tested against evidence from the literature.

TABLE 1: POSTULATED CAPITAL MARKET GAPS

Perceived Gaps in the Debt Market	Perceived Gaps in the Venture Capital Market
a size gap is postulated such that business owners who seek small loans perceive that their borrowing needs are too small to be of interest to institutional lenders.	an early stage gap, which reflects the belief that small early-stage companies are not the strategic focus of most private investors.
a risk gap is claimed, according to which lenders do not price loans to reflect risk (rather, they reject loan applications if risk exceeds a particular threshold or if insufficient collateral is available).	a dollar gap, according to which Canada was said to rank tenth among developed countries in terms of venture capital funds raised per capita.
a knowledge gap is asserted, that "financial institutions do not understand knowledge-based businesses	an institutional gap that reflects the lack of involvement in the venture capital sector of pension funds, mutual funds, and other such institutions in Canada.
a flexibility gap is described in that some SME owners claim that financial institutions do not provide flexible terms and conditions on their loans.	a smaller appetite for IPOs in Canada compared with the US.

Source: *Supporting Small Business Innovation: Review of the Business Development Bank of Canada, 2001.*

¹ Such firms, for example, might well include those with high levels of sales growth. However, some firms may lack the skills to manage effectively working capital and the demands on cash – and therefore for financing – that growth often entails. While such firms might qualify as growth businesses, the lack of management may render them too risky for commercial lenders or investors.

Accordingly, this project is structured as follows.

- Step 1:* For each of the major capital markets segment, gaps postulated are restated as hypotheses. This restatement is followed by an overview of the current state of the segment — given available secondary data analysis.
- Step 2:* The literature regarding gaps and imperfections of the particular segment is then reviewed. This review leads to enrichment and expansion of the initial set of hypotheses. Additional gaps, imperfections, and market failures are also restated as testable hypotheses, adding to the testable implications of the literature review.
- Step 3:* Following a discussion of the findings from the literature, this report presents for discussion purposes a gap analysis framework.
- Step 4:* Following this report, a workshop will be scheduled involving the research team and project stakeholders. The purposes of the workshop are to jointly develop an empirical approach to the gap analysis framework described here and to identify and discuss problems or improvements.
- Step 5:* A final report will take into consideration the outcome of the workshop and any other feedback that the team receives. The final report will also address further research steps that might be needed to fully explore the issues identified here.

Gap Analyses: Debt Markets for Canadian SMEs

Overview of the Debt Market for Canadian SMEs

The two primary means of debt financing are lines of credit and business loans. The CFIB (2001) reports that almost 71.2 per cent of small businesses hold a line of credit with their financial institution, and 41 per cent have a business loan. Other means of debt financing include commercial and personal mortgages, personal loans, supplier credit, overdraft protection, and credit cards.

The tables that follow summarize the breakdown of the debt market for SMEs according to the various types of institutions and categories of borrowing. The purpose of these tables is to provide a quantitative sense of the structure of the debt market across the three primary types of SME financing:

- commercial loans,
- non-residential mortgages, and
- lease contracts.

Table 2 illustrates shifts in lending patterns between 1994 and 1998 for the various groupings of institutional participants. Table 3 outlines the breakdown of 1998 lending by category of loan and institution type.

**TABLE 2: PRINCIPAL SOURCES OF DEBT FOR
CANADIAN SMEs: 1998 VS. 1994**

Source	1994 (\$millions)	1998 (\$millions)	Change (\$millions)	Change (%)
Domestic Banks	44,042	58,232	14,190	32%
Credit Unions & Caisses Populaires	14,093	16,153	2,060	15%
Specialized Finance Companies	7,928	17,410	9,482	120%
Crown Corporations	6,166	9,234	3,068	50%
Foreign Banks	4,404	3,692	-712	-16%
Trust & Mortgage Loan	4,404	2,442	-1,962	-45%
Life Insurers	3,523	2,639	-884	-25%
Credit Card Companies	3,523	5,778	2,255	64%
Total	88,084	115,580	27,496	31%

Source: Conference Board of Canada, *SME Debt Financing*, as summarized in *Secor* (July 2000)

These tables convey that commercial loans from domestic banks, crown corporations, and credit cooperatives (Credit Unions & Caisses Populaires) are by far the dominant form of financing for SMEs. Collectively, these account for more than \$71 billion and 62 percent of all debt financing in 1998. The second largest segment (more than \$17

billion, 15 percent of lending during 1998) comprises commercial loans and leases from specialized finance companies. Non-residential mortgages account for much of the remaining lending to SMEs.

These data also convey that the debt side of the market appears to have expanded substantially during the 1994-1998 period. This expansion is particularly evident in terms of commercial loans (additional \$19 billion) and specialized finance companies (additional \$9 billion). On the other hand, lending by Trust & Mortgage loan companies and by Life Insurer companies has shrunk considerably, reflecting changes in the non-residential mortgage market.

**TABLE 3: TYPES AND SOURCES OF DEBT
USED BY CANADIAN SMEs**

Source	1998 (\$millions)	Proportion of Lending	Commercial Loans	Non- Residential Mortgages	Lease Contracts
Domestic Banks	58,232	50.4%	53,072	4,276	884
Credit Unions & Caisses Populaires	16,153	14.0%	9,126	7,027	0
Specialized Finance Companies	17,410	15.1%	11,129	146	6,135
Crown Corporations	9,234	8.0%	9,234	0	0
Foreign Banks	3,692	3.2%	3,455	160	77
Trust & Mortgage Loan	2,442	2.1%	255	2,074	113
Life Insurers	2,639	2.3%	0	2,617	22
Credit Card Companies	5,778	5.0%			
Total	115,580	100%	86,271	16,300	7,231

Source: Conference Board of Canada, *SME Debt Financing*, as summarized in *Secor* (July 2000)

Commercial Bank Lending

According to data published by the Canadian Bankers Association (www.cba.ca) as of the second quarter of 2001:

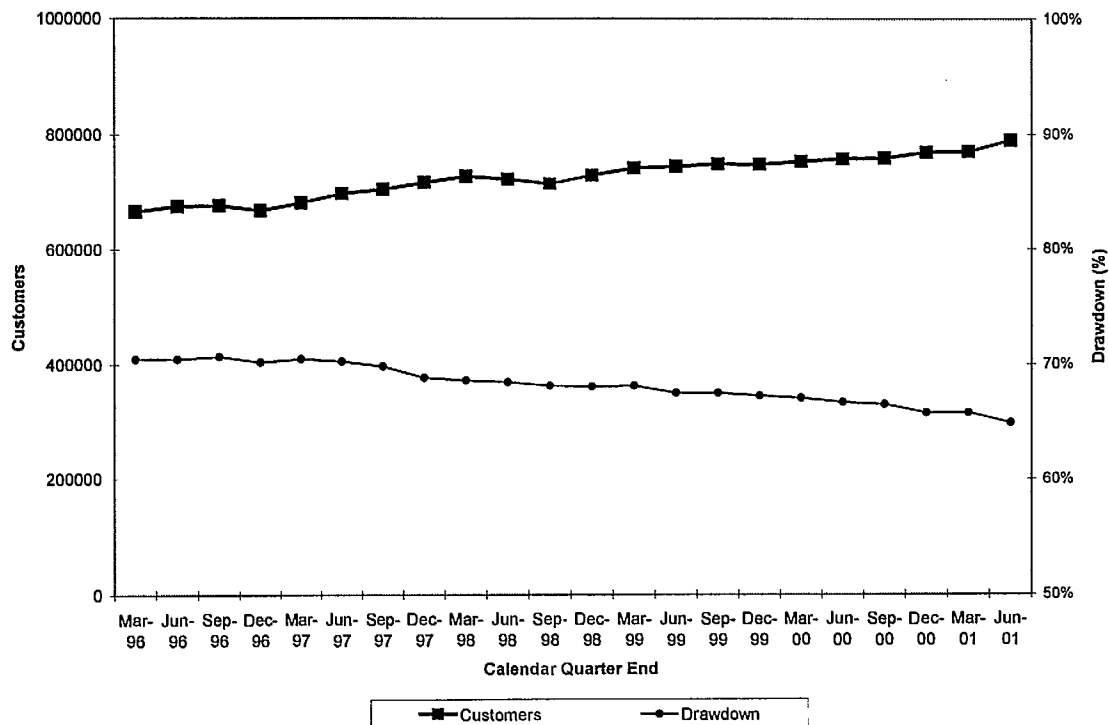
- more than \$50 billion in bank credit facilities were reported as authorizations of less than \$250,000. Of this total, \$32.6 billion was outstanding, representing a 64.9 percent drawdown of authorized credit.
- 789,000 customers represent an increase of 18.5 percent since the first quarter of 1996.
- The increase in authorized credit since 1996 (Q1) was 5.7 percent and the \$32.6 billion of credit outstanding was actually slightly less than the \$33.5 billion outstanding as of the first quarter of 1996.

These data suggest, and Figure 1 demonstrates, that credit authorizations of less than \$250,000 have been advanced to a greater number of clients; however, SMEs have been making progressively less use of the credit available.

In terms of lending to knowledge-based (KBIs) firms, the loan authorizations of less than \$250,000 (www.cba.ca), includes credit authorizations of \$806.4 million to firms in the KBI sector of which \$429.4 million has been drawn down (53.25 percent).² It is worth noting that this draw down of authorized credit is much lower than the 64.9 percent rate reported above. These data suggest that, on average, credit is available for firms that have been granted a credit facility.

The low drawdown of credit facilities suggests that, on average, for those firms that have been granted a credit facility additional capital is available. It will be seen that this finding is contrary to some views about what constitutes a capital market gap.

FIGURE 1: MEASURES OF SME BANK LENDING ACTIVITY



Wynant and Hatch (1991) undertook an exhaustive analysis of bank lending to small firms. They used bank-maintained loan files to document the credit decision process and terms of credit encountered by Canadian SMEs. Subsequently, Haines and Riding (1994), in a project supported jointly by Industry Canada, the Canadian Bankers Association, and the Canadian Federation of Independent Business (CFIB) also studied terms of credit to SMEs.

Ongoing periodic assessments of terms of lending between banks and Canadian SMEs have been conducted by both the CBA and the CFIB. For example, Thompson Lightstone and Company (1996, 1997, 1998) have undertaken annual surveys of the Canadian debt market as it pertains to SMEs on behalf of the CBA. The CFIB has also

² The KBI sector, according to CBA data, comprises firms that are contained in a specified set of four-digit SIC codes.

periodically sought to document terms of credit to SMEs (for example, see CFIB, 2001). However, neither the CFIB nor the CBA have access to the quality and quantity of data that is available to Statistics Canada nor are they able to achieve the magnitude of response rates typical of Statistics Canada surveying. Therefore, the FDI will be able to document, with high levels of reliability, the terms of credit available to Canadian SMEs and to gauge the relative importance of various forms of financial capital.

Research Task

The FDI should document terms of credit to Canadian SMEs and to provide breakdowns of credit policy (interest rates, collateral requirements, loan turn-downs, etc.) across a variety of dimensions that include sector, size of firm, etc. It should be recognized that such breakdowns, however, may not provide definitive evidence of gaps or imperfections. This is because of the complex interactions of various elements in the credit decision.

These various analyses have also led to several analyses of the bank-SME interface. Fabowale *et al.* (1991a, 1991b, 1995), Feeney *et al.* (1999), Haines *et al.* (1991, 1993, 1998, 1999), Orser, Riding, and Swift (1993), Riding and Swift (1990), and Wynant and Hatch (1991) have all used CFIB data or CBA to document the nature of lending practices and processes of SME lending. These empirical works have found empirically that determinants of access to and terms of, bank lending include the size of firm or loan, the industry sector, and other factors. In general, these works have not accounted for the experience and skills of the business owners. Thus, there may be missing variables biases in the above results.

Specialized Finance Companies: Asset-based Financing and Leasing

According to the Canadian Finance and Leasing Association (CFLA, <http://www.cfla-acfl.ca/>)

"asset-based financing is the financing of equipment and vehicles by way of a secured loan, conditional sales contract or lease. The equipment and vehicles secure the borrower's unconditional obligation to make payments over the term of the agreement ... users of equipment and vehicles can use the value of the asset as security to finance its acquisition."

The most frequent form of asset-based financing provided by specialized finance firms is a *lease*: "an agreement under which the owner of the equipment conveys to the user the right to use the equipment in return for a number of specified payments over an agreed period of time" (CFLA, <http://www.cfla-acfl.ca/>). The CFLA distinguishes two categories of leases. *Capital leases* are usually used to finance equipment for the majority of its useful life and "there is a reasonable assurance that the lessee will obtain ownership of the equipment by the end of the lease term."

The second type of lease, *operating leases*, are usually used to finance equipment for less than its useful life. At the end of the lease term, the lessee usually returns the equipment to the lessor without further obligation. In Canada, a wide variety of equipment can be leased. Leasing is used frequently for office, medical and dental

equipment, computer equipment, trucks and trailers, construction equipment, railway rolling stock, busses, etc.

The CFLA quotes the International Finance Corporation (the private sector arm of the World Bank) that "asset-based financing and leasing are particularly attractive to small and medium-sized businesses (SME)". Leasing is attractive to some businesses because it frees up cash that would otherwise be tied up in fixed assets and that would not be available to finance other dimensions of the firm, such as working capital. In an environment where access to capital may be difficult, leasing may provide a useful complement to traditional bank financing, augmenting the pool of available credit to SMES. In addition, it is asserted that lessors use different criteria for advancing credit by means of a lease than do commercial lenders. For example, the CFLA claims that

"cash-flow-based credit analysis is a primary financial innovation of this industry. Because a leasing company retains ownership of the leased equipment or vehicle, at least until the end of the lease, it enables a lessee to qualify for use of the asset leased based on its generated cash flow rather than the lessee's credit history, assets or capital base."

This gives rise to the following hypothesis:

Hypothesis

Decision criteria employed by leasing firms differ from those use by commercial lenders.

Considerable consolidation has characterized the supply side of the specialized finance market. Consequently, asset-based financing and leasing are becoming more standardized in terms of products and approaches. The CFLA asserts that the primary driver of this consolidation is the goal of achieving economies of scale. The result has been what the CFLA refers to as a polarization of the industry. At one extreme are well-capitalized lessors that operate on a national scale with an extensive infrastructure and which have good access to funding. At the other extreme are smaller, niche, participants who are either regionally based or focused on a particular segment.

The CFLA estimates (<http://www.cfla-acfl.ca/>) that the asset-based financing and leasing industry finances as much as 25 percent of total business investment in machinery and equipment. The CFLA compares this to five percent of total business investment in machinery and equipment fifteen years ago. However, these estimates are based on surveys of members of the CFLA. There is little independent confirmation of the relative importance of asset based financing with respect to SMEs or of the growth of this form of asset acquisition. The Financing Data Initiative will clarify the importance of this segment of the market and document its usage across industrial sectors, sizes and stages of firm, and other dimensions of interest.

Research Task:

The FDI should be able to document the usage of asset based financing across sectors, geographic areas, sizes and stages of firms, and by other dimensions of interest. This will allow an assessment of the importance of this category of financing to SMEs and to particular categories of SMEs.

Hypothesis:

Asset based financing is equally employed by firms in all areas of the country, across all industrial sectors, and across all stages of business development.

Mezzanine Financing

Mezzanine financing is a means of raising growth capital for firms that are well beyond the start up stage but not yet ready to go public. Mezzanine financing usually involves the use of subordinated debt through private-placement transactions with institutional lenders, and equity investment. *Subordinated debt* refers to loans secured by a general claim on assets, as distinct from claims secured by specific assets. In case of bankruptcy, lenders' holdings of subordinated debt rank next behind secured lenders and ahead of equity holders. Typical deals sizes range from \$1 million to \$20 million.

In a mezzanine deal, investment bankers look for strong profits and cash flows sufficient to finance the debt obligations. Financing is typically in the form of subordinated debt combined with equity from the sale of shares in the business to the same investor from which debt is obtained. Mezzanine financing is often a transitional financing arrangement such that the mezzanine financier(s) are either bought out upon an IPO or the deals are refinanced after five to seven years.

Often, mezzanine financing is available from institutional venture capital companies. Approximately one-quarter of the full members of the Canadian Venture Capital Association list mezzanine financing or subordinated debt among the types of financing they provide. In addition, other firms specialize in mezzanine financing. Because of the size of the deals and the fact that most are private, no reliable data yet exist to document the importance of this segment of the marketplace or current trends. This leads to a research tasks and hypotheses noted below:

Research Task

The FDI should be able to document the usage of mezzanine financing across sectors, geographic areas, sizes and stages of firms, and by other dimensions of interest. This will allow an assessment of the importance of this category of financing to SMEs and to particular categories of SMEs.

Hypothesis:

Mezzanine financing is concentrated in firms that are at relatively advanced stages of development.

Hypothesis:

Mezzanine financing is equally employed in all areas of the country and across all industrial sectors.

Consequently, the FDI may be able to provide, for the first time, reliable estimates of the importance of mezzanine financing in Canada. It should also be able to document breakdowns of its usage by size of firm, stage of development, sector, geographic location, and other dimensions of interest.

Review of the Literature: Gaps in the Debt Market for SMEs

This section reports on a review of the professional and academic literatures that pertains to gaps, imperfections, and market failures for the debt markets in which SMEs participate. It is found that suggestions of gaps found in the professional literature and in the media may be consistent with the concept of imperfections that have been studied by academic theorists. The result is the identification of a series of dimensions across which the presence of gaps may be present and which are consistent with both the theoretical and professional literatures. However, it is also found that what little empirical work has been reported is inconclusive.

Gaps in the Credit Market: The Practical Perspective

The presence of gaps in the debt market for SMEs has been postulated for some time. For example, the perception of size-related gaps was part of the premise behind the Canadian Small Business Loans Act of 1961. Work conducted on behalf of the BDC (2001) identified four perceived gaps that relate to the debt markets in which SMEs participate.

The first three of these perceived gaps have in common that financial institutions are unable to adequately meet the needs of particular groups of potential borrowers: *small firms*, *risky firms*, and *knowledge-based enterprises*. Stated differently, the BDC findings suggest that firm size, knowledge orientation, and risk may be dimensions according to which lenders ration credit. Therefore, this empirical finding may be consistent with predictions from theories of information asymmetry.

Based on periodic surveys of its members, the CFIB (2001) also asserts the presence of gaps. The CFIB has identified two potential gaps.

The first was documented in research by Marleau (1995) in which she claims that women business owners face discrimination with respect to banks' lending practices. More recently, the CFIB (2001) claims that one in five SMEs were unable to obtain the necessary level of financing and that a high proportion of these are "young high performers". The CFIB findings with respect to both gaps, while suggestive, are not conclusive. This is so for several reasons. First, the CFIB surveys are limited to its members, introducing a selection bias. Second, the CFIB analysis, while based on 10,024 respondents represents a substantive non-response bias in that the survey was apparently distributed to the entire membership. If the CFIB membership totals more than 100,000 firms, the response rate to the survey is less than 10 percent. Non-response often signals that the topic is not central to those who chose not to fill in the questionnaire. Third, the level of analyses is generally limited to basic breakdowns, an approach that can result in misleading conclusions.

Gaps in the Credit Market: The Academic Perspective

The basis of most of the academic research lies in the theories of information asymmetry and the usual assumption that borrowers possess salient information about the likelihood of success of their projects that is not fully shared with lenders. This imperfection, according to some theorists, can lead to *credit rationing*. This section

attempts to capture the essence what Berger and Udell (1992, p. 1048) say is "... an entire generation of work on credit rationing based on an information-theoretic approach ... [about which] there remains little consensus".³

Theoretical models often assume that entrepreneurs possess salient private knowledge that is not shared with the lender or investor. Consequently, capital suppliers (lenders) cannot differentiate between a 'high-quality' firm and a 'low-quality' firm. *Adverse selection* can result. In theory, lenders respond to this dilemma by offering uniform terms of credit and by denying credit to particular classes of prospective borrowers. For example, the seminal article by Stiglitz and Weiss (1981) argues that banks may restrict lending by practicing capital rationing – denying credit to particular classes of borrowers. In general, however, theory is silent about the criterion on which lenders base loan turnaround decisions.

Moral hazard is another potential consequence of information asymmetry and relates to the capital supplier's inability to control fully how the entrepreneur-borrower uses funds provided. Entrepreneurs can conceivably benefit economically by taking actions that hurt the capital supplier (for example, using borrowed funds to invest in higher risk projects than those approved by the lender). To avoid this situation, lenders structure contracts or implement (costly) monitoring practices that deal with moral hazard, potentially leading to credit rationing if the cost of monitoring exceeds the value of profits from the loan.

In theory, information asymmetry can be mitigated in at least three ways, each of which reduces information asymmetry and provides salient information to investors or lenders:

- through a firm's ability to somehow signal its credit worthiness;
- by having developed a strong relationship with its lender; and,
- through due diligence or the lender's examination of the business plan and other lender requirements for documentation.

Some have argued that the availability of (and the willingness to use) collateral is one means of signaling creditworthiness (Bester, 1987; Chan and Kanatas, 1985; Toivanen and Cressy, 2000). Boot, Thakor and Udell (1991) find empirically that collateral is a powerful instrument for dealing with moral hazard.

If these theories are correct, then firms that are most likely to receive credit are those that are able to signal the creditworthiness of the firm, those that have an established relationship with the lender, and those that have been able to reduce information asymmetry through effective communications. This suggests the "pecking order" of information asymmetry modeled in Table 4. According to this tabulation firms with the greatest degree of difficulty accessing debt capital would be new firms that lack collateral and effective management.

³ The awarding of the 2001 Nobel Prize in Economics to Spence, Stiglitz, and Akerlof was in recognition of their contributions to the development of these theories of information asymmetry. For example, Stiglitz (with Weiss, 1981) demonstrated theoretically that if lenders are unable to distinguish good credit risks from poor credit risks, the debt market could collapse. In Akerlof's seminal 1970 article, he showed how the unequal distribution of information between buyers and sellers resulted in lower prices for the commodity in question (used cars in his case, but the principles he derived held wide applicability).

TABLE 4: DEGREES OF CREDITWORTHINESS ACCORDING TO THEORIES OF INFORMATION ASYMMETRY

	← MORE INFORMATION ASYMMETRY				LESS INFORMATION ASYMMETRY →			
Able to Signal Creditworthiness through Collateral	✓	✓	✓		✓			
Has an established relationship with lender	✓	✓		✓		✓		
Management of firm able to communicate creditworthiness	✓		✓	✓			✓	

Hypothesis

Firms with least access to credit are those that do not have established relationships with lenders (e.g., new firms), those that are unable to provide collateral (a signal of creditworthiness), and those whose management are unable to communicate effectively the firm's creditworthiness.

Bridging the Academic and Practical Perspectives

It is not clear, from either the practical or the theoretical academic literatures, whether or not credit rationing is practiced or the extent to which it is a problem. As Berger and Udell also note (1992, p. 1048):

"[G]iven the reasoned arguments on all sides of this issue, it is clear that the significance or insignificance of credit rationing will have to be established empirically".

Is it possible that if credit rationing is present that it might be based on such dimensions as size, risk, or knowledge as suggested by the BDC? Hillier and Ibrahim (1993, p 287) state that:

"[An] implication of the [credit rationing] analysis is that when there are several observationally distinguishable classes of borrowers, some classes may be denied credit at any interest rate whilst other classes obtain credit"

While economic theory is consistent with the idea that observationally distinct classes of borrowers may be rationed, theory does not specify the categories across which credit rationing might occur (if it exists!). If credit is rationed, it remains to identify the basis by which lenders discriminate among applicants and the dimensions across which they may deny loans, possibly leading to "gaps".

Potential Bases for Credit Rationing Gaps

Collateral.

The studies summarized above suggest that lenders may be more likely to approve loans to firms that are able to provide collateral and to those firms that have established long term relationships with lenders. Lack of collateral, therefore, may hamper access to capital. To the extent that young KBIs may lack collateral, the lack of collateral may manifest itself as a gap that is specific to KBIs, as suggested by the BDC (2001). Likewise, many technology-based firms are relatively young firms and may not yet have developed relationships with bankers. Also, as Åstebro, Johannsen, and MacKay (2000) note, "...intellectual assets of high technology firms are more difficult to value than the brick and mortar of low technology firms". This "information opacity" may well make it relatively difficult (at least in theory) for knowledge-based firms to access debt. This argument, of course, begs the question of the extent to which debt is an appropriate source of capital for knowledge-based businesses. For example, MacIntosh (1994) suggests that debt is not the most appropriate source of early-stage capital, a suggestion echoed by Leitinger and Schofer (2000) as well as by Brierley (2001) .

Technology Orientation.

Haines, Riding, and Swift (1993) used CFIB data to compare empirically loan turndown rates and terms of credit between technology-based firms and non-technology-based companies. They concluded that, after allowing for traditional determinants of credit policy (sector, size of firm, age of firm, etc.), loan turndown rates and other dimensions of bank credit policy did not differ between the two categories of firms. From their analyses, they found that what appeared to be a gap based on technology orientation appeared to be more related to technology-based firms being small and young. However, it is not clear that this finding is robust across different definitions of "knowledge-based firm".

Growth

Rapid growth may be another dimension that forms a basis for a gap based on capital rationing and for which a gap may be claimed. As Binks and Ennew (1996) argue, high growth firms may be more informationally opaque and may face a greater degree of difficulty obtaining financing. This is consistent with findings also reported by the CFIB (2001) to the effect that "young high performers" have the most difficulty accessing capital. On the other hand, rapid growth can be a source of significant financial and managerial stress for a firm (Eggers, Leahy, Mikalachki, 1997). Rapid growth of sales, for example, usually leads to expansion of inventories and receivables, in turn generating a need for both additional cash and careful management. Creditworthiness requires that good fiscal management needs to accompany rapid growth.

Gender

As noted, gender may also be a dimension on which gaps may be present. Orser and her colleagues (2000) found that women-owned businesses were more likely than men to cite access to capital as a problem. In addition, Marleau (CFIB, 1995) contends that women business owners also face particular difficulty obtaining credit. However, Fabowale and her associates (1995), Statistics Canada (1994), Haines and his

colleagues (1999), and others have found that rationing on the basis of gender may be more related to systemic attributes (e.g., sector, age of firm) of women-owned businesses.

Size of firm

Size of the business (or its correlate, size of loan) may also be a dimension across which a financing gap may be present. This is suggested by the BDC (2001) and CFIB (2001) research and is also consistent with the theoretical and empirical findings of Toivanen and Cressy (2000). Toivanen and Cressy contend that credit policy is influenced by a fixed costs component associated with due diligence and monitoring. They argue that the size of this component relative to the size of the loan is a partial determinant of access to, and terms of, credit. Likewise, Wynant and Hatch (1991), Haines and Riding (1995), and Thompson Lghtstone (1996, 1997, 1998) also found empirical evidence that small firms face particular challenges with terms of credit and access to bank loans. In addition, of course, the understanding that small firms face disproportionate lack of access to credit is the basis for loan guarantee programs to small firms in many countries. It is not clear to what extent such schemes have mitigated access to credit on the basis of firm size. This forms a research task that the FDI might address.

Research Task

Data obtained under the terms of the FDI may be able to inform the extent to which the SBLA and the CSBFA achieve incrementality in terms of loans to smaller businesses.

Risk.

Finally the BDC contends that risk may be a dimension across which a financing gap might exist. The theories of information asymmetry also suggest that credit rationing may reflect risk. However, the definition of risk in the theoretical sense may differ from that implicit in the BDC's research. Moreover, it can be argued that the role of the banks is in fact to discriminate among loan applicants on the basis of risk. Thus, it is not clear whether a gap based on the dimension of risk is material to a societally efficient allocation of credit.

Previous Empirical Research on Testing for Credit Rationing and Market Imperfections

While the theories of credit rationing are highly developed, the same cannot be said about the state of empirical testing. As noted by Berger and Udell (1992, 1995) empirical studies of credit rationing requires micro data (firm-specific information). However, such data seldom document rejections of loan applications and researchers have resorted to analysis of such factors as the 'stickyness' of interest rates on loans.

Perhaps the most widely-cited analyses are those of Berger and Udell (1992, 1995) who conducted empirical tests of credit rationing theories, interest rates behaviour, collateral requirements, and business relationships with banks. They used a data set of about 3,400 telephone surveys conducted by the Federal Reserve Board and the Small Business Administration (SBA). Their work focused on the duration of a business-bank relationship as a measure of strength and observed the influence of 'stronger' relationships and contract terms. The study found that borrowers with longer banking

relationships pay lower interest rates and are less likely to pledge collateral. These findings were both statistically and economically significant. The findings are consistent with the theoretical predictions of Petersen and Rajan (1994, 1995) and Boot and Thakor (1994) and support the literature on the role of banks as information producers.

Testing is complicated, however, because scholars have defined credit rationing in slightly different terms. For example Bester (1985, p.850) describes credit rationing as follows:

“...[credit rationing] occurs when some borrowers receive a loan and others do not, although the latter would accept even higher interest payments or an increase in the collateral.”

According to Jaffe and Russell (1976), however,

“[credit rationing] occurs when lenders quote an interest rate on loans and then proceed to supply a smaller loan size than demanded by the borrowers.”

The two definitions are somewhat ambiguous because they can be interpreted in either of the two ways identified by Stiglitz and Weiss (1981). On the one hand, credit rationing can occur whenever there is a person/firm that is willing to accept the lender's terms of lending yet they are refused a bank loan. On the other hand, credit rationing is said to occur when certain categories of borrowers are systematically denied credit.

Jaffee and Russell, however, suggest that size of loan is the issue. However, Jaffee and Russell's definition is not consistent with the data reported regarding credit facilities to SMEs. Recall that, on average, the draw down of credit facilities was low, particularly for KBIs. The lending data reviewed previously suggests that, on average, borrowers are able to avail themselves of more credit than they are using.

Therefore, it remains that credit rationing occurs when firms are refused credit that are willing to accept the required terms (interest rate, collateral, etc.) and which are capable of fulfilling such requirements. Thus, an empirical test for credit rationing must take into account firms' ability to meet terms of credit and then isolate the extent to which the credit decision is varied on the basis of the possible dimensions that may form a basis for credit rationing.

Another implication of credit rationing is that the law of the single price fails.⁴ This may provide an alternative avenue for empirical testing. If, as Hillier and Ibrahimo (1993, p. 276) contend, we "can view the banks as the buyers of risky promises to pay and borrowers as the sellers of such promises", firms that have been turned down for loans would be indistinguishable from firms that have received loans if credit rationing obtains. Thus, a finding consistent with credit rationing would be that the attributes of firms that were turned down do not differ systematically from the attributes firms that received loans. This leads to the following hypothesis.

Hypotheses:

The attributes of firms that have been turned down for loans do not differ from those whose loan applications were successful.

In summary, there appears to be both theoretical and anecdotal evidence to suggest that certain classes of borrower firms may face relatively greater difficulty with access to credit. As Berger and Udell (1992) note, however, the theory-based literature lacks consensus and resolution must rest on empirical methods. To address the possibility that credit is rationed based on firm size, knowledge content, risk, gender, or other factors, the following testable hypothesis, based on both academic theory and the gaps postulated by the BDC, is advanced:

Hypothesis:

Financial institutions are unable to meet the needs of particular classes of borrowers. These classes include (but are not limited to) small businesses, risky firms, and knowledge-based enterprises.

The existence of gaps for these segments would be consistent with credit rationing and the presence of imperfections in the form of information asymmetry.

Another hypothesis arises from the fourth "gap" noted by the BDC:

Hypothesis:

Financial institutions do not provide flexible terms and conditions on their loans to SMEs.

Strictly speaking, this is not a gap in the sense of economic theory. The notion of "flexibility" is a highly subjective construct. At one extreme, this concept could be taken to mean that the loans provided by financial institutions are highly standardized: so called "cookie cutter" loans. The CFIB argues that such loans are a consequence of credit scoring, a practice that lenders are increasingly using. However, it can also be argued that credit scoring reduces the fixed cost component of lenders' due diligence and may therefore result in yet more credit being made available to SMEs. In a finding consistent with this argumentation, Frame, Srinivasan, and Woolsey (2001) conclude that "credit scoring lowers information costs between borrowers and lenders" and attribute an 8.4 percent increase in the portfolio share of small business loans to credit scoring.

⁴ The law of the single price states that "all objects with the same observational characteristics should sell at the same price" (Hillier and Ibrahimo, 1993, p. 286).

Because of the subjective nature of the notion of 'flexibility', this hypothesis may not be directly testable from survey data and requires qualitative analysis of borrowers' perceptions of the nature of 'flexibility' and 'inflexibility' in the context of bank-SME relationships.

Gap Analyses: Equity Markets for SMEs

The equity markets that are of interest to SMEs have three distinct segments, each of which is reviewed below.

The Canadian Market for Informal Capital

The informal venture capital market comprises individuals who provide risk capital directly to new and growing businesses with which they had no previous relationship.⁵ In the US, this market has been identified as the single most important source of risk capital for SMEs. Data for the importance of the informal market in the Canadian context are scarce; however, four studies suggest that the informal market in Canada is at least as important as the institutional venture capital market.

- The first estimate (Short and Riding, 1989) used capture-recapture statistical methods to estimate the population of angels in the Ottawa region. Extrapolation of their data suggested an informal market that was at least as large as the then institutional market.
- More recently, estimates by Farrell (1999), the CBA (1998), and the Global Entrepreneurship Monitor (GEM, 2001) estimate an annual rate of investment excess of one billion dollars, a rate that is of the same order of magnitude as that of the institutional market.

Moreover, because the average size of private investments (approximately \$100,000) is typically less than that of institutional venture capital (in excess of \$1 million), informal investors likely finance substantially more firms than do the institutional VCs. The following table is based on the findings reported in the GEM 2000 report. The results illustrate the relative sizes of the Canadian market with respect to those of other industrialized countries that participated in the GEM project.

The findings in this table bear further explanation. First, these data show that Canada ranks fourth among these countries in terms of institutional venture capital invested in 1999. All three countries that rank ahead of Canada are substantially larger in terms of population. On a per capita basis, only the US and Israel rank ahead of Canada in terms of venture capital invested per year. Moreover, the data for 2000 may well move Canada into second place overall as well as on a per capita basis. These data are clearly inconsistent with the BDC contention that there exists a "dollar gap" in the Canadian venture capital industry, that Canada ranks tenth among developed countries in terms of per capita supply of venture capital.

Second, investments in new firms, in aggregate, total \$3.373 billion US (approximately \$ 5.2 billion \$Cdn). GEM estimates that approximately 75-80 percent of this total represents investments made by friends and family in new firms. This implies that angels, or private investors, invested between at least \$1 billion (\$Cdn) during 1999 in

⁵ The Center for Venture Economics (1995), in a report for the Office of Advocacy of the US Small Business Administration, estimated that approximately 250,000 angel investors were investing about US\$20b in 30,000 small companies each year. That is approximately twice the value of annual investment by US institutional venture capital funds and about fifteen (15) times the number of companies receiving investment (Freer, Sohl and Wetzel, 1996 in Acs and Tarpley, 1998).

new firms and comprise a maximum of 0.5 percent of the Canadian population (this is arguably an upper limit because research shows that angel investors usually invest larger amount than do friends and family).

TABLE 5: INTERNATIONAL COMPARISON OF RISK CAPITAL INVESTMENT ACTIVITY

	Institutional Venture Capital Invested in 1999 (\$Millions, US)	Percentage of Population Making Investments in New Firms	Total Non-Institutional Capital Invested in New Firms (\$Millions, US)
US	45,932	7.0	54,333
Germany	2,024	3.9	11,979
UK	1,895	3.1	12,610
Canada	1,489	2.7	3,373
Korea	890	5.5	16,939
Israel	432	3.7	651
Australia	288	2.6	2,803
Sweden	261	2.5	535
Singapore	145	1.3	458
Finland	106	3.6	269
Norway	96	5.1	656
Denmark	75	4.1	1,165
Argentina	n/a	2.5	1,383

Source: GEM (2001)

The average size of informal investments is approximately \$100,000 and that such investments tend to be made locally (CBA, 1998; Farrell, 1999; Equinox, 2001). Typically, informal investments are in sectors and stages that are complimentary to those on which institutional venture capital firms focus and are particularly important for start-ups and early-stage firms (Freear and Wetzel, 1988). Referrals and reference checks tend to be made informally, although an offering memorandum generally governs terms and conditions of the investments, at least for larger investments. Syndicates of informal investors often make such investments, although a substantial fraction of investors remains unsyndicated. More details are available in recent reports produced in conjunction with the FCI (Equinox, 2001a; 2001b).

Suret and his colleagues (1995), in their study of private investment in Quebec, confirm the importance of private investment stating:

"Based on the most realistic hypotheses and an inferential method, we can estimate that there are approximately 2,175 angels in Quebec. Their collective portfolio is on the order of \$1.36 billion. Annually they apparently invest \$232.5 million and could draw on an additional \$277 million if a sufficient number of profitable projects were submitted to them. If the average amount invested is consistent, it can be estimated that Quebec angels finance an average of 840 projects each year. ... On an annual basis, angels apparently finance six to seven times more business firms than institutional investors, providing total amounts representing one and a half to two times the amounts actually invested by that industry, which is, however, extensively subsidized."

Attributes of Private Investors

The supply side of the informal market has been widely studied and a consistent picture of informal investors emerges.

- Informal investors are self-made, high income, well educated (normally hold a minimum of a college degree), and middle-aged.
- They are predominantly male (98.1% in Haar, Star and MacMillan, 1988) and have substantial business experience. Most angels have entrepreneurial experience as owners or managers – that is, they do not tend to be wealthy professionals such as physicians, dentists, etc.
- They usually prefer investing within their localities. In Short and Riding (1989), over 85% of the investments by the respondents had been limited to within 50 miles of home or office.
- Business angels are generally experienced investors confident about their ability to appraise investment opportunities and therefore do not typically rely on professionals.
- Their investment decisions are usually opportunistic (based on commercial intuition) rather than scientific (Mason and Harrison, 1996).

Canadian studies (Riding and Short; 1987a; Farrell, 1999; Feeney et al., 1999) confirm that the characteristics of Canadian angel investors are generally consistent with the wider literature. However, Canadian investors display higher rates of activity (investment), lower rates of participation in the management of the investee firm, and higher rejection rates of possible investment opportunities than their counterparts in the US. They also commit higher amounts of capital to individual investments than their US counterparts though they usually assume minority roles in the investee firms⁶.

The Marketplace for Informal Capital

In most countries, the operation of the informal venture capital market is usually characterized as inefficient. The market has even been described as "inchoate". According to Sherid (1997), "if stock markets are an extremely efficient capital market, angel investing is at the other end of the spectrum". The inefficiency has been attributed to three (3) main factors:

⁶ Feeney et al. (1999) attribute this to Canadian Securities laws that limit smaller deals.

- 1) *invisibility of informal investors*: for fear of being pestered by unwanted calls from desperate entrepreneurs, most angels prefer to remain anonymous.
- 2) *the fragmented nature of the market*: the reliance of informal investors on 'primitive' (Prowse, 1998) informal networks of trusted friends and business associates in the referral/search process.
- 3) *poor communication channels*: there are no clearly defined channels of communication between entrepreneurs and business angels. This leads to high search costs and frustrations for both investors and entrepreneurs.

In the Canadian context, these problems are being addressed by a variety of public sector and private sector initiatives. All three levels of government have established mechanisms to address the fragmented nature of the market.⁷ However, attempts to improve the informal marketplace in Canada must still contend with securities regulations. As MacIntosh (1995) notes, compliance with securities acts generally entails a high cost and that it is likely that many deals are not in full compliance. MacIntosh argues that securities regulations are particularly troublesome for knowledge-based firms, an assertion with the contention of a knowledge-based gap.

Mobilizing New Angels

Freer et al., (1994) have found that a high proportion of individuals with the financial resources to be angels are willing to invest some amount of their portfolio (between 1% and 14%) in the informal venture capital market. This implies that the potential size of the informal venture capital market is far bigger than its present size. Short and Riding (1989) estimate that the potential size of the informal market in Canada may be ten (10) to twenty (20) times the size of the institutional venture capital market.

According to Mason and Harrison (1993), a high proportion of prospective angels cite "the inability to identify suitable firms requiring finance" as the major reason why they have not invested in entrepreneurial companies. Other considerations included the high risks involved, concerns about exit routes, and lack of expertise in investment appraisal. Mason and Harrison state that the factors most frequently-cited needs were personal knowledge of the management team, information on companies seeking finance from a trustworthy source (these two factors essentially relate to concerns about risk), and tax incentives.

These findings coincide with those of Feeney and her colleagues (2001) who asked private investors to identify factors that they considered essential in an investment opportunity and those that they regarded as detractors. The management ability of the entrepreneurial team was regarded as the most important element. Other key aspects of "suitable" investments included the business potential of the service or product idea and the integrity of the founders. Detracting factors included unrealistic projections and elevated valuations of the founders' share of the business.

⁷ For example, Industry Canada has implemented the Canadian Community Investment Program (CCIP), a program that assists smaller municipalities to establish intermediaries to help businesses become ready for investment, to assist with locating suitable investors, and to provide post-investment counsel. Provincial and municipal governments have also established mechanisms to help address the issues listed by Mason and Harrison.

Lerner (1998) advances a caveat with respect to enticing more angels. SMEs, particularly start-ups, are inherently more risky than large firms. There is considerable uncertainty regarding their survival and growth. On this basis, Lerner cautions that amateur individual investors should not be encouraged; rather, he argues that care should be taken to ensure that the prime targets should be value-adding investors. The targeted investor should, on average, be able to withstand the loss of their investment in the informal capital market. In recognition of the importance of this factor, the OSC argues that even though education and experience should count towards the definition of a sophisticated or accredited investor, ability to withstand financial loss of the investment in the informal market should be an overriding criterion.⁸

These findings suggest that knowledge-based firms, because of securities regulations, may face disproportionate difficulty accessing informal capital. In addition, the BDC (2001) states that an **early stage gap** exists such that small early-stage companies are not the strategic focus of most private investors. While this perception may have related primarily to institutional venture capitalists, it is worth exploring in the context of informal investment. Expressed as testable hypotheses, these perceived gaps are phrased as follows:

Hypothesis:

Private investors do not focus on small early stage companies.

Hypothesis:

Private investors do not focus on knowledge-based businesses.

Mason and Harrison (2001) note that barriers to informal investment may not rest with the supply side of the market. They find that in the UK, many business angels are willing to allocate a higher proportion of their investment portfolios to investments in private companies. Most informal investors were looking to make additional investments. Three factors, according to Mason and Harrison, constrained their ability to invest: they did not see enough deals that met their investment criteria; the majority of proposals they received were of poor quality; and they were often unable to negotiate mutually acceptable terms with entrepreneurs. Mason and Harrison state that the need for intervention should be centred on the demand side and on the market-making process. In so doing, SMEs could potentially access what Mason and Harrison found to be "substantial pool of angel finance that is available". These findings are consistent with those reported by the CBA (1998) and Equinox (2001a). Both studies found that Canadian informal investors report having substantial capital available for investments in small firms and they often cite the lack of management skills on the part of entrepreneurs as the primary barrier to investment.

These findings imply that informal capital is accessible to entrepreneurs with growth opportunities and management skills or experience.

⁸ "Revamping the Regulation of the Exempt Market" (www.osc.gov.on.ca).

Hypothesis:

Firms that have accessed informal capital are those with experienced and capable management and that report growth histories and growth opportunities.

The Canadian Market for Institutional Venture Capital

Overview of the Institutional Venture Capital Markets in Canada and the US

The Canadian Venture Capital Association recognizes five categories of venture capital firms that comprise the Canadian market (categories are based on firms' respective sources of investment capital):

- *private independent funds* which obtain capitalization from a small number of individuals or organizations;
- *labour-sponsored venture capital companies (LSVCCs)* which raise their capital by means of public solicitations to individuals and which are able to offer substantial tax incentives;
- *corporate subsidiaries* which are funded by parent organizations;
- funds that derive their initial funding from *government-related* sources; and
- *other funds*.

According to Clendenning and Associates (2001) the marketplace has been dominated by LSVCCs; however, private independent venture capital firms have recently become relatively more important. According to data reported by Clendenning and Associates (2001) for the year 2000, these two categories of funds accounted for 86 percent of the \$18.8 billion in assets under management. Labour sponsored funds accounted for 42 percent of capital under management in 2000 and private independent funds accounted for 42% (up from 21 percent of the \$12.1 billion of funds under management 1999). This has largely been the result of a recent proliferation of new private sector funds. According to Bloom (2001), the number of active venture capital firms in Canada has increased from 67 in 1995 to 326 in 2000.

The last few years have reflected an unprecedented level of activity in the Canadian venture capital sector. Bloom (2001) provides the following comparison between 1995 and 2000.

TABLE 6: CANADIAN VENTURE CAPITAL ACTIVITY, 1995 VS 2000.

Indicator	1995	2000
Number of Active VC firms	67	326
Capital under management	\$6.0 billion	\$18.8 billion
Number of companies financed during year	502	1,089
Number of Investments	610	2,566
Disbursements during year	\$699 Million	\$6.3 billion

Source: Bloom (2001); Clendenning & Associates (2001).

The table that follows presents a comparison of the US and Canadian venture capital industries.

TABLE 7: VENTURE CAPITAL ACTIVITY IN CANADA AND THE US

Measure	Canada	US	Ratio
Population (1999)	30.5 million	273.1 million	1:9
Number of Households (1999)	10.8 million	100.3 million	1:9
GDP (\$ Cdn)	\$1.0 Trillion	\$14.9 Trillion	1:14
Number of VC Investments	2,566	5,380	1:2.1
Total Investment (2000)	\$6.3 billion	\$103 billion (US)	1:25
Proportion of VC to KBI	89%	97%	
Average Size of Investment	\$4.4 million	\$16.4 million (\$US)	1:5.6
Pension Fund Commitments to VC Pools	\$441 million	\$55.5 billion (\$US)	1:189

Source: Bloom (2001) and Clendenning and Associates (2001).

This table reveals several differences.

1. Canadian venture capitalists invested in a disproportionately large number of ventures compared to the US. This is partly, but not fully, accounted for the finding that 45% of Canadian VC investments are to "early-stage" firms whereas only 23% of US VC investments go to early-stage companies.

Hypothesis

Investment by institutional venture capitalists is complimentary to that of private investors. Institutional VCs invest in later stages of development and in larger amounts than do private investors.

2. In general, investments by US VCs are substantively larger. This poses a competitiveness issue because firms financed by US VCs are evidently better

capitalized than are Canadian investee firms (see Bloom (2001) and Clendenning and Associates (2001)).

3. The average size of investments has been increasing in both countries, but at a much more rapid rate in the US than in Canada. These data reveal that the average size of Canadian VC investments has increased from approximately \$1 million in 1995 to \$4.4 million in 2000. In part, this is a consequence of increased activity among US investors in Canada.

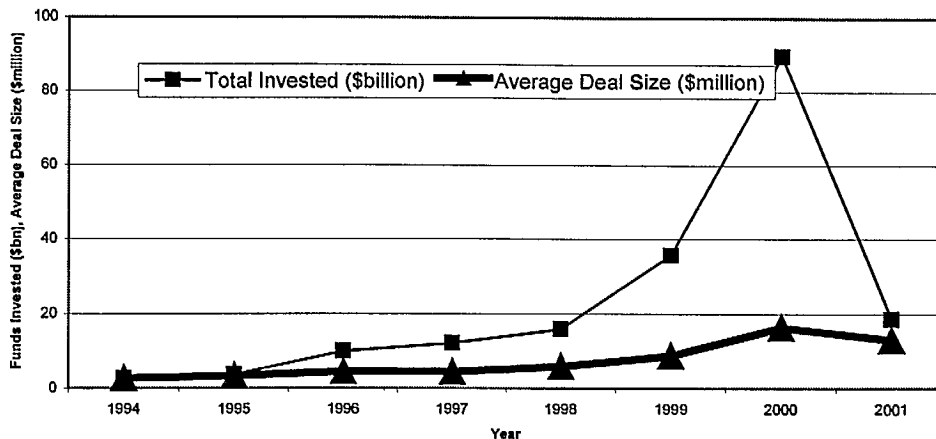
Hypothesis

As the pool of institutional venture capital expands, the average size of investments increases and earlier stage firms face greater difficulty raising venture capital.

4. The US industry relies largely on pension and other investment funds as sources of capital. In Canada, labour sponsored venture capital firms are among the largest venture investors. They derive their capital largely from individuals' tax-incented investments. Relatively little capital is supplied to venture funds by Canadian institutions. However, several Canadian pension funds have recently been active as direct or syndicated partners in venture investments in Canada.

It should be noted that the larger average deal sizes characteristic of US VC financings is relatively recent, as depicted in Figure 2.

FIGURE 2: US VENTURE CAPITAL ACTIVITY SINCE 1994



Source: Bloom (2001) and Clendenning and Associates (2001).

Through the first half of 2001, the rate of VC investing in the US has declined considerably: from \$54 billion invested during the first half of 2000 to \$23 billion during the first half of 2001. Conversely, the rate of venture capital investment in Canada has continued near the 2000 pace, in no small part due to investments being made here by US venture capital firms (at least as of the first half of 2001). During the first half of 2001, Canadian venture capital firms invested approximately \$2.5 billion in 521

financings. For the comparable period of 2000, the Canadian investment was \$2.36 billion across 683 investments.

Theory and Evidence of Gaps in the Venture Capital Market

The BDC noted three perceived "gaps" associated with the Canadian venture capital industry.

- an **early stage** gap, which reflects the belief that small early-stage companies are not the strategic focus of most private investors.
- a **dollar** gap, according to which Canada was said to rank tenth among developed countries in terms of venture capital funds raised per capita.
- an **institutional gap** that reflects the lack of involvement in the venture capital sector of pension funds, mutual funds, and other such institutions in Canada.

These assertions may be re-phrased as three separate hypotheses to be tested against the literature and investigated under the terms of the FCI.

Hypothesis:

Institution venture capital companies do not focus on early-stage entrepreneurial enterprises.

Hypothesis:

The Canadian venture capital industry, in terms of funds raised per capita, ranks low among developed countries.

Hypothesis:

Institutional investors such as pension funds, mutual funds, and other such institutions are not substantive participants in the Canadian venture capital sector.

From the overview of the Canadian industry, it would appear that the second of these hypotheses is not tenable. Table 5, 6 and 7 all speak to a venture capital sector in Canada that is disproportionately large on a world scale. In some respects the industry is more active than that in the US (e.g., the number of investments per capita). If comparisons are restricted to the US, it is true that the aggregated volume of venture capital investment is low and that this is at least partially attributable to the lack of participation from pension funds, mutual funds, etc. However, in comparison with other countries, Canada appears to rank among the world leaders.

This discussion raises the question of how much venture capital is sufficient. Mason, Cooper, and Harrison (2001) investigated the development of the venture capital market in Ottawa. As they note, the saturation of the US market is among the reasons that US venture capital firms were investing in Canada. According to the US Small Business Administration (SBA), it is not entirely clear that a larger venture capital market is necessarily a benefit. According to the SBA (1998), the amount of capital under management by US venture capital funds has increased substantially during the 1990s, as has average venture capital fund size. Ordinarily, growth of the pool of venture capital

would be viewed as good news for the SME sector. However, the SBA suggests that the organized venture capital industry may have become a victim of its own success. With the rapid growth in the amount of available funds, the average value of individual investments has also experienced rapid growth. According to the SBA, large funds now prefer to invest not less than US\$10m in any given venture capital partnership and prefer to represent less than 10% of that partnership capital. This 10/10 rule tends to drive venture capital funds to the US\$100m+ range leading VC fund managers to make increasingly large investments. The SBA report indicates that venture capitalists rarely fund deals of less than US\$3m to US\$4m.

This discussion also begs the question of the extent to which the supply of venture capital in Canada is sufficient to meet the needs of those firms that require venture capital or whether there is a gap (in the shortage sense) of venture financing.

Hypothesis:

There is a sufficient supply of venture capital for Canadian firms

The theory of gaps in the venture capital market also derives from the work on information asymmetries. As noted in a previous section, an agency problem occurs when the goals of the principal (e.g., bank, investor) and of the agent (owner(s) of entrepreneurial firm) differ and the principal lacks salient information possessed by the agent. However, as described so far, the theory of information asymmetry relates exclusively to the interface between the lender or investor and the owner(s) of the entrepreneurial firm seeking capital. In the case of institutional venture capital, the investor also acts as an agent -- on behalf of the original source of funding: pension funds, individuals, parent firms, etc. The responsibility to achieve the investment goals of the funds supply is superimposed on the VC's decision process.

Agency problems are, in theory, particularly relevant for the institutional venture capital investor. First, the goals of the VC investor and the business owner arguably differ. The VC is primarily interested in growth of the investee firm and the firm is one of several in the VC portfolio. The business owner shares an interest in the growth of the firm, but also faces consumption needs. Second, the VC investor and the firm owner may hold different attitudes towards risk and may therefore respond differently towards the same situation.⁹

The problems associated with informational asymmetry, however, are arguably mitigated in the context of equity investment relative to that of lending relationships. De Clerq and Sapienza (2000), for example, show that it is in the best interests of investor and entrepreneur to cooperate to achieve their mutual goals. Shepherd and Zacharakis (2000) and Manigart et al. (2001) contend that trust and confidence lead to cooperative behaviour for mutual benefit. This type of behaviour is more likely in a VC relationship than is a banking relationship for three reasons.

- First, the VC (unlike the bank) stands to participate in future performance of the venture: the bank would only get the loan repaid with interest; the VC stands to share in appreciation of firm value.

⁹ For a full explanation of these issues, see De Clerq and Sapienza (2000).

- Second, the development of trust and confidence is engendered by a substantial due diligence process and a time-consuming process of negotiation and communication: this is not economic for small amounts of capital such as those normally encountered in bank loans. This is also why VCs prefer to invest relatively large sums.
- Third, it is argued that the size (in terms of the number of firms) of a VC portfolio tends to be much smaller than that typically managed by a bank loans account manager (see, for example, Wynant and Hatch, 1991) allowing the manager more time per investment.

This literature, therefore, is consistent with the previously-stated hypothesis that VCs' are less interested in small investments and, by extension, early-stage investments.

Mason, Cooper, and Harrison (2001), in their investigation of the development of the venture capital market in Ottawa, addressed a 'chicken and egg' problem. Specifically, they asked which comes first: high technology firms or venture capital? Their study addresses directly (and in a Canadian context) two relevant issues to this work. The first is the geographic dispersion of venture capital.

Hypothesis

Investments by Canadian venture capital companies are limited in terms of geographic scope.

Second, they studied the extent to which technology firms (and other types of high growth companies) are constrained by limited access to local risk capital. Through a series of interviews with business owners, VC managers, and private investors, Mason and his colleagues traced the development of both the Ottawa technology cluster and the investment patterns of risk capital in the cluster. They note that between 1990 and 1995 the number of technology-based firms had doubled to approximately 600. Yet, prior to 1995, there were no local private-sector sources of institutional venture capital in the Ottawa region even though the Ottawa cluster had experienced at least a decade of technology-based development. Between 1995 and 2001, however, the success of a number of Ottawa firms spawned significant VC interest in the regions. The result was that, 14 institutional VC firms had been established in Ottawa and approximately \$1.2 billion of VC was invested in Ottawa in the year 2000. This level of investment was approximately 25 percent of the national total.

Mason and his colleagues conclude that four factors led to the development of an active VC market in the Ottawa region. First, they note that the character of venture capital was changing "with the emergence of funds focused on specific technology spaces and weaker geographical ties". Second, they suggest that the history of development in the Ottawa region has led to the "development of a supply of experienced managers willing to take jobs in start-up companies". Third, they maintain that the "spectacular" returns earned on some early investments caught the attention of the VC community. Finally, they find that VC funds located in the Northeastern USA as well as funds located in Silicon Valley exceeded the opportunities available locally, "prompting a wider geographic search for investment opportunities". These findings are not consistent with the contention that the supply of institutional VC is limited for Canadian firms with strong growth prospects. Nor are these findings consistent with the hypothesis that the scope of venture capital investments is limited. According to Sohl (2001), US managers of VC

funds are willing to travel – including travel to Canada – to explore investment opportunities.

Venture Capital Decision Variables

There is a substantial literature on determinants of venture capitalists' decisions. The seminal article by Tyebjee and Bruno (1984) outlined the evaluation steps in the decision process. Subsequent work (Dixon, 1991; Fried and Hisrich, 1994; Hall and Hofer, 1993; Knight, 1990, 1994; Macmillan, Siegel, and Narasimha, 1985; Manigart, Wright, Robbie, Desbrieres, Philippe; and De Waele, 1997; Sandberg, Schweiger, and Hofer, 1988; Wright and Robbie, 1996; and Zacharakis and Meyer 1998), are examples, among many others, of ongoing work that attempts to identify the parameters of the venture capital decision process.

The literature examining the nature of the decision-making process used by venture capital firms can be classified in four categories. A first stream examines the stages of the decision making process (Tyebjee and Bruno, 1984; MacMillan, Siegel, Narasimha, 1985; Fried and Hisrich, 1994). These authors identified the following stages: initiation of the proposal, pre-screening, valuation (includes due diligence), structuring of the transaction, post-investment monitoring, and valuation of the investment.

A second stream tries to identify the selection criteria used by venture capital investors and their decision tree. The criteria identified fall under a number of categories such as the specificity of the product or service offered, the potential market size, the management team abilities (in particular the entrepreneurial experience and personality traits) or financial-related considerations (required return, exit potential, etc.). Some studies highlight the key role of the management team in investment selection (MacMillan, Siegel and Narasimha, 1985; Dixon, 1991; Knight, 1994) or the perception of the project risk (Tyebjee and Bruno, 1984).

In a related stream of research, the methods used to gather data during the studies mentioned above have been called into question. There is a fairly large potential for bias when the VCs are asked to give a retrospective account of the criteria used and their importance. They tend to place the criteria in the wrong order and list more of them than they actually use. Therefore, researchers suggest the use of verbal protocol analysis instead (Sanberg, Schweiger, Hoffer, 1990; Hall and Hoffer, 1993) or the simulation of decisions from certain cases (Zacharakis and Meyer, 1998) to infer the actual criteria used. Although they offer interesting leads, these studies offer sketchy results for the moment. Hall and Hoffer (1993) was exploratory in nature and analyzed the criteria used only during the first two stages of the decision-making process. Zacharakis and Meyer (1998) examined the power of introspection of the VCs in relation to their own decision-making process, obtaining mixed results, some supporting the poor capacity of the VCs to understand the way in which they operate and others showing some form of consistency in the application of their decision-making criteria.

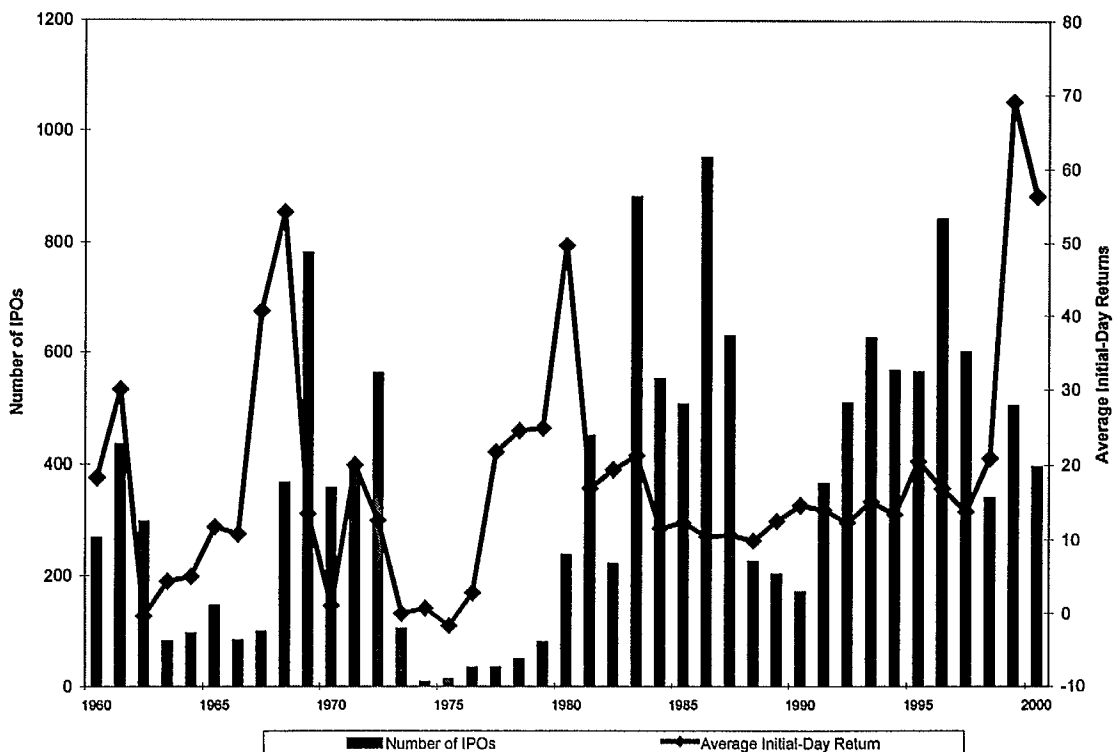
Another stream examines the valuation methods and techniques used by VCs, (as in Wright and Robbie (1996) in the United Kingdom and Manigart, Wright, Robbie, Desbrières and De Waele, 1997 in France, the Netherlands and Belgium). The methods most commonly used appear to differ across countries. In France and the United Kingdom the most commonly used methods are those based on multiples (net profits, profits before historical or projected interest and tax), followed by recent transactions

multiples and discounted cash flows. In Belgium and The Netherlands, discounted cash flows predominate, followed by multiples and comparisons with recent transactions. No work appears to have been conducted in a Canadian context on these issues.

Gap Analysis: The Market for IPOs

The market for initial public offerings is highly cyclical. Figure 3 charts the number of IPOs issued in the US annually since 1960 (the pattern for Canada has been very similar). For 2001, fewer than 70 IPOs have been issued in the US, although there is current speculation in the popular media that the frequency of IPO financing is increasing. The cyclicity is emphasized in Figure 3 by the average initial-day returns (gain or loss during the initial day of trading as a percentage of the initial listing price). It can be seen that several periods can be identified as "hot markets", including the 1998-2000 period. "Hot markets are evidenced by both a high number of IPOs and a high demand for the newly-issued shares of IPOs.

FIGURE 3: HISTORICAL PATTERNS OF IPO ISSUANCES AND INITIAL-DAY RETURNS



It is generally understood that regulatory requirements that pertain to IPOs are less severe in Canada than in the US (Clendenning and Associates, 2001). Moreover, it is also understood that the costs of going public – both direct costs and underpricing -- are also lower in Canada. The argument, articulated by the BDC (2001) that there is a "smaller appetite for IPOs in Canada" may stem from remarks made in a speech by The Honourable Paul Martin (speech to the Toronto Board of Trade: September 14, 2000) to the effect that the "per capita dollar value of IPOs done by Canadian enterprises in

Canada was only half the level raised by American enterprises in the US". The comment is bound to be true. As noted by Clendenning and Associates (2001), listing requirements on the NYSE, AMEX, and NASDAQ are all higher than those on the TSE. Firms that list on US exchanges are inevitably bigger; hence, the dollar value of IPO capital raised per capita is bound to be higher on US exchanges. Moreover, the BDC's interpretation of the Minister's comment does not take account of the Canadian firms that also raised capital by IPOs on US exchanges. Many did so for reasons unrelated to a perceived lack of capacity on Canadian markets (Foerster, Karolyi, and Mavrinac, 1998).

Clendenning and Associates (2001) echo the concerns raised by the Minister, and ask whether:

"capacity limitations in the Canadian market force Canadian SMEs to delay going public until they are sufficiently large to meet the more stringent regulatory requirements in the US?"

In a related question, Clendenning and Associates (2001, p.45) ask:

"Since Canadian companies continue to undertake a large volume of IPOs in the US market, despite the cost advantages of going public in Canada, does this indicate that there is a lack of capacity in the Canadian IPO market to meet Canadian financing needs or that other business benefits arising from going public in the US outweigh the Canadian cost advantages?"

These questions prompt the following hypothesis.

Hypothesis

It is relatively more difficult for Canadian firms to raise capital from the public markets in Canada than in the US.

Canadian IPO Activity: 1990-2000

Canadian Firms Listing in Canada

The data show that between January 1 1990 and December 31, 1999 approximately 179 Canadian firms undertook an IPO exclusively on the TSE (Jog and Hitsman, 2000). Jog and Hitsman document the yearly frequency and average underpricing of Canadian IPOs. Their findings are reproduced in Table 8.

As noted by Shutt and Williams (2000), going public in Canada is generally less expensive than doing so in the US. Updating Jog and Hitsman's figure to include 2000, approximately 210 firms have gone public on the TSE alone during the 1990-2000 period.

In addition, between January 1, 1994 and December 31, 2000, 46 Canadian companies made an IPO exclusively on NASDAQ or an IPO interlisted on NASDAQ and another exchange (usually the TSE). That these firms chose to issue their IPOs in the US begs the question of why they did so in spite of the findings that (a) 210 firms were able to go public and raise capital from Canadian markets with (b) lower levels of underpricing, and (c) at lower issuance costs (Shutt and Williams, 2000). Given these results, it is not entirely clear why a gap has been postulated in this segment of the market.

TABLE 8: CANADIAN IPOs, 1990-1999

Year	Number of IPOs	Underpricing		
		Minimum	Maximum	Average
1990	1	-0.70%	-0.70%	-0.70%
1991	3	0.96%	20.69%	8.55%
1992	6	0.00%	20.63%	9.46%
1993	50	-11.36%	200.00%	17.98%
1994	19	-7.75%	45.83%	5.60%
1990-94	79			13.76%
1995	8	-4.00%	83.33%	14.88%
1996	26	-5.33%	62.50%	11.63%
1997	32	-11.11%	84.21%	18.84%
1998	17	-33.33%	61.76%	9.43%
1999	17	-33.33%	54.05%	9.05%
1995-99	100			14.00%
<u>1990-99</u>	<u>179</u>			<u>13.55%</u>

Source: Jog and Hitsman (2000).

Canadian Firms Listing on US Exchanges

It is therefore worth investigating why these 46 Canadian firms listed on NASDAQ. Foerster, Karolyi, and Mavrinac (1998) have already examined why Canadian firms list on US markets. They interviewed the CEOs of 45 Canadian companies whose shares listed on US exchanges between 1990 and 1997. They found that Canadian firms chose to list on US exchanges for a multiplicity of reason. The findings of this study suggest that CEOs certainly recognized the greater access to capital, greater liquidity and higher degrees of institutional investment and analyst coverage associated with a US listing. However, the CEOs also recognized that American exchanges were more user-friendly, provided helpful marketing material and had more frequent contact with issuers. More specifically, reasons for listing on US exchanges include the following.

Size and liquidity of US markets. The US capital markets are the deepest in the world. This affords firms the ability to issue stock or debt securities more easily. The enhanced liquidity of the securities can translate into a lower cost of capital (because no liquidity premium is necessary). By comparison, many shares listed on Canadian markets,

including the TSE, are subject to infrequent trades. Many securities do not trade daily and others trade even less frequently.

Better IPO valuations. It has been claimed (Business Council on National Issues, 2000) that IPOs command a higher price in the US. This claim, however, is at variance with the finding that there is less underpricing in Canadian IPO markets (Clendenning and Associates, 2001). Underpricing is an important element of cost because high levels of underpricing mean that founders must dilute their holdings of equity to raise the funds the firm is seeking. Thus, it is not clear that CEOs' perceptions of better IPO valuations are consistent with research findings.

Access to US Institutional Investors. CEOs believe that US investment institutions are reluctant to invest in stocks on Canadian exchanges but that country of origin is irrelevant to US investment institutions if the shares are listed on US stock markets. In other words, Canadian investment institutions actively invest on US markets but US institutions are less likely to invest on Canadian markets. Moreover, firms that are cross-listed gain better visibility by means of a larger analyst following. In particular, CEOs of companies in non-traditional or emerging industries believed that listing on US exchanges affords a higher level of institutional following than if the firm had not cross listed.

Global Image. Foerster and his co-workers found that 76 percent of CEO respondents ranked the improved corporate image associated with listing on a US exchange ahead of other outcomes of interlisting. The respondents noted that listing in the US confers enhanced credibility for their companies and potentially facilitates strategic alliances and mergers.

"Be with your peers". CEO respondents inferred that when many companies in the same industry listed on a particular exchange there is much to be gained from doing so. CEOs believed that they would not be taken seriously if their firms were not listed on the same exchange as their competitors. Not to do so may put the company at a competitive disadvantage. This belief is witnessed by the proliferation of Internet-related companies on NASDAQ, considered the exchange of choice for Internet firms. As of early 2001, 32 Canadian Internet companies had listed exclusively on NASDAQ (Financial Post, November 15, 2001, IPO Market Begins to Show Signs of Life, p. IN1).

In addition, Jog and Hitsman (2000) speculate on other reasons that may prompt Canadian firms to list in the US. They argue that with freer trade, many of the Canadian firm's suppliers and customers may be located in the US and that they would be "more inclined to do business with firms having a presence in their own country". If so, a Canadian firm could benefit from the visibility that attends having stock traded on a US stock exchange even if it keeps its operations in Canada. However, they also note that if this were the only reason for an IPO on a US exchange, then the domestic firm could simply create a foreign address or seek a cross-country listing after raising IPO capital in the domestic market.

Jog and Hitsman conclude that differences in US and Canadian exchange rules, policies and taxation and regulatory regimes may make the US a more attractive alternative for IPO listing. The exchange policies with respect to insider trading, escrow requirements, and disclosure rules may result in preference for a US financing. The difference in tax regimes (for example in the taxation of capital gains) may benefit investors from one

country over another. Given the same expected after tax returns demanded by investors from their investment in an IPO, valuations will be higher in a country with a lower degree of capital gains taxation.

These arguments raise the question of the degree to which the Canadian and US markets are integrated. In general, two markets are integrated if the securities that trade on them provide the same risk-adjusted returns. Foerster and Karolyi (1999) identify several potential barriers to integration. For example, segmentation is furthered by foreign content rules on RRSP portfolios and the definition of "Canadian" firms that are eligible for RRSP investment. Foerster and Karolyi document differences in liquidity between Canadian and US markets and different levels of information asymmetry that suggest segmentation. However, they also note that North American markets are becoming increasingly integrated over time as globalization and free trade lead to elimination of barriers. For example, discussion regarding the formation of a global equity market have been initiated, a market in which the TSE would join with other international markets to form a global 24-hour-trading exchange.

Overall, the work of Foerster and his colleagues suggests that enhanced liquidity, credibility, and global image are the main reasons that Canadian firms list their shares on US markets. The importance of corporate image and credibility were found to be particularly important determinants of listing location. A substantial number of Canadian firms also undertook IPOs within Canada. This situation questions the hypothesis that the capacity of the Canadian market is limited. On the other hand, it is also true that the shares of many Canadian companies are relatively illiquid.

The FDI is not likely to provide the data to fully resolve this debate. To do so will likely entail a specialized study of Canadian IPOs; however, given the work already published by Foerster and his colleagues, it is not clear that an additional study would add to our understanding of these issues. Moreover, it is seen that a "lack of appetite for IPOs" could be interpreted in either of two ways: a lack of ability of the marketplace to purchase the IPO issues or a lack of liquidity in the aftermarket.

Valuation of IPOs, Underpricing, Post-Issuance Performance

Several hundreds of academic papers that relate to IPOs have been published.¹⁰ Generally, these papers deal with one of three aspects: valuation of the shares (setting the offering price), underpricing (the change in the share price during the time immediately following the offer), or IPO performance (returns to investors for a sustained period following the offer). Loo and Riding (2001) offer concise summary of this research, the salient conclusions of which follow.

Valuation of IPOs is usually accomplished by means of the comparable firms approach is typically implemented by capitalizing the earnings per share (EPS) of the firm under consideration at a price-earnings (P/E) ratio representative of comparable publicly traded firms. Other market multiples, such as market-to-book, price-sales, and price-operating earnings ratios, are sometimes employed among other alternative market multiples that can be used in this approach. According to Kim and Ritter (1999), however, multiples based on comparable firms have only modest predictive power without adjustments for differences in growth and profitability.

¹⁰ See, for example, <http://www.iporesources.org/iporefs.html>

IPOs are, on average, *underpriced*. Loughran, Ritter and Rydqvist (2000) summarized studies of IPO underpricing across 36 countries. Most countries experienced positive initial returns. In other words, all had shown underpricing phenomena. China experienced the highest average initial returns (388%) and France the lowest (4.2%). Jog and Riding (1987) and Jog (1997) compared underpricing of IPOs on the Toronto Stock Exchange (TSE) in Canada with underpricing reported for the United States. According to Clendenning and Associates (2001) underpricing on the TSE averaged 5.8% (this value differs from the 14 percent reported by Jog and Hitsman, 2000) compared with 10.9% on the NYSE and 49.6% on NASDAQ. Loo and Riding (2001) also show that underpricing on NASDAQ is more severe for technology-based firms than for traditional enterprises.

Assessment of post-issuance stock market *performance* has been reported by Ritter (1991) using US data and by Jog (1994), using Canadian data. Both found that the long-term performance of IPOs was disappointing and that IPOs underperformed, on average, stock market indices. Young and Zaima (1987) examined potential industry effects on IPO underpricing and performance. The aftermarket performance did not show any statistically significant differences across traditional industry groupings.

These results may provide background for future specialized studies related to the FDI as it pertains to IPOs.

Gaps as seen by Suppliers of Capital

Gaps on the Demand Side: Lack of Management Skills

The usual sense of capital market gaps, as traditionally described in the media and much of the research literature, pertains to a shortage of the *supply* of capital for SMEs. However, Hillier and Ibrahimo (1993) note that suppliers of capital can equally be viewed as purchasers of "risky promises to pay". From this perspective, there is increasing evidence that suppliers of capital perceive a shortage of *investment-ready opportunities*. This section of the study reports on recent studies that witness a gap on the "demand side" of the capital markets.

Managerial competency is the key element in investment readiness. This is because managerial competencies are positively associated with firm performance across a variety of organizational and industry settings (Baldwin, 1993; Baum, 1995; Dyke et al., 1992; Lefebvre & Lefebvre, 2000; Tucker & McCarthy, 2001; Watson-Wyatt, 2000; among others). For example:

- recent reports by Newton (2001) and Newton and Lee (2001) document that "among various sources of firms' innovation, management is the most prominent" and that "small firms rely on management as the well-spring of their innovation to a greater extent than do large firms.
- Lefebvre & Lefebvre (2000) report that the *innovative capabilities* of the management team (e.g., *ability to undertake R&D, knowledge intensity* and *unique know-how*) are strongly associated with export performance and growth.
- Orser's (1997) *Managerial Capacity Index* presents a composite measure of managerial experience and activity. Significant differences were found among groups of business owners. Owner's breadth (versus depth) of experience was positively associated with *both* strategic planning practices (e.g., planning sophistication, ability to communicate business planning intentions) and high performance.
- Similarly, the absence of managerial skills is associated with poor firm performance. For example, Baldwin (1997) concludes that the main reason for Canadian business failure is inexperienced management. Seventy-one per cent of the firms that failed reflected deficiencies in both general and financial management. This author also refers to issues related to depth and breadth of knowledge about marketing, finance and operations. Loss of management control, inability to adapt, lack of flexibility and poor communication were cited as problematic.

These findings point to the issue of *attribution of business success*, an issue that goes to the core of demand-side gaps. On the one hand, while general management competencies are consistently associated with firm survival and performance, business owners often fail to attribute success (or failure) to their skills and (lack of) abilities. For

example, Industry Canada's (2001) recent survey of micro-businesses owners asked respondents to indicate those factors perceived as "vitally important in determining whether or not your business succeeds". Only 6 in 10 (61 percent) indicated management skills. Management skill were ranked well below "favourable market conditions", "the regulatory environment", "relationship with business partners", "planning" and "clear vision".

On the other hand of the attribution issue, lack of management skill is consistently cited as the principal reason that capital is *not* advanced. Early evidence about the role of management competencies and lending was documented by Wynant and Hatch (1991). In their comments about the planning and financial management skills in small businesses, the authors note:

"Our interviews with small businesses and accountants indicate that the vast majority of small business owners are overly optimistic about the prospects for their firms ... Most small businesses engage in little, if any, planning...The financial management skills in most small businesses are weak... Many small business managers do not appear to be familiar with the actual terms of their loan facility."

More recent studies cite the association between access to capital and managerial competencies. For example, in a review of the Small Business Lending Act (SBLA) loan portfolio, Equinox (2001a) documents that the primary reason given by lenders for default of loans was poor management skills of borrowers. Management competencies also impact the ability of business owners to secure capital. For example, in a UK-based study of early stage equity finance, Mason and Harrison (2001) found no shortage of available capital. Among the 74 British business angels surveyed, 81 percent indicated that their ability to invest was limited by the quality of the opportunities they see. The two primary deficiencies were: (a) unrealistic assumptions or information that is not credible, and (b) the entrepreneur/management team lacked credibility. The researchers conclude:

"The implication is that there is a need for further interventions by policy makers to remove these barriers so that more small firms can take advantage of the substantial pool of angel finance that is available." (Mason and Harrison, 2001)

Unfortunately, while the association between (a) managerial competencies, (b) the ability to secure capita, and (c) firm performance is intuitively sound and supported empirically, research has yet to determine the particular competencies associated with firm survival.

"Studies of small firm failures often reveal failures in managerial competence in specific areas such as financial management and marketing (Storey et al., 1987). However, such umbrella terms often disguise the specifics of failure. For example, what is meant by financial management – does it mean cashflow? Does it mean pricing? Does it mean controlling stock? Does it mean obtaining adequate fiance to begin with? Does it mean not paying too much for funding? Does it mean attracting the right type of funds for the business? Does it mean appointment an accountant?" (Hines, 1995)

It is not clear, however, which competencies are required to successfully start or build firms. This is likely because managerial competencies are situation-specific (Hines, 1995).¹¹ These results do, however, suggest that gaps in the demand-side of the capital marketplace demonstrate the importance of business owners' managerial capacity when evaluating access to capital.

Hypothesis

Access to all forms of debt and equity capital is positively associated with business owners' managerial capacity.

Managerial Competencies and Threshold Theory

While it is beyond the scope of this study to review the theories of SME growth, the concepts of managerial competency and threshold theory is particularly relevant given managerial competency is consistently associated with firm survival and growth and hence, the ability to acquire capital. Thornhill and Amit (1998) point out the importance of competency research, work "that seeks to ascribe credit (or blame) for performance to the decisions of the manager or entrepreneur. Again, according to Thornhill and Amit:

Which strategies are utilized, and which distinctive competencies or capabilities are cultivated and employed, can each have a significant impact on a firm's chances for survival and, ultimately, for growth. The resource-based view (RBV) depicts firms as heterogeneous bundles of idiosyncratic hard-to-imitate resources and capabilities (e.g., Conner, 1991; Rumelt, 1984; Wernerfelt, 1984). This baseline view of the firm has been extended by Amit and Schemakrer (1993), who emphasize the importance of capability development within industry context, and by Teece, Pisano and Shuen (1997) who lend a dynamic perspective to the RBV."

Two Canadian research teams have recently explored empirically the notion of managerial competency and thresholds of growth. A third recent Canadian report focuses on the deficiencies in management skills in the small business population:

- Orser et al (2000) argue that firm growth occurs when a threshold of administrative and managerial acumen is attained by the management team. The study also investigated the problems that confront owners and managers at different stages in business development. They found that the severity of managerial problems varies by firm attributes, including size. Problems of domestic demand, the firm availability of alternative sources of finance, a lack of financial expertise and lack of information about financing options were particular problems for smaller (micro) operations. Female business owners

¹¹ This raises additional challenges for research. For example, Burgoyne (1989) refers to eight problems that any competency-based approach must address: divisibility of the competencies and their reintegration for performance; measurability of competencies, and appropriate methods to measure; how universal or generalisable a listing is over different categories of manager; the ethical/moral content of professional management, and their representation in competency listings; the permanence of competency listings given the changing nature of managing; accommodating different styles and strategies of managing; how managerial competencies relate to the whole person; and finally, how individual competence contribute to and integrate into collective or organizational competence.

were more likely to report lack of access to capital as a problem. Growth was associated with younger and larger firms, incorporated businesses, the manufacturing sector, and a business plan.

- In a study about the importance of innovative capabilities as determinants of export performance, Lefebvre and Lefebvre (2000) also comment on organizational thresholds in the non-linear growth patterns of SME:

"Furthermore, it is quite possible that, above a certain threshold, size no longer plays a significant role. Evidence from Australia, Denmark, Italy, Japan, and Spain supports this observation: size is of considerable importance during the early stages of internationalization but does not seem to be a significant factor afterwards (OECD, 1997)... The relationship between age and exports may also produce conflicting results. On the one hand, mature firms may have accumulated considerable stocks of knowledge (Baldwin and Rafiquzzaman, 1998) and built strong core capabilities that allow them to better penetrate foreign markets. On the other hand, core capabilities can become core rigidities or competence traps (Leonard-Barton, 1992) and younger firms may be more proactive, flexible and aggressive.

These empirical results are consistent with the conceptual paper on "Management Skills for Small Business" by Newton (2001). This author concludes that policy-makers require a better understanding of the links between the development of small business management skills and performance. More information is also required about potential generic management skills sets that are common across industries and competencies that are specific to particular lines of business.

These studies suggest the following hypothesis:

Hypothesis

Particular management competencies are related to the stage of firm development.

In summary, the two hypothesis advanced in this section suggest that management competence is a key determinant of access to capital and that a lack of appropriate management skills may mitigate against access to financing and encourage the perception of gaps when they may not exist.

An Analytical Framework for Gap Analysis

For each source of capital considered here, two aspects of financing are of particular interest: the finance granting decision and the terms on which financing is advanced. The former is the suppliers' decision of whether or not to advance financing (for example, grant a loan application or not; provide venture capital or not; etc.). The latter aspect relates to the terms on which financing is advanced (for example, interest rates and collateral requirements etc. on loans; terms of venture capital contract; etc.).

This section opens with some generic comments about the empirical challenges associated with discerning the extent to which financing decisions are subject to two types of influences. The first set of factors are those that are usually considered to be legitimate determinants of credit or investment decisions. The second set of factors are across which gaps have been hypothesized. In a sense, the latter category are problematic because they may be less legitimate determinants of creditworthiness or investment readiness.

Generic Issues

From a general methodological standpoint, the problem posed by the gap analysis research is to determine if a particular variable, (an rationing criterion) affects financing outcomes or terms of financing. The impact of such variables cannot be measured directly as there are numerous other variables that can legitimately affect financing-related outcomes (for example credit/equity worthiness variables which we will refer to as *covariates*). Thus a simple breakdown across gap categories will be biased if the values of the "legitimate" variables also differ initially across categories of the rationing variable, as is usually the case. For example, sector of firm (arguably a legitimate determinant of creditworthiness) correlates with gender of owner (a potential rationing variable). Thus the problem at hand is to develop appropriate methods for removing this bias so that a plausible causal inference can be made.

This problem differs slightly from many bias reduction studies in that legitimate credit/equity worthiness variables can be enumerated and measured. This is in contrast to many bias reduction situations in which there is always the possibility that unknown and unmeasured covariates remain to bias the group comparison after the effects of all known covariates have been removed. Nevertheless, in the present case, if a particular "gap" effect is identified after due adjustment for the covariates, this still does not necessarily constitute proof that the postulated "gap" variable is causally related to the observed differences in financing outcomes. For example, one can conclude that it is not imbalances in the legitimate covariates (i.e., the credit/equity worthiness measures) that are responsible for the gap. However, there may be other rationing criteria (perhaps unmeasured) that are correlated with the outcome financing measures, and that are causing the observed effects. In other words, there may remain what Campbell and Stanley (1966) called "plausible alternative hypotheses" to the postulated source of the measured gap. If variables representing such plausible alternatives have been measured, their effect can be explored, which will then exhaust all possibilities for statistical bias reduction. If a statistically significant gap remains, then the validity of the

causal inference will rest on the care taken by the survey designers to include and measure all relevant variables.

The Access to Capital Decision

To examine the finance granting decision (for example, loan approval or turndown) a logistic regression approach is recommended. This type analysis uses a linear predictor vector that includes standard determinants of eligibility for credit or equity (call these the x 's) and one or more possible rationing criteria that specify the hypothesized gap or gaps (call these the z 's). Alternative rationing criteria include: the gender of the owner, whether or not the company is knowledge-based, size, etc. The strategy for a given rationing criterion, z_j , is to determine whether or not z_j makes a significant contribution to the regression, over and above the effect of the x 's. This will be signaled by a significant logistic regression coefficient for z_j .

Likelihood of Loan Turndown

$$= f \{ \text{Rationing Criteria (z)} \} + f \{ \text{Moderating Variables (x)} \}$$

Company size as a rationing variable is of particular interest methodologically (as well as substantively) as it is also one of the primary stratification variables used in the demand-side survey design (further details of the design are yet to be supplied by Industry Canada and its partners). Since there are far more small companies than large companies, the sampling fractions will vary across size strata, with the smallest sampling fraction being assigned to the stratum containing small companies (details to be verified). Thus units (companies) will be selected into the sample with unequal probabilities, so that the units in the sample will have associated survey weights that vary across strata. If Statistics Canada uses post-stratification to improve survey accuracy, and / or weighting adjustments to correct for non-response, additional variation will be incorporated into the survey weights.

Whenever unequal survey weights are encountered, the analyst must decide whether to use the weights and perform a design-based weighted analysis, or to ignore the weights and perform a model-based analysis. There is an extensive literature on this (see the reviews by Thomas, 1993; Korn and Graubard, 1999; Lohr, 1999), and there are advantages and disadvantages to both approaches, as described presently.

- The basic advantage of the *unweighted model-based approach* is that if the analytical model correctly describes the mechanisms generating the data, then the unweighted analysis is unbiased (in the linear regression case - approximately so for logistic regression) and more efficient than the weighted analysis. However, if the model is not correct (if it has the wrong functional form, or if it omits variables that are related to the weights) then a purely model-based analysis may be seriously biased. What is interesting about the rationing variable size is that its inclusion will automatically build into the model information about the design, which will decrease the potential bias.
- In contrast to the unweighted model-based approach, a *weighted design-based analysis* yields approximately design-unbiased estimates irrespective of the model form. However, this may not necessarily be as good as it sounds, unless the model, which is imposed on the finite population of interest, is a meaningful representation of the true (unknown) model

generating the data. In other words, it is important to search for a good model irrespective of the analysis method that is chosen.

The consensus now is that both analyses, weighted and unweighted, should be carried out and compared, in order to assess the magnitude of any bias in the unweighted analysis. Korn and Graubard (1999) also describe a method for assessing the degree of relative inefficiency introduced by the weighted analysis. The choice of which strategy to use (weighted or unweighted) will be made after due consideration of the bias and efficiency tradeoff. All variance estimation for the design-based analysis must follow design principles - the standard "weighted" analyses available in SPSS and SAS, for example, will give incorrect variances in the weighted case.

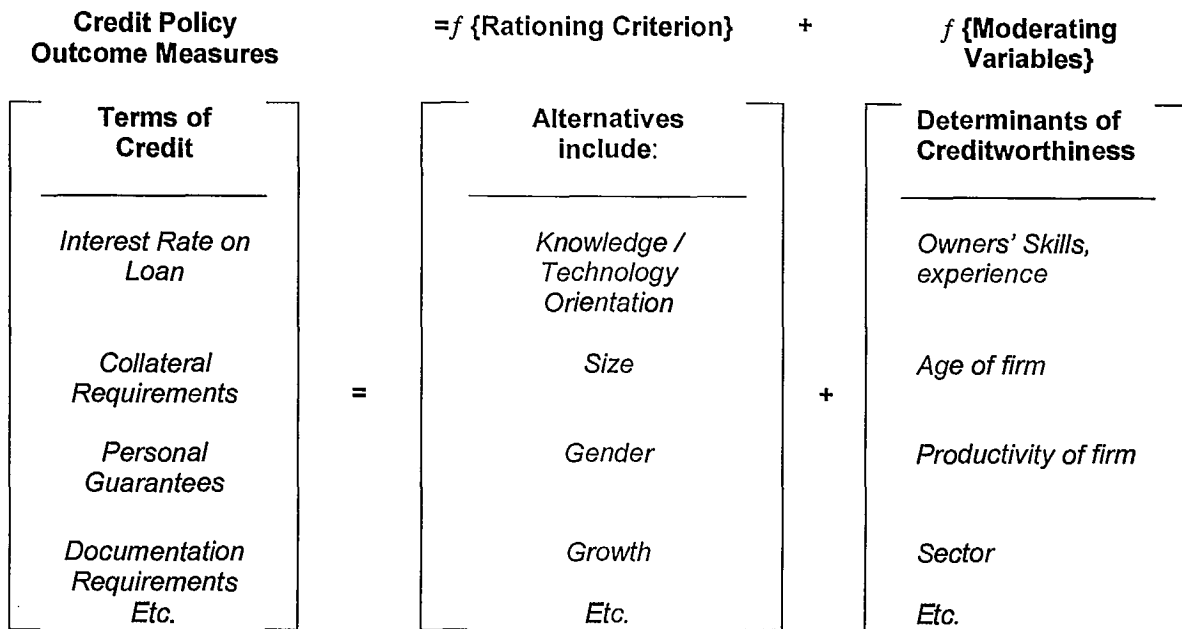
It is particularly important to perform extensive regression diagnostics and studies of model fit. It is always easier to perform such investigations for multiple linear regression rather than for multiple logistic regression. However, strategies for examining fit have been developed in the latter case also (see, for example, Hosmer and Lemeshow, 1989). Some of these have been adapted to the logistic case, as described by Korn and Graubard (1999). Goodness of fit tables based on weighted data can be constructed to assess model fit. Partial residual plots can also be constructed to examine residual variation relative to single variables, useful for assessing linearity and for identifying influential observations. Interactions among the x 's and between the x 's and the z 's must also be systematically explored, as the "gap" under examination may not be uniform but may vary depending on legitimate determinants of credit/equity worthiness.

In summary, it is critical that a thorough search be made for the best fitting model, since the determination of a gap will depend on the presence in the model of a significant coefficient for gap variable z_j . If this significant coefficient could be rendered insignificant through the addition of other (non - z) variables and / or interactions to the model, this case for the gap would disappear. Given the public policy implications, we must ensure (within the data limitations of the survey) that all plausible alternatives (Campbell and Stanley, 1966) have been accounted for.

Terms of Financing

For this discussion, we will use terms of credit as an example; however, the discussion applies generally to each of the various types of financing investigated under the DFI.

The terms of credit to be investigated include: interest rate on the loan; collateral requirements; personal guarantees; and documentation requirements. Assuming that these can all be represented in terms of ratio or interval scaled variables, a strategy similar to that described above can be used to investigate the existence of specific gaps. Instead of using logistic regression, the vector of measures of credit terms can be modeled using multivariate multiple regression. With the possible rationing variables (gaps) represented by categorical variables, and the moderating variables representing legitimate determinant of creditworthiness represented by continuous and / or categorical variables, this analysis amounts to multivariate analysis of covariance (MANCOVA). If a "gap" variable is significant after adjustment for the effect of covariates, then this will constitute evidence of the existence of the postulated gap in the terms of credit. The MANCOVA model may be conceptualized as follows.



The issue of weighted versus unweighted analyses is again relevant. An unweighted analysis, if valid, can proceed using the classical MANCOVA approach, the "gap" test comprising an adjusted test of a main effect. The usual multivariate tests (Hotelling's, Wilks) can be applied, subject to an appropriate assessment of the model assumptions. In addition to the model exploration described above, the assumptions in this case include equality of covariance matrices, avoidance of extreme non-normality, as well as testing for parallelism of covariate slopes in the two (or more) "gap" categories, e.g., size strata. A weighted design-based analysis will accomplish similar goals, though the formulation will appear to be quite different, and some of the model-based assumptions (e.g. covariance equality, slope equality) will not be relevant. It is interesting to note that design-based MANCOVA analyses have not been explicitly described in the literature, though they can be effected using fairly standard techniques, as described below.

In the weighted case, it is convenient to represent the MANCOVA as a system of correlated multiple regressions, one for each of the individual terms of credit. The regression coefficients for the "gap" variables (one or more) and the covariates (the x's) will in this case correspond to a MANCOVA model in which the assumption of equality of covariances and covariate slopes are completely relaxed. Hypothesis tests in the weighted case (to identify specific gaps, and to explore model adequacy) will be constructed using Wald tests; examples of Wald tests for a variety of regression situations are described by Korn and Graubard (1999). It should be noted that the correlations among the various terms of credit can be accounted for in these hypothesis tests. This will require that design-based estimates of correlations include correlations across equations as well as between different covariates. Such correlations can be readily obtained if Statistics Canada variance estimation is based on a replication strategy (jackknifing or bootstrapping). It was noted in the previous section that weighted and unweighted analyses should be compared in order to assess possible

biases. Again, this would be greatly facilitated if replicate estimates of variance can be obtained.

Alternative Methodologies

The two approaches described above are similar in that the search for a "gap" is dependent on a model, irrespective of the type of estimation and inference used (unweighted model-based or weighted design-based). It is for this reason that the need for model diagnostics was stressed - selection of an incomplete model might result in the erroneous identification of a gap (or no gap).

There are alternative techniques that place less reliance on a model linking loan success or terms of credit to credit worthiness and possible rationing (gap) criteria. The general principle behind the available methods is to match companies in different "gap" categories (e.g., male versus female company principal) on the basis of the moderating variables or covariates, namely the legitimate measures of credit worthiness. This balances the covariates across the gap categories, so that a simple comparison of loan outcome or credit terms between the balanced groups will comprise an approximately unbiased assessment of the gap.

For a two-category gap variable (e.g., male - female), one method for effecting this covariate balancing is to categorize units (companies) on the basis of their *propensity scores* (Rosenbaum and Rubin, 1984). A propensity score is the probability that a particular unit belongs to a given reference category (e.g., the male group). To compare terms of credit, for example, the average interest rate for males and females in each propensity group would be calculated. The unweighted mean of the differences between corresponding propensity group means would then provide an overall male - female interest rate contrast, balanced for the effect of initial differences in credit worthiness. For use in this study, this method would have to be adapted to accommodate survey weights, a routine task.

Other techniques based on *pairwise matching* could also be used. Matching can be based on the propensity scores themselves (Rubin, 1979) or on Mahalanobis distance (Rubin, 1980). Previous experience is that grouping based on propensity scores is the easiest to implement. A major attraction of the Mahalanobis matching method, on the other hand, is that it is model free.

The GAP Analysis Model: The Market for Commercial Loans

Given the above research challenges, a two-stage gap analysis framework is suggested:

- The first stage would use logistic regression to assess the determinants of the decision to grant a commercial loan.
- The second stage would use responses from those firms whose loans were approved and it would assess determinants of the terms of credit. Two alternative empirical approaches might be used for the second stage. One

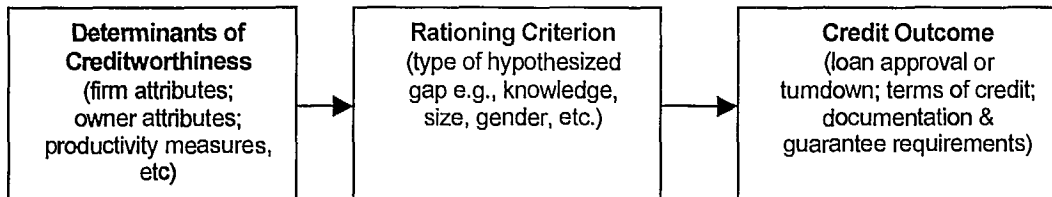
alternative is a MANCOVA framework; the other is based on matching and propensity scoring.

Determinants of Loan Turndowns

The subsample of interest for this analysis comprises those firms that have reported applying for a loan during the period investigated by the questionnaire. The dependent variable would be either a binomial measure of the loan decision outcome (whether or not the loan had been turned down) or multinomial (whether the loan had been turned down, approved in full, approved in part). To comply with the statistical assumptions, the loan decision outcome would need to be transformed using a logit-type transformation. The research literature has shown that lenders' decision to grant a loan, or not, is based on a variety of factors. Therefore, a multivariate analytical framework is mandated. Potential drivers of the loan decision include such factors as sector, skills of owner(s), age of firm, etc. (see Wynant and Hatch, 1991 and Haines and Riding (1994). In addition, the analysis would include measures of potential rationing criteria.

Several statistical approaches are possible, especially with such large samples. A complication of the analysis is the likelihood that potential rationing criteria correlate with moderating variables (for example, gender with sector) and that moderating variables may be correlated among themselves (for example, size and age of firm). This collinearity condition may hamper direct interpretation of regression coefficients.

It is proposed that the approach for testing of credit gaps be vested in the following framework. According to this model, credit outcomes reflect traditional measures of creditworthiness (e.g., efficiency of firm, owner(s) skills and experience determine credit). However, in the presence of a gap, the gap dimension (e.g., size, gender, etc.) acts as a filter through which traditional credit determinants may differentially affect the credit outcome.



Several credit outcomes are of interest. Access to credit is measured by the firm's experience related to whether or not a loan request had been approved. A second outcome, terms of credit, is measured by elements of the loan approval such as interest rate charged, collateral requirements, documentation requirements, the nature of personal guarantees, etc.

For the loan granting decision, a multivariate logistic regression model with a binary dependent variable (loan granted or not) is proposed.

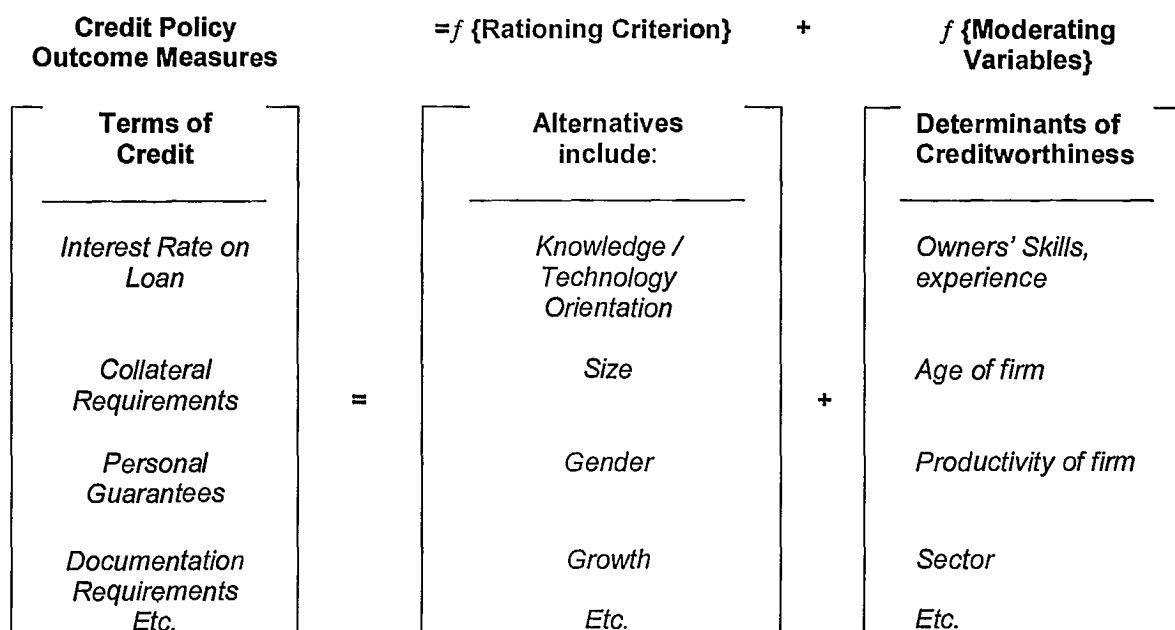
Likelihood of Loan Turndown = f {Rationing Criterion} + f {Moderating Variables}

The outcome variable would be a logit or probit transformation of whether or not the firm's application for a commercial loan had been turned down or not. Moderating

variables here would include those factors that are generally accepted determinants of the credit decision. Based on previous work by Wynant and Hatch (1991), Haines and Riding (1995) (among others) these include measures of owner(s)' skills and experience, industry and geographic sector variables, measures of age of firm, productivity, and other dimensions of credit worthiness. The rationing criterion would be the particular dimension suspected of being the basis of a gap or imperfection.

Terms of Credit

Statistical modeling of terms of credit may be undertaken in several ways. One approach is based on that of Toivanen and Cressy (2000) who used a system of equations based on a theoretical model of the bank-SME relationship. Another approach is based on MANCOVA. In MANCOVA a vector of outcome variables (each of which is a measure of credit terms; for example, interest rate, collateral demand, etc.) is statistically related to a group of covariates (in this instance, determinants of terms of credit) and one or more fixed factors (here, potential bases for credit rationing).



MANCOVA provides a relatively robust means of investigating the types of relationships that are of interest here.

Extensions of the Model to Leasing and Mezzanine Financing

The framework outlined above is specified in terms of the commercial loan market. However, it is also appropriate (with suitable modification of the variables) for application to the leasing market. In the event that there is sufficient data, this framework can also be used to investigate the determinants of access to mezzanine financing. Of course, the data used for these analyses would be based on different extractions from the full sample. For investigation of leasing, only those firms that have reported applying for a lease would be used. Likewise, only firms seeking mezzanine financing would be used for that analysis.

A Framework for Analysis of Gaps in the Canadian Informal Market

The data to be collected under the terms of the FDI may inform further the debate about the level of investment collectively made by private investors. The findings from the sample, properly weighted and scaled up to the Canadian population of firms would provide a useful starting point for this estimate.

In addition, the research literature has consistently reported that informal investors focus on early stage growth-oriented businesses. This finding that characterizes the academic literature appears to be at variance with respect the gaps postulated by the BDC. This may be resolved by breakdowns by stage of business, size of firm, and growth record of firms that have reported receipt of informal capital. If the BDC position is correct, early stage firms, small firms, and growth firms ought not received informal capital any more frequently than, respectively, later stage enterprises, large firms, and firms that have not grown.

The research framework suggested to examine the gaps postulated is very similar to that described above for the debt marker. As before, a multivariate analysis is suggested based on logistic regression. In logistic regression, the dependent variable is dichotomous (e.g., firm received private investment or it did not). In view of the research related to the informal market, independent variables should include measures of firm size, growth, stage of development, measures of managerial ability and experience, sector classification variables, and others that would logically relate to private investors decisions.

For the private investment outcome, a multivariate logistic regression model similar in structure to that described with respect to lending decisions is proposed.

$$\begin{array}{l} \text{Likelihood of} \\ \text{Approval of} \\ \text{Application for} \\ \text{Private Investment} \end{array} = f \{ \text{Rationing} \\ \text{Criterion} \} + f \{ \text{Moderating} \\ \text{Variables} \}$$

The outcome variable would be a logit transformation of whether or not the firm's application for private investment had been turned down or not. Moderating variables here would include those factors that are generally accepted determinants of angels' decision criteria. Based on the previous works by Mason and his colleagues (1996, 2001), Feeney, Haines and Riding (1999) (among others) these include measures of owner(s)' skills and experience, industry and geographic sector variables, growth orientation of the firm, and attributes of the business. As before, the logistic regression model employs a linear predictor that includes literature-specified determinants of access to informal capital (the x's) and one or more possible rationing criteria that specify the hypothesized gap or gaps (the z's). The rationing criterion would be the particular dimension suspected of being the basis of a gap or imperfection (hypothesized dimensions include size, stage, KBI orientation, etc.).

The analysis strategy for a given rationing criterion, z_j , is to determine whether or not z_j makes a significant contribution to the regression, over and above the effect of the x's. This will be signaled by a significant logistic regression coefficient for z_j . As noted previously, it is critical that a sound theoretical model be specified because the

determination of a gap will depend on the presence in the model of a significant coefficient for gap variable z_j . If this significant coefficient could be rendered insignificant through the addition of other (non - z) variables and / or interactions to the model, this case for the gap would disappear. This analysis would be applied to that subset of respondents who reported having applied for financing from private investors. Even with 11,000 respondents to the survey, the fraction of respondents who have sought capital from third-party private investors may be small. The reliability of the analyses suggested here will depend ultimately on the number of respondents who have sought informal capital.

A Framework for Analysis of Gaps in the Canadian Venture Capital Market

To further inform this issue, a multivariate analysis similar to that specified for bank loan decisions and decisions rendered by private investors is suggested. Based on logistic regression, the dependent variable would be dichotomous (firm received venture capital investment or it did not). This outcome measure is modeled as a function of a vector of independent variables. In view of the hypotheses advanced here, these variables should include measures of firm size, growth, stage of development, measures of managerial ability and experience, sector classification variables, and others that would logically relate to venture capital investment decisions. That is:

$$\text{Likelihood of Approval of Application for VC Investment} = f \{ \text{Rationing Criterion, } Z_j \} + f \{ \text{Moderating Variables, } X_i \}$$

The outcome variable would be a logit transformation of whether or not the firm's application for VC had been turned down or not. Moderating variables here would include those factors that are generally accepted determinants of VC decision criteria. As before, the logistic regression model employs a linear predictor that includes literature-specified determinants of access to informal capital (the x 's) and one or more possible rationing criteria that specify the hypothesized gap or gaps (the z 's).

As noted previously, it is essential that a sound theoretical model be specified because the determination of a gap will depend on the presence in the model of a significant coefficient for gap variable z_j . This analysis would be applied to that subset of respondents who reported having applied for financing from private investors. Even with 11,000 respondents to the survey, the fraction of respondents who have sought venture capital may be small. The reliability of the analyses suggested here will depend ultimately on the number of respondents who have sought informal capital and this makes model specification more important.

The rationing criterion would be the particular dimension hypothesized as being the basis of a gap or imperfection (hypothesized dimensions include size, stage, KBI orientation, etc.).

Next Steps

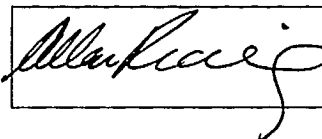
This document has provided an initial summary of the research literature that pertains to capital market gaps, imperfections, and failures. On the basis of this review a number of hypotheses have been posed as a basis for empirical testing and a gap analysis framework has been proposed.

The next steps are to use this document as the basis of discussion involving the research team and the various partners to the Financing Data Initiative. On the basis of such discussion, the approaches that have been proposed here – and of additional research strategies that may yet evolve from further discussion – will be examined. On the basis of such feedback, the gap analysis model will be developed more fully and as appropriate.

PLEASE NOTE: THIS DOCUMENT IS SUBMITTED IN THE INTERESTS OF INITIATING FURTHER DISCUSSION WITH THE PROJECT AUTHORITY AND OTHER STAKEHOLDERS. AS SUCH THIS IS A DRAFT REPORT THAT WILL BE UPDATED TO REFLECT FUTURE DISCUSSION AND FEEDBACK

COMMENTS AND SUGGESTIONS ARE WELCOME.

Submitted

	<p><i>Allan Riding</i> <i>Equinox Management Consultants Ltd.</i> <i>November 19, 2001.</i></p>
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