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CANADA

National Advisory Board
on Science and Technology

Under-Funding the Future: Canada's Cost of Capital Problem

Report by The Canada Consulting Group

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Canada's Cost of
Capital Problem**

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Under-Funding the Future: Canada's Cost of Capital Problem

A Report by
The Canada Consulting Group

February 17, 1992

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ABOUT THE AUTHORS

The Canada Consulting Group is an international consulting firm based in Toronto specializing in corporate and business unit strategy and organizational effectiveness for companies, and in economic development and industrial policy work for governments, industry associations, and trade unions.

In addition to its extensive work in the private sector, The Canada Consulting Group has provided economic policy advice to the federal government and a number of provincial governments in Canada, as well as to governments and public policy agencies in the U.S., Europe, Latin America, and Australia.

Members of The Canada Consulting team on this project included David Pecaut, David Thompson, Jerome Redican, Joan Dea, Sherri Taggart and Ken Purdy.

ACKNOWLEDGEMENTS

The work that forms the basis for this monograph was carried out at the request of the Financing of Innovation Committee of the National Advisory Board on Science and Technology (NABST), as part of their continuing work directed towards strengthening Canada's competitive position in science, technology and knowledge-driven industries. NABST also funded the majority of the costs associated with the project.

We are grateful for the enthusiastic support and guidance of Ms. Beverly Brennan, the then Chairperson of the committee, and for the tactful and insightful guidance of David Beattie and David Burden, advisers to NABST and to us. We also appreciated the lively debate and discussions we had with NABST members in our various presentations.

In carrying out the analysis of the cost of capital at the country level we built upon the methodology initially developed by Robert McCauley and Stephen Zimmer of the Federal Reserve Bank of New York, (FRBNY). We imposed extensively upon their time and patience and appreciated their generosity with both. The company level calculations were carried out by Callard, Madden and Associates, and we thank Dennis Aust for his efforts and Chuck Callard for his support and insights.

We also relied on the insights of the technical advisors whom NABST and we recruited for this project. Professor Richard Lipsey of UBC, Pierre Fortin of UdQM, and Doug Purvis of Queen's. They added to the rigour of the presentation of our analysis, but did not attempt to impose upon us their individual views of the appropriate conclusions or remedies. We also benefited from the counsel of two distinguished advisors from the United States: George Hatsopoulos, CEO of Thermo-Electron Inc. and a major contributor to the debate on the cost of capital in the United States; and Paul Krugman, of the Massachusetts Institute of Technology.

The Australian analysis was funded by the Bureau of Industrial Economics (BIE) of the Government of Australia and the Australian Manufacturing Council (AMC). Our work on the particular issue of Australia benefitted from our discussions and debate with Bill Mountford, Director of the AMC and with Donald Brunner and Charles Jubb of the BIE, while Pappas, Carter, Evans and Koop assisted us in our data-gathering and analysis.

Above all, the conclusions in this report rest on the information and insights we developed as a result of numerous and extensive interviews in Canada and abroad with senior corporate executives, policy-makers, and members of the financial community. They were generous with their time and experience, and we thank them.

Responsibility for our conclusions, however, rests exclusively with The Canada Consulting Group, and while we believe that they will be shared widely by those whom we consulted in the course of our project, the participation of particular people and organizations should not be read as implying an endorsement of our findings.

Chapter I

THE NATURE OF THE PROBLEM

The argument that Canada needs to invest and innovate to remain competitive has been made eloquently and at length many times before in discussions of our economic prospects and policies. Such discussion is not confined to the academic and political arenas; it has become part of the day-to-day reality of companies struggling against aggressive foreign competition.

Companies have two sources for the capital needed to invest and innovate: their shareholders and institutional lenders, each of which exacts a cost. This report sets out to show that for Canadian companies, that cost of securing capital is high relative to the cost of capital that competitor companies in many other countries face.

For Canadian companies, the high cost of capital puts them at a significant competitive disadvantage. It also explains why they are less willing and able to invest in innovation than their foreign competitors, even though they may recognize that such investment is critical to their long-term health and ultimate survival.

Despite its importance to our companies' competitiveness and our country's prosperity overall, the cost of capital has only recently begun to receive serious attention as a public policy issue. What little debate there has been on the issue has been hampered by a lack of relevant facts and much muddled or erroneous thinking.

Part of the problem has been that there is no agreement on the basic question of whether the cost of capital is indeed higher in Canada than in the countries with which we compete. There has been much empty assertion on the issue, but no comprehensive and accurate evidence gathered to support it. Consequently, the first task is to establish the facts: do we indeed have a disadvantage in the cost of capital?

IS THERE A PROBLEM?

To determine whether Canada has a higher cost of capital than our international competitors, we used a series of statistical approaches and talked to managers in a large number of Canadian companies and their overseas counterparts. We also interviewed academics, policymakers and members of the financial community in Canada and abroad.

What we found was that Canada belongs in a group of countries whose cost of capital is high when compared with that of Japan, Germany and the industrializing countries of Asia. This cost of capital difference has been persistent and exists even after Canada's relatively generous tax treatment of some forms of investment has been factored in.

Our higher cost of capital in turn raises the rate of return that Canadian companies must obtain from an investment before it is economically acceptable. Competitors with lower capital costs can justify investments that Canadians must decline, and can afford to wait longer for their returns. They invest more intensively and more patiently, while Canadian companies cannot justify many of the investments needed to keep them globally competitive.

BUT DOES IT REALLY MATTER?

Historically, our high cost of capital has not been a significant problem. Although reliable statistics are not available to confirm this, we have probably had a higher cost of capital than many of our key competitors for a number of years. Nevertheless, our companies were generally able to earn returns above this cost of capital, and so continued to invest and grow.

Now things have changed. Increasing global competition, often from emerging lower wage areas, has forced down the returns available to many of our companies below their cost of capital. Our higher cost of capital has now become a problem for these firms as they seek to invest to improve their competitive position.

The high cost of capital makes it extremely difficult for our economy to generate real growth and to shift to the higher value-added businesses that alone can sustain our high wage rates. Our resource-based and mature manufacturing companies – the companies that traditionally drove Canada's growth – can no longer play that role. Unable to earn their high cost of capital, they are now unable to invest adequately for growth. In real terms, the assets of Canada's 300 largest companies, most of which are these traditional drivers of growth, have hardly expanded at all since the early 1980s.

It has not been any easier for our high technology firms, though in some ways they seem better off. While they can generally make returns that exceed their cost of capital, like all our companies, they cannot invest at the same rate or with the same patience as some of their competitors in Europe or Asia. They therefore face a dilemma: do they concentrate their more limited investment funds on a smaller range of technologies, markets and products than their competitors or do they cover the same range, but spread their investment more thinly? Neither approach can really keep them sustainably competitive.

For the next generation of technology-intensive businesses, the problem is even more severe, and often they cannot obtain financing at any price. Lacking a critical mass of such firms in Canada, our companies cannot draw on a pool of experienced managers and financiers as many similar U.S. firms can do. This, in turn, hampers the performance of the Canadian firms and inhibits the development of that critical mass, creating a vicious circle.

Simply put, here is the problem. We have a high cost of capital, which historically has not been a problem. Now, however, many of our companies can no longer carry that burden because it does not allow them to grow, diversify and invest to stay competitive. The only option for these firms, should they continue to bear this yoke of high capital costs, is to shrink, limit their product and market development, and divest. This problem at the individual company level translates into a disaster for the

economy as a whole, since it will lead to a steady erosion of our competitiveness and a lowering of our standard of living.

FIVE DANGEROUS MYTHS

Perhaps because the high cost of capital appears a complex and esoteric issue, it has not been a ripe subject for lively public debate. But the real barriers to full consideration of the cost of capital issue in the public policy forum may lie in several widely-believed myths that deny or minimize the problem.

Myth 1: It's a matter of attitude

Recent studies of Canada's competitive situation have tried to argue that our shortcomings in tackling global trade head-on can be traced directly to the business community's timidity and unhealthy attitude. From this perspective, complaints about Canada's high cost of capital are just an excuse to keep business from getting on with the job. The view that business' attitude is the real problem is not only naive, it is dangerous. By offering up a simple and highly misleading explanation of why we are not competing as effectively as we should, these studies mask the real competitive problems, which are structural, not attitudinal. Their solution, furthermore, lies in definable and urgent actions, not patient psychological counselling.

Myth 2: High interest rates have been the main problem

The belief that high interest rates alone created the problem leads to an overly simplistic, as well as unrealistic, view of where the solution to the problem lies. Proponents of one school of thought argue that if the government simply reduced interest rates, this problem, not to mention others, would go away. But others argue that high interest rates are needed to reduce inflation and support the Canadian dollar, and that nothing can be done about the cost of capital until inflation is beaten. Once this has

happened, interest rates will come down and the problem will supposedly solve itself.

This myth has a surface plausibility. After all, Canadian corporate bond yields in 1990 were roughly 2.1% above those in United States, and 3.2% above those in Japan. A fairer comparison, however, would be to look at real interest rates, – taking out the impact of inflation and calculating interest costs net of corporate income taxes – because companies in Canada, as in most countries, get tax relief on interest payments and because inflation distorts the true costs of servicing loans. When these adjustments are made, Canada's real after tax interest rates are at about the same level as those in other countries. (This is, of course, a reflection of the development of an international debt market.)

But calculating real interest rates can lead to a more pernicious form of the myth if one assumes that, because interest rates are essentially the same all over, the cost of capital is the same. In fact, a company's cost of capital is more strongly influenced by its cost of equity than by its cost of debt. The cost of equity is significantly higher – typically two to three times higher – than the real after tax cost of debt. Furthermore, Canadian companies use significantly more equity than debt in their capital structures.

Myth 3: The business community is too short-sighted

It is true that many Canadian managers have a shorter-term perspective than the typical manager in Japan or Germany. The same charge of short-sightedness is also laid against managers in the United States and Britain. But managers in all three countries protest in turn that this concern with the next quarter rather than, say, the next five years is forced on them by the investment community.

The general explanation for the short-term focus is that investors, both individual and institutional, would rather invest for short-term returns in areas like real estate than long-term returns in goods producing or related service assets, particularly if any high technology is involved. Moreover,

because the stock market and the financial community are said to be pathologically short-term in their perspective, corporate management responds by seeking to maximize short-term earnings. Consequently, they cut back investments of all kind to, or even below, the level needed to remain viable over the long term.

There may indeed be substance to these complaints. However, as this report will attempt to set out in more detail, our higher cost of capital makes it entirely reasonable that Canadian managers and investors maintain a shorter-term focus than their counterparts in Japan or Germany or Korea. Indeed, given a higher cost of capital, a shorter time horizon is merely wise financial and business management.

Myth 4: Globalization of financial markets will fix things

This myth is based on the argument that there is a competitive market for capital. If companies must pay more for their capital in one country, it follows that the investors providing this money are getting higher returns. Investors elsewhere, seeing this, will move to invest in the country with the higher returns, increasing the supply of capital and lowering its price. This will simultaneously reduce the supply and raise the price of capital in other countries. Thus, the powerful working of free markets will harmonize returns in all countries. (Borrowers, of course, will act in an opposite manner to investors, reinforcing the effect.)

While this argument fits the free market philosophy of our times, it is nevertheless wrong. In the first place, it rests on the assumption of a relatively perfect market in capital, with no significant hindrances to the ready flow of investment from one market to another. But as we shall see, this perfect market simply does not exist now and will not exist for a considerable period of time. Changes in technology and consequent shifts in regulation have indeed made the flow of funds across borders and continents much easier; as a result, debt markets are effectively global. But, there are still major barriers to the free flow of equity investment – a critical determinant of the cost of capital.

Moreover, even with fully integrated markets, the price of capital will still vary from country to country. Some economies, and hence the typical company within them, are simply more risky than others. Fully international capital markets would reflect this risk in the cost of capital in the various countries: companies in the riskier economies would pay more. This risk/return relationship is at the heart of much finance theory; indeed, the financial pages of any newspaper provide evidence of it working within a given country. It would not be suspended simply because financial markets became global.

Myth 5: Nothing can be done about the cost of capital

Laissez-faire economists are fond of saying that problems like the cost of capital cannot and should not be influenced by government policy. Others, meanwhile, see the issue as a uniquely Canadian burden that our companies must suffer. Those who view the cost of capital as, in effect, a natural disadvantage with limited remedies say that the most that can be done for our ailing companies is to drive interest rates down and reduce the deficit.

But Canada's high cost of capital is not an unfortunate accident, nor should it be grudgingly accepted as a natural disadvantage. In the end it reflects the higher risk to investors in Canada – a degree of risk that, in a free market, leads them to demand a higher return. This higher risk is the product of our industrial structure and our macro-economic performance: much of our economy is driven by cyclical businesses; our growth is less steady than that of our competitors; and our inflation rates are higher and more volatile.

Changing these underlying economic conditions is obviously a long-term and complex challenge. There are, however, actions that can be taken by both business and government that will improve the situation in the short term while contributing to the long-term solutions.

There are some ways in which companies can reduce their individual cost of capital, but in the main their task is to work on the other side of the equation: to increase returns sufficiently so that they more than earn their cost of capital. Most companies have opportunities to improve their productivity, their service to customers, and the way they use their skilled workers.

If companies do their part, what can government do? The single most important thing government can do is to improve our overall economic performance – reducing risk by stabilizing inflation and producing strong steady growth, with an appropriate and stable exchange rate. This is the goal of just about every government with a market economy, however, and many countries have found it an elusive objective.

Governments can also take advantage of a variety of policy levers that will result in a lower cost of capital for individual companies, selected industries or types of projects. Japan, Korea and Taiwan are examples of nations which have used such programs to target desired areas of economic activity.

These policies and their implications for economic growth and industrial development are examined in the next chapter.

Chapter II

THE HIGH COST OF CAPITAL IN CANADA

HOW COMPANIES RAISE CAPITAL

At the simplest and most general level, all companies operate in the same manner. They persuade investors to provide them with cash, which they invest in the enterprise, managing the business to earn enough to produce an adequate return to those investors.

Companies acquire capital from two main sources: equity raised through the stock market or from people and organizations willing to invest in that company; and debt that is borrowed from banks and other institutions or raised by issuing some form of commercial paper.

Each of these sources of financing carries an associated cost. A company's cost of capital is simply the average of the cost of its debt and equity weighted by the amounts of each that it uses. This chapter will demonstrate that Canada belongs among those countries with a high cost of capital.

MEASURING THE COST OF CAPITAL

Comparing the cost of capital across countries is a complex task. Because of this difficulty, we adopted a number of approaches that involved analyzing case studies of individual companies, as well as researching entire economies. We supplemented these with interviews with financial institutions, government officials and economists in Canada and abroad. (A list of these organizations is contained in Appendix A).

Calculating the cost of the debt component of capital is relatively straightforward. It is the cost of the interest that a company pays on the

money it borrows after taking into account whatever tax benefits are available to corporations in treating interest as a deductible expense.

Identifying the cost of equity is more difficult and has been the subject of considerable debate among academics and economists who have attempted to make comparisons between countries. By definition, it is the minimum rate of return that equity investors require from a stock. However, determining a numerical value for this is no easy matter. Shareholders, like debtholders, invest in a company in the expectation of a return on their investment, but this return is neither certain nor known in advance. Shareholders get what is left over after all expenses, including interest and taxes, have been paid. This amount varies sharply from one period to another and from one company to another.

Instead of selecting a single approach, we decided to use two separate quantitative methods to estimate the cost of equity at the country level. The first was developed by the Federal Reserve Bank of New York and uses the inverse of the price/earnings ratio for a particular country's stock markets as the basis for estimating the average cost of equity. The second method looks at the theoretically derived rate of return that an investor is likely to require in return for investing in equities in a given country (we call it the shareholder required return model – SRR). We saw the two methodologies as complementary "checks" upon each other. Indeed, the two methodologies yielded consistent results in all countries except Australia. (A more detailed analysis of these alternative methodologies is contained in Appendix D).

In comparing Canada's cost of capital, our research focussed on seven of this country's competitors:

- The United States, our major trading partner
- Japan, the new economic superpower
- Germany, the dominant European economy

- The United Kingdom, which has strong links with Canada
- Australia which has an economic structure similar to Canada's (a small domestic market and large natural resource sector)
- South Korea and Taiwan, two newly industrializing Asian economies

The amount of information available to make these comparisons varied significantly from country to country. We were able to develop a quantitative analysis for Canada, the United States, the United Kingdom, Germany, Japan and Australia. The necessary quantitative data was not available for Korea and Taiwan, but qualitative and anecdotal evidence provided a good picture of how the cost of capital in these countries is significantly lowered for major homegrown companies competing in international markets.

Canada's Overall Position

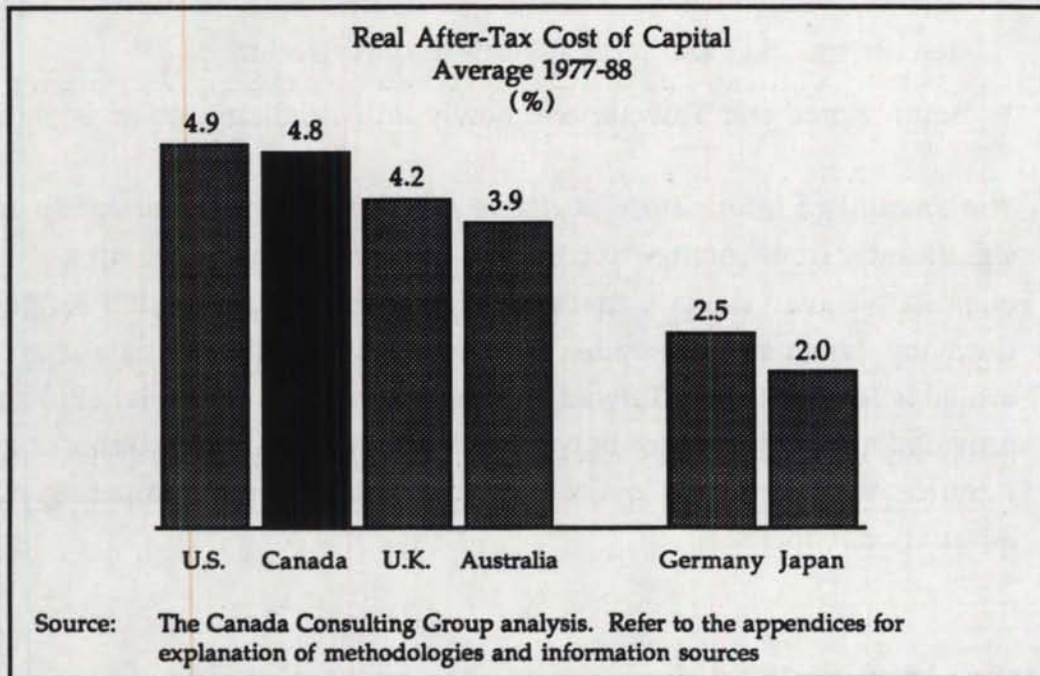
When it comes to companies' overall cost of capital, we have discovered there are two distinct groups of countries:

- A high-cost of capital group, including not only Canada, but the United States and the United Kingdom
- A low-cost of capital group, consisting of Japan and Germany

Australia represents a special case, and will be dealt with separately.

The results of our research show that between 1977-88 Canada experienced the second highest after-tax cost of capital of any of the countries studied. (See Exhibit II.1) (A detailed analysis of how these costs were calculated is contained in Appendix E.)

Exhibit II.1



Recent Events in Japan and Germany

The statistics on which the analysis underlying this exhibit is based are now over three years old – a reflection of the lag in their becoming available as well as the timing of our work. This gives rise to a legitimate question: has the cost of capital in the various countries changed sharply since then?

There have certainly been significant events in the Japanese financial markets. The Nikkei Index, reflecting stock prices on the Tokyo Stock Exchange, fell by some 40% in 1990 and has continued to slide at a less precipitate rate through 1991 and into 1992. It is now at levels last seen in 1986.

One explanation of this fall could be that the cost of capital in Japan has risen. This would raise the rate at which investors implicitly discount future earnings, and so would lower the value of stocks. However, stock prices would drop even without a change in the cost of capital if company

earnings fell, or if they were expected to fall in the future from the previously expected levels.

The balance of the evidence strongly shows that there has not been a shift in the Japanese cost of capital, sufficient to close significantly the gap between Canada's cost of capital, and that of Japan.

In the first place, even if all of the fall in the Nikkei Index is attributed to a rise in the cost of capital, Japan's cost would still be well below that in Canada. A precise calculation of the difference would require repeating much of the work on which this study is based. However, a close approximation is possible. The drop in the Nikkei between the end of 1988, the last date in our study and the end of 1991, would raise the Japanese cost of equity by less than 1%, and the cost of capital by about half that – nowhere near enough to close the gap between Japanese and Canadian costs¹.

More importantly, however, the fall in the index seems to be driven by declining earnings expectations rather than an increasing cost of equity.

Japanese corporate earnings have fallen sharply. Throughout the 1970s and 1980s real earnings in Japan grew strongly, so that in 1989 they were twice those of 1980, and four times the level of 1970. Then in 1990 corporate earnings growth slowed to just over $\frac{1}{2}\%$ while earnings in 1991 declined by some 14%.

This slump in earnings by itself would explain a sharp drop in stock values. However, it is expectations about future earnings that ultimately drive the market. Prospects for 1992 and beyond do not suggest a rapid return to the

¹ This assumes that there have been not other changes that would magnify or diminish the impact that a simple change in the Japanese earnings/price ratio has on the true cost of equity. As far as we are aware there have been no such changes. In addition, Canadian E/P ratios have fallen as the country has sunk into recession. This does not argue for a fall in our cost of capital, however. Rather, it reflects a phenomenon that was discernible in the early 1980s. As earnings slump, driven by the cyclical nature of our economy, price/earnings ratios rise. Investors know that the depressed earnings at the bottom of the cycle do not reflect the true earnings potential of the stocks they buy. They value the stocks on the basis of expected earnings, which are considerably greater than the latest historic earnings. So, at a constant cost of equity, P/E ratios are inflated by the difference between historic and more "normal" earnings, and the E/P ratio is commensurately depressed.

strong growth of the 1980s. The United States, Japan's major export market is in a recession, which while not deep by the standards of 1981/2, threatens to be enduring and has significantly shaken confidence. Even when the recession is over the consensus of observers suggests that growth will be less strong than a decade ago. There are also concerns that are Japan-specific. Property prices have slipped, diminishing the asset base of companies, and especially of banks. In turn, this puts additional pressure on banks struggling to reach the equity levels required by the BIS. Pessimists see in this the risk of a contraction in the supply of credit, and a continuing reduction in the Japanese rate of growth.

Moreover, the squeeze on credit comes just at the time when many major Japanese companies face the need to raise capital to repurchase the warrants that they have previously used to finance growth. Essentially, companies raised debt and issued warrants that the lender could exercise to convert the debt into equity. In a period of rising stock prices this meant in effect that the debt was never refinanced or repaid. The stock price rose to well above the equity conversion price, so debt owners converted their loans into stock rather than seeking repayment. Now, for many companies, stock prices are well below the exercise price, so lenders will seek repayment.

In these circumstances, not to mention concerns about the impact of increasing competition from the developing countries in South East Asia, investors' expectations in Japan have fallen compared with the headier days of the late 1980s. Such reduced expectations alone, without assuming a rise in the cost of capital, have affected the value of the market dramatically. For example, if investors who in 1989 foresaw earnings growth continuing at the rate experienced in the 1980s, adjusted their expectations to predict growth in real terms of "only" 5% a year, then the value of stocks in the market would fall by some 40%.

On balance, therefore, while there may have been a marginal increase in the Japanese cost of capital, we see no evidence that changes in 1989 and subsequently have altered the fact that the cost of capital in Japan is significantly lower than in Canada.

This conclusion is, as we shall argue later, consistent with an understanding of the underlying drivers of the cost of capital. These forces have not significantly changed, so neither should the cost of capital.

The question of the impact of recent events in Germany on the cost of capital is perhaps more complex. In the short-term, the cost of capital is likely to be marginally higher than historically. The costs of unification are clearly high, and the Federal government has chosen to fund them without raising taxes or cutting expenditures elsewhere. The Bundesbank has responded with a tight monetary policy to counteract the government's loose fiscal approach. This has pushed up short-term interest rates, and so raised the cost of borrowing. There has probably, therefore, been a small increase in the short-term cost of capital.

The impact of unification on the *long-term* cost of capital is more complex. The problems of the old East Germany are considerable, even for an economy as strong as that of the old West Germany. This in turn may raise the risk of the economy and with it the cost of capital. At the same time, however, the opening of Eastern Europe affords Germany greater opportunities in the longer term. In addition, the sources of stability that have kept down the country's cost of capital remain and seem to be as powerful in the united Germany as they were in the West: the institutional relationships between banks and companies; and the strong anti-inflation, stable currency policies of an independent Bundesbank.

On balance, there seems no reason to believe that the dramatic events of the last couple of years will raise the German cost of capital by a significant amount. Thus, while we have analyzed data from 1977-88, we believe our conclusions are still valid in today's financial environment. Canada has a higher cost of capital than some of our key competitors.

We have demonstrated this cost of capital disadvantage at the level of our whole economy; it is equally evident at the company level. We investigated the cost of capital of 60 Canadian companies and more than 100 of their foreign competitors. The results demonstrate that our companies are at a clear disadvantage to Japanese companies across most industrial sectors.

Company-Level Comparisons

It is not necessarily significant in itself that the average cost of capital in Canada is higher than the cost of capital in other countries. Sectors may vary considerably in their typical cost of capital, so that differences in the average from country to country may simply reflect a different mix of sectors in each economy.

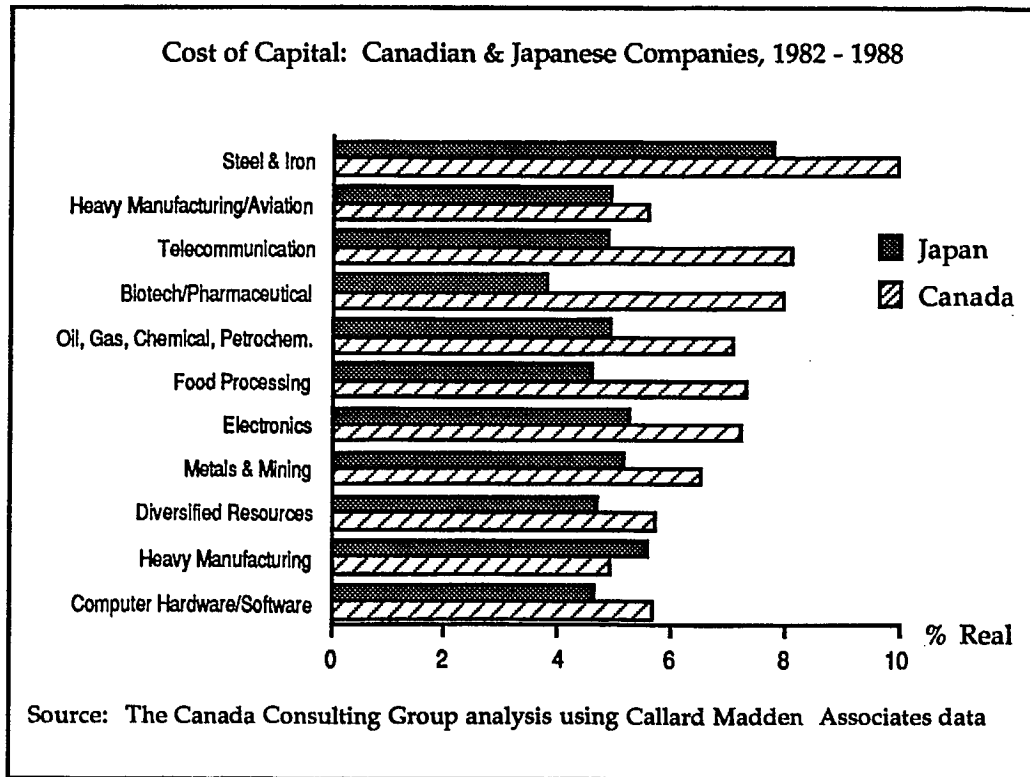
For example, the earnings of resource-based companies tend to be much more cyclical than those in most other industries. This makes investing in them riskier, raising the cost of capital for this type of company. Since Canada's economy is more dependent than most on resource-based companies, our average cost of capital may be high, but individual companies may still not be at a disadvantage compared to foreign competitors in similar businesses.

Moreover, competition takes place company-to-company, not economy-to-economy. It is therefore important to determine whether Canada's higher average cost of capital translates into a comparatively higher cost of capital for individual Canadian companies. Hence, we used a third methodology to analyze the cost of capital of individual Canadian companies and their foreign competitors. This analysis shows that Canada's higher cost of capital is equally apparent at the company level; it is not simply a statistical quirk that reflects the different economic makeup of the various countries examined. Exhibit II.2 compares the Canadian and Japanese companies in our sample.

Thus, at both the economy-wide level and the corporate levels, Canada is among those countries with a high cost of capital.

Perhaps even more compelling than this quantitative data is the evidence that comes from talking with company management in the various countries to learn how they think about investment and the rates of return needed, as well as how competitors in the high- and low-cost groups see each other. This evidence is presented in the next chapter.

Exhibit II.2



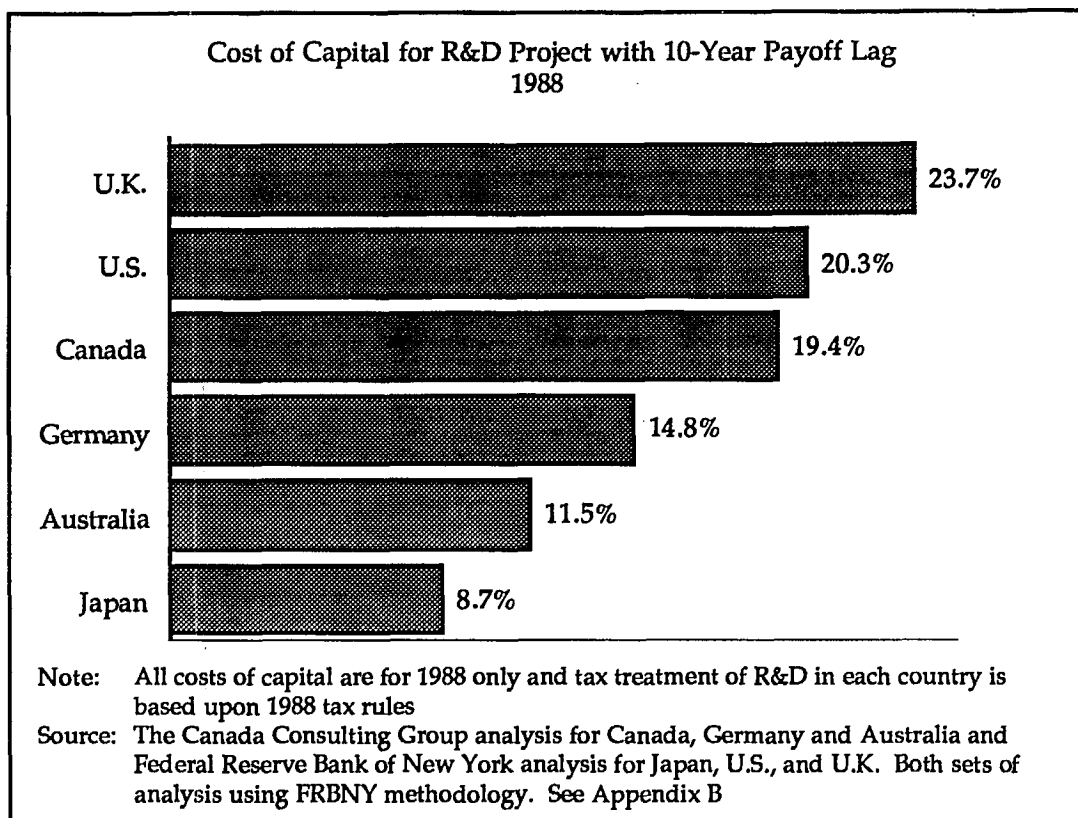
Assessing The Cost Of Capital For R&D

The cost of capital numbers displayed above are based on assessing the cost of capital at the level of the investor after corporate and individual taxes have been paid. This is the appropriate level to assess the comparative cost of capital in different countries, but it is not the level at which company executives are used to assessing the risks and returns of specific investments. In fact, differences of one or two percentage points in the overall cost of capital can be magnified greatly when a specific investment project with its own particular cash flows and tax treatments is analyzed.

To illustrate the effect of the underlying cost of capital on specific long pay-back investments, we have calculated the cost of capital for an R&D project

with a ten-year payoff lag undertaken in each of our comparison countries in 1988. The results in Exhibit II.3 demonstrate that for such an R&D project, a Canadian company in 1988 needed a 19.4% return to recover its cost of capital versus an 8.7% return for a company in Japan.

Exhibit II.3



Australia, with its incredibly generous tax treatment of R&D (a 100% R&D tax deduction) effectively lowered its cost of capital for R&D projects to a rate below Germany and only 2.8 percentage points above Japan. In company interviews with major multinationals doing business in Canada and Australia, the generous tax treatment of R&D was mentioned many times as a major advantage in that country's R&D environment. Canada's 20% R&D tax credit is also generous by the standards of countries like the U.S. and U.K. but this is not sufficient to overcome our higher cost of capital versus Japan and Germany.

**Korea and Taiwan:
Lowering The Cost Of Capital
For Export Industries**

Our analysis of the cost of capital in Japan and Germany indicates that all firms in those economies benefit from a generally lower cost of capital. There are, however, economies where the overall cost of capital may be high, but through government action the cost of capital to particular sectors or companies is kept low. Naturally, this is a subsidy and some other part of the economy must pay higher costs, at least in the short run, to enable the subsidy.

Japan in the post-war period was in fact a country that widely embraced the practice of lowering capital costs for designated export industries. This was achieved both by limiting the returns available to savers and by allocating the available capital at differential interest rates. Favored export-oriented industries such as steel and autos received low cost capital while purely domestic sectors such as retailing or real estate development paid higher rates.

Under pressure from other countries and recognizing that such capital cost subsidies are not needed anymore, Japan has moved away from a system of allocating capital at differential rates. However, a new generation of newly industrializing countries, such as South Korea and Taiwan, have followed the Japanese example and created financial systems which bestow low capital costs on targetted export sectors at the expense of savers and domestic oriented industry. It is doubtful that South Korea or Taiwan have an overall cost of capital disadvantage vis-a-vis Canada, but they certainly have created a cost of capital advantage for specific industries such as steel and electronics.

Both South Korea and Taiwan use a range of regulatory instruments to maintain relatively closed capital markets. In so doing, their governments maintain strict control over the allocation of capital. Depending on the country's priorities, capital is allocated at extremely low cost to specific

companies or types of projects (e.g., a project improving the economy's export infrastructure). Canadian companies compete with many of these companies that have access to extremely low costs of capital and find themselves at a capital cost disadvantage because of this artificial allocation of funds.

"We were bidding against a Taiwanese company for an acquisition. They made a ridiculously high priced bid. We investigated how they could bid so much and found it was because they had received capital at a minimal cost from their government."

Chemical Industry Executive

The development models pursued by Japan, Korea and Taiwan violate the canons of conventional economics. In Japan's early industrialization after the war, the market did not allocate capital resources, the government did. From the 1950s through the early 1980s the Ministry of Finance and the Bank of Japan maintained strict control of the banking system. Through the control of the financial system and the development of a broad-based postal savings system, the government was able to limit the returns paid to savers and control the allocation of funds.

Exhibit II.4 shows the range of regulations – regulation of deposit rates, lending rates, foreign exchange and capital flows – used in Japan and Korea to achieve this control. The Japanese system kept overall capital costs lower than they would have been otherwise and then allocated the available capital at differential costs to industry with export-oriented industries focussed by a lower cost of capital.

Exhibit II.4

Capital Regulation in Japan and Korea		
	Japan	Korea
Government Control of Banking System	<ul style="list-style-type: none"> • Ministry of Finance and Bank of Japan maintained strict control and provided economy-wide strategy and credit allocation until 1980s 	<ul style="list-style-type: none"> • Government owned and controlled all commercial banks and allocated credit • Privatization in 1980s did not eliminate control
Regulation of Deposit Rates	<ul style="list-style-type: none"> • Interest rates on large denomination deposits (>¥1 Bn) regulated until 1985 • Small denomination deposits, including postal savings, regulated • In 1986 approximately 80% of deposits were under fixed interest rate regulations 	<ul style="list-style-type: none"> • Deposit rates regulated – maintained at very low levels
Regulation of Lending Rates	<ul style="list-style-type: none"> • Interest rates strictly regulated in postwar period • Maximum rates legislated for short-term loans • Banks set long-term lending rates based on regulated Prime rate 	<ul style="list-style-type: none"> • Domestic debt costs were higher than foreign debt costs; through government control a multiple interest rate policy was implemented • Target industries and investments provided with long-term capital at favourable interest rates
Regulation of Foreign Exchange and Capital Outflows	<ul style="list-style-type: none"> • Foreign Exchange and Foreign Trade Control Act 1949 forbade all cross-border transactions – allowed maintenance of low domestic interest rates while averting capital flight • Separated domestic and foreign financial markets through exchange controls • Restricted foreign currency deposit accounts • Liberalization of controls began in 1980 	<ul style="list-style-type: none"> • Legislation passed in 1960s to restrict capital outflow • Maintained multiple exchange rate regime (exports subsidized) • Export encouraged through devalued Won and targetted low domestic interest rates, averting capital flight

Sources: The Canada Consulting Group analysis and interviews and *Asia's Next Giant*, Amsden; *The Japanese Financial System*, Suzuki; *Inside Japanese Financial Markets*, Viner

As outlined in Exhibit II.5, basic capital intensive industries, such as steel, shipbuilding, chemical and automobiles, were targetted for development and allocated low cost investment capital in the 1950s and 1960s. In the 1970s, low cost capital was given to export ventures in new, knowledge-intensive industries, such as computers, semiconductors and telecommunications equipment.

Exhibit II.5

Investments Targetted with Provision of Low Cost Capital	
Country	Areas Provided With Low Cost Capital
Japan	<ul style="list-style-type: none"> • Basic capital intensive industries targetted for development in 1950s and 1960s <ul style="list-style-type: none"> - Steel, shipbuilding, chemical and automobile industries - Export oriented firms • Emphasis placed on Japan's capabilities in knowledge intensive industries in 1970s <ul style="list-style-type: none"> - Computers, semiconductors, specialty chemicals, machine tools and telecommunications equipment - Export oriented firms • Keiretsu-related firms favoured, major infrastructure investments
South Korea	<ul style="list-style-type: none"> • Basic capital intensive industries in 1970s <ul style="list-style-type: none"> - Shipbuilding, machinery, steel industries • High technology and skill-intensive activities in 1980s <ul style="list-style-type: none"> - Consumer electronics, information technology, computers, automobiles • Chaebol favoured over small firms • Export oriented firms • Major infrastructure investments
Taiwan	<ul style="list-style-type: none"> • Basic capital intensive industries in 1970s <ul style="list-style-type: none"> - Steel, cement, aluminum smelting • Skill-intensive industries in 1980s <ul style="list-style-type: none"> - Telecommunications equipment, computers, automobiles and automobile parts • Export oriented firms • Major infrastructure investments

Source: The Canada Consulting Group analysis, interviews and government planning documents

South Korea modelled itself very closely after the Japanese financial structure. In South Korea, for example, the government owned and controlled the commercial banks until the early 1980s and in practice still maintains this control. By controlling the financial sector, the government can allocate funds at favorable rates to the *chaebol* – Korea's large, export-oriented industrial groups, which are the country's primary vehicle of industrialization. While subsidized credit for working capital was available for any exporter, long-term capital at favorable interest rates was allocated only to targetted firms and industries. (Exhibit II.5)

Korean deposit rates on individual savings are regulated at low rates, while the government's multiple interest rate policy favours target industries, investments and exports. Legislation is also in place to restrict capital outflow and foreign direct investment. Again, this gives the Korean government the control needed to ensure that the investments necessary for growth are made.

This allocative process has not been without costs. The assistance to the chaebol was often at the expense of other companies or industries. For example, in the machinery building sector the three leading chaebol – the Hyundai, Samsung and Daewoo groups – were favoured with low cost funds and subsidies over several smaller firms with long-standing expertise. In shipbuilding, seven small experienced shipbuilders were overpowered, and in some cases bankrupted, by government assistance to the Hyundai group.²

Taiwan maintains similar capital and investment controls. In the early years of the Kuomintang rule in Taiwan, the economy and financial system were strictly controlled. Banks were essentially offshoots of the Ministry of Finance; their executives were civil servants implementing an over-arching strategy.

Deposit rates, foreign exchange, interest rates and foreign direct investment are all highly regulated. The government-set interest rates on deposits was 3.5 percent in 1989 and, prior to 1987, individuals required Central Bank permission to withdraw virtually any amount of money from the country. Moreover, Taiwan's high savings ratio (greater than 37% of GNP in 1989) means that it is not reliant on overseas finance for its investment program. These measures enabled thousands of small companies in Taiwan to grow and create wealth with the benefit of low capital costs.

This type of regulation of capital markets cannot continue indefinitely, as Japan's financial deregulation demonstrates. Target companies and industries in Korea cannot continue receiving low-cost funds at the expense

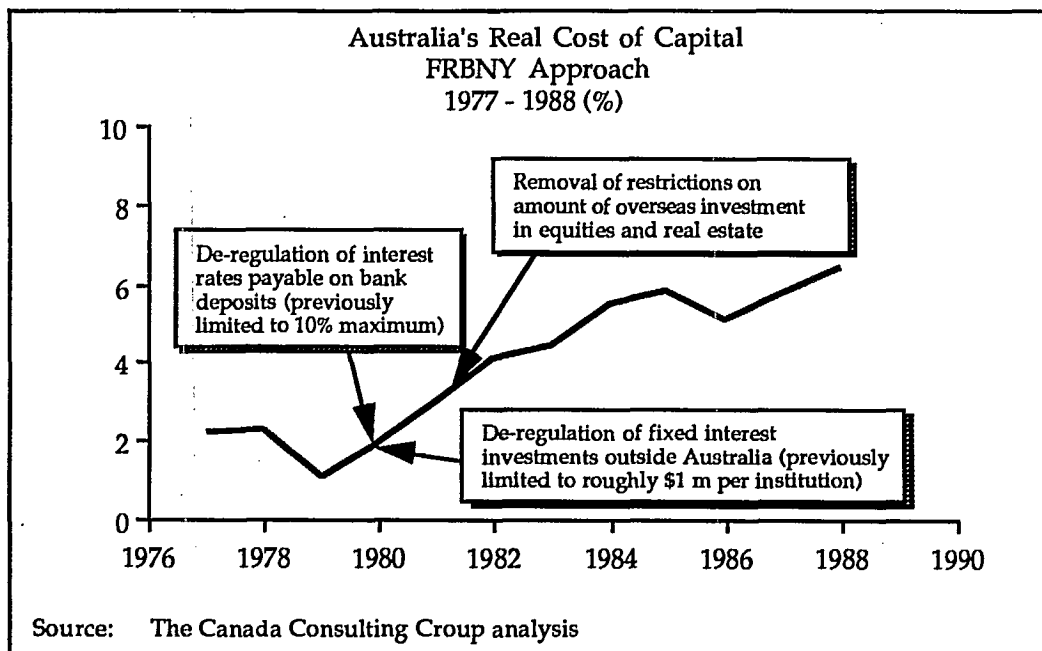
² Amsden, Alice H., *Asia's Next Giant* (1989)

of other elements in the economy. Eventually, internal or external forces will demand deregulation or market-determined prices. In fact, both Taiwan and Korea are currently undergoing some capital market deregulation. Until a level playing field has been created, however, our companies will continue to be hamstrung in competing with Korea and Taiwanese companies enjoying favorable capital costs.

Australia: A Special Case

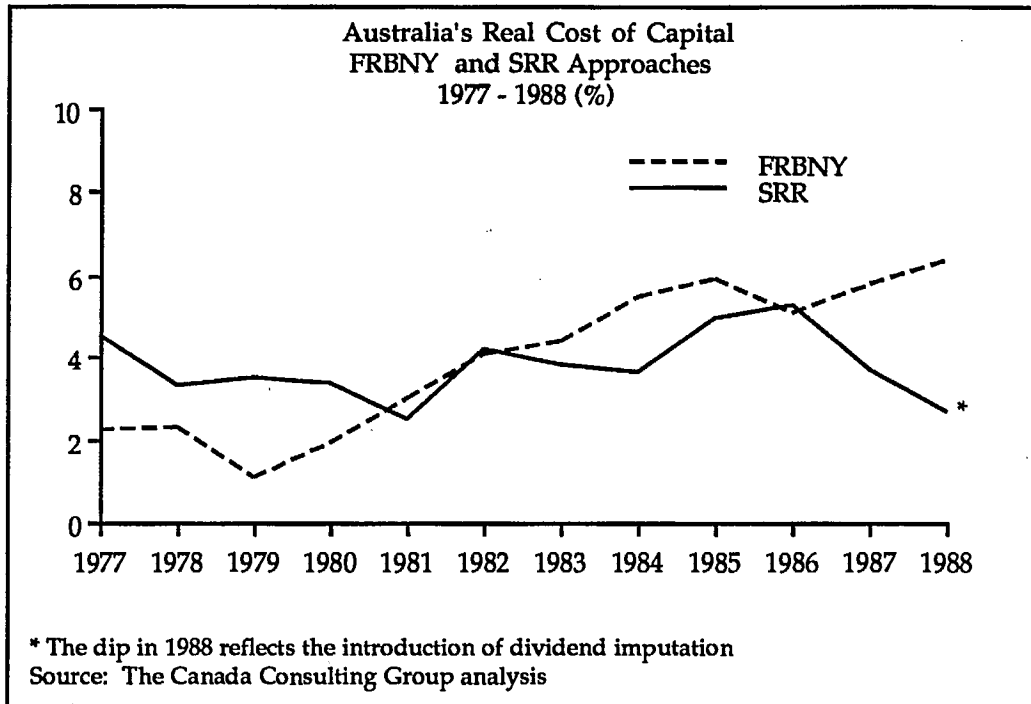
Like Japan, Korea and Taiwan, Australia has used financial controls as a way to reduce the cost of capital but unlike those countries it did not explicitly keep the cost of capital low for industrial development reasons. The impact of these controls makes Australia a special case in the group of countries analyzed. On average over the twelve year period from 1977-1988, Australia fell into the high cost of capital group. However, in the 1977-1982 period, Australia's cost of capital was low – so low that it in fact rivaled the German and Japanese levels. After the de-regulation of interest rates, specifically deposit rates, and the removal of capital controls in 1980 and 1981, the cost of capital rose steadily until the end of 1988. Exhibit II.6 shows this trend.

Exhibit II.6



When capital controls and regulations restrict the free flow of capital, the return requirement demanded by an investor is in effect "subsidized" by other areas of the economy. This subsidy is reflected in a lower market cost of capital. In theory, the investor's requirement and the market's price should be equal. Comparing the market cost of capital with the shareholder required return (SRR) shows the impact of this subsidy. The market (or the FRBNY) results reflect the cost of capital to companies during this regulated period, while the SRR results reflect the warranted cost of capital, were Australia free of capital controls and restrictive regulation. Exhibit II.7 shows the cost of capital in the two cases.

Exhibit II.7

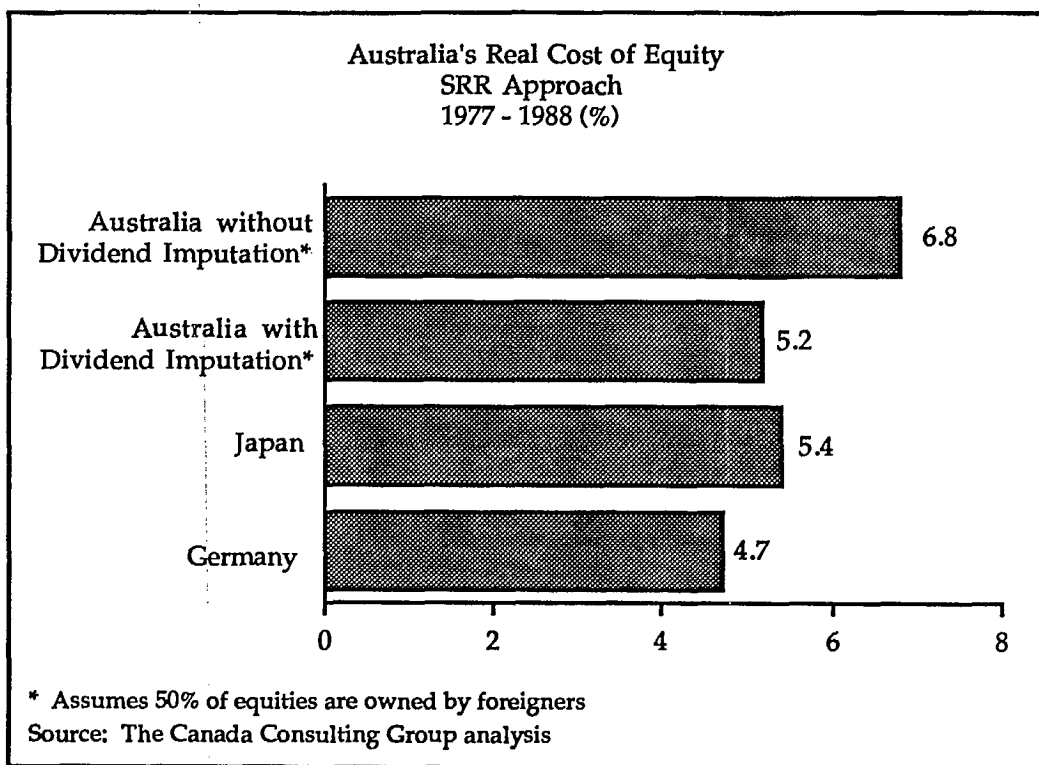


As Australian companies grappled with a steadily rising capital cost in the 1980s, it became apparent that many past investments were not generating returns in excess of the current cost of capital. In fact, of 20 individual Australian firms we examined – generally leaders in their industries – most were not successful in earning their costs of capital over the 1982-1988 period. This was due to a combination of an increasing cost of capital, tariff reductions and tougher global competition.

Recognizing the difficulty facing many of its companies because of this convergence of events, Australia recently took steps to reduce the cost of capital. Full dividend imputation was introduced allowing investors to impute the corporate income taxes already paid when they calculate their personal taxes on company dividends. In theory, dividend imputation eliminates the double taxation of dividends, thereby reducing the investor's return requirements. By reducing the minimum return required by an investor, the cost of equity falls.

Because a large portion of Australia's equities (perhaps as high as 50 percent) are owned by foreigners, the effect of dividend imputation on that country's cost of capital is not clear.³ However, dividend imputation should, in the end, lower Australia's cost of equity, going some way to close the gap with Japan and Germany. (Exhibit II.8)

Exhibit II.8



³ Foreign investors do not receive the benefits of dividend imputation under Australia's rules

GLOBALIZATION IS NOT THE ANSWER

Some would argue that differences in the cost of capital will not endure because they merely reflect imperfections in international capital markets. These imperfections, it is argued, are being rapidly washed away as deregulation and technology make capital markets increasingly global. But will Canada's disadvantage disappear as increasing globalization of financial markets harmonizes the cost of capital across national economies?

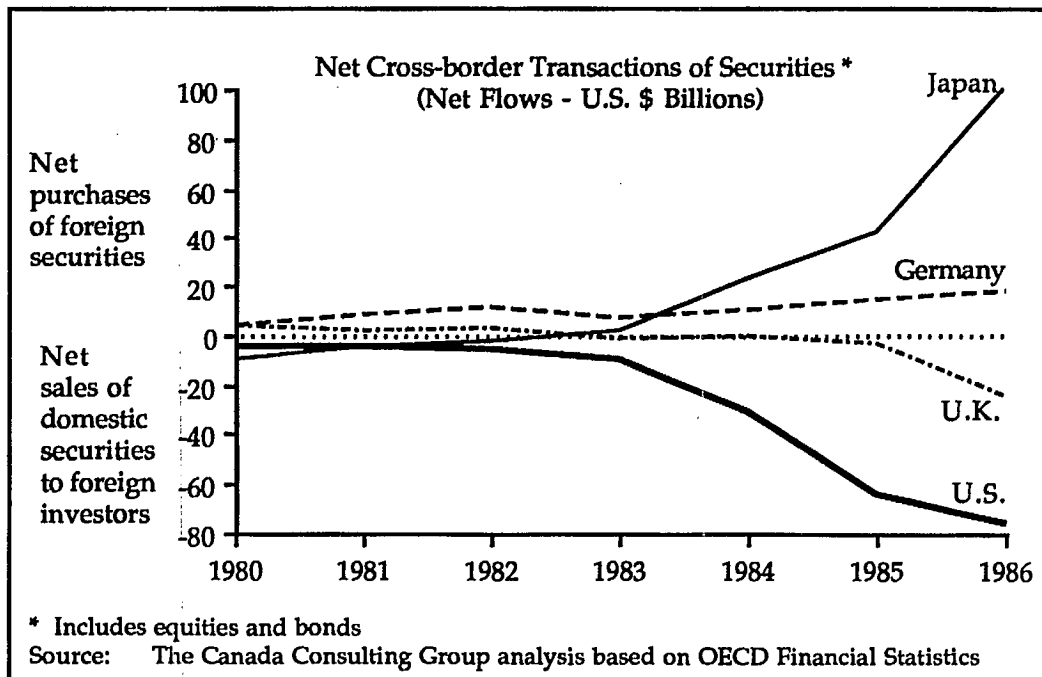
Unfortunately not. There are good reasons to believe that Canada's cost of capital will still be high compared to that of our low-cost competitors, even with a more global market. The discussion may be somewhat academic, however, since the global capital market is still a long way off.

Convergence in debt markets

Financial markets are indeed moving toward harmony. But harmonization so far is confined to debt markets. Such limited integration as has occurred in equity markets has been confined to intra-regional harmonization: within Europe and within North America.

Throughout the 1980s, as regulation of financial markets loosened and technology made instantaneous communication around the world both feasible and economical, the amount of cross-border financial activity rose sharply. Net cross-border transactions of securities grew dramatically, largely to finance the ballooning U.S. deficit. (See Exhibit II.9)

Exhibit II.9



At the same time, fuelled by growth in the Euro-bond market, new international bond issues more than doubled their share of total issues in the decade between 1976 and 1986.

From a corporate point of view, financial deregulation and improved communications provided the possibility of financing on a more global scale. The motivation to raise money in foreign markets was driven by price considerations. For example, differences in credit rating systems have given certain North American corporations lower rates in the Euro-market. In this market, price is driven substantially by 'name recognition' of the issuing corporation. Consequently, a North American corporation with a well-known name but only an A rating can raise money at AA or AAA rates, saving between a quarter and a half a percentage point on its borrowing rate.

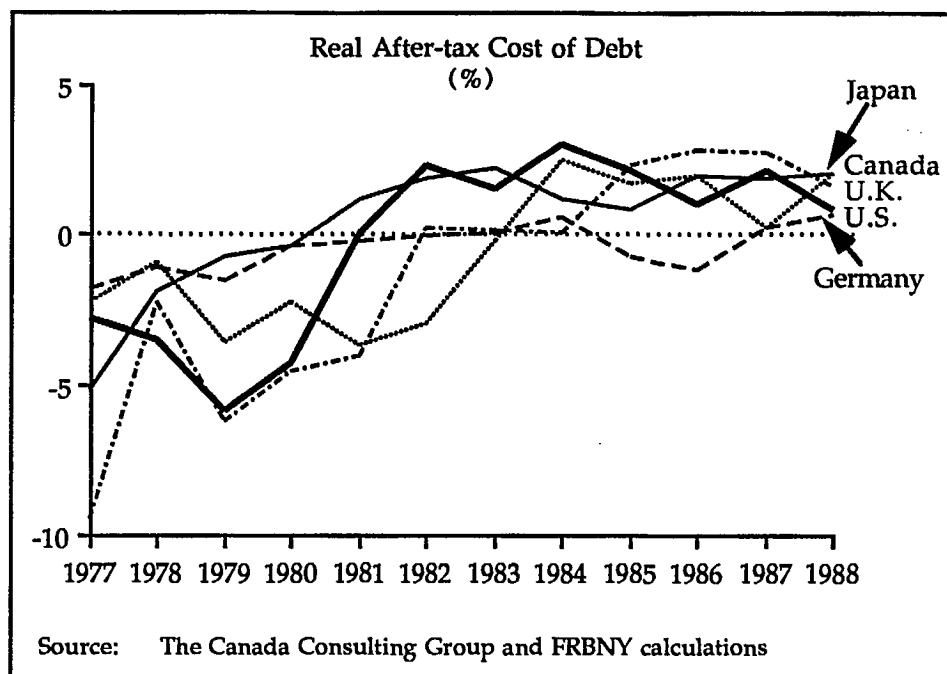
Differences in regulatory requirements also make certain markets attractive. For example, in Switzerland foreign corporations have been able to obtain

attractive rates on Eurodollar bonds because of the Swiss investor's preference for privacy over higher yield.

At the same time, new financial products, such as interest rate and currency swaps, have made access to global debt markets more flexible and more widely available. The swap market expanded over a hundred fold from 1983 to 1987. As this market grew in scale and equity, it allowed firms to gain access to international funds without bearing the full currency and interest rate risk exposure.

As might be expected, this globalization has led to rapid harmonization in the cost of debt across countries.

Exhibit II.10



To a marked degree, this underlying convergence is hidden by differences in the rates of inflation in various countries and, in Canada, by the government's policy aimed at reducing the inflation rate. At the time of writing, nominal short-term interest rates in the United States were some four percentage points lower than in Canada. However, when allowance is

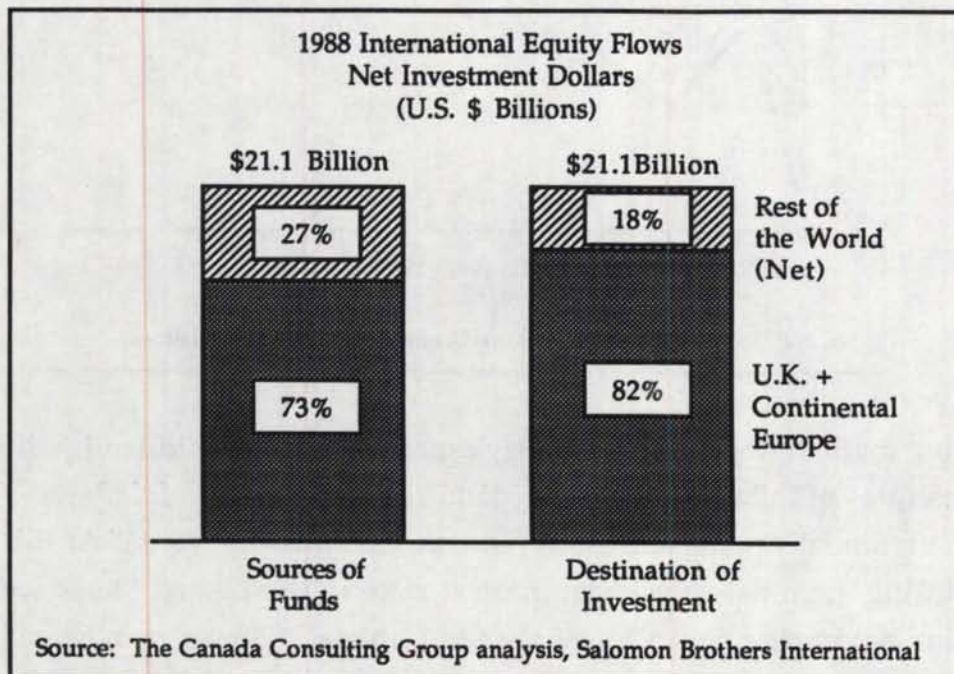
made for the different inflation rates in the two countries, the net real cost of borrowing is only 1.5 percentage points higher in Canada – a significant amount to be sure, but much less than a simple comparison of nominal rates would suggest.

Only governments and larger corporations can actually use foreign debt markets, but smaller firms are affected indirectly. Although they borrow only in local markets, interest rates in those markets reflect the fact that large borrowers have access to international markets. This spreads the effects of globalization to even the smallest borrowers.

Divergence in equity markets

Despite the growing internationalization of the debt market, globalization has not and will not narrow in any significant way the international range of costs of equity in the near future. Cross-border equity issues have grown considerably since 1985, but most international equity transactions occur within Europe, largely within the European Community (EC).

Exhibit II.11



As the EC standardizes accounting rules and reporting requirements across its member countries, and as investors become more familiar with member companies and industries, EC equities become easier to value. Similarly, the integration of the Canadian and U.S. economies facilitates cross-trading of U.S. and Canadian equities.

However, progress towards an integrated global market faces significant barriers:

- Assessing the true value of an equity investment is inherently more difficult than pricing a debt instrument.
- Investors find it very difficult to analyze and follow the performance of firms based in other countries. A major reason for this is simply the different accounting standards that make equity valuations across borders so complex. For example, German companies make allocations to a number of reserves before arriving at reported earnings, which may lead to an understatement of German corporate earnings from a North American perspective. It is difficult, then, to ascertain just what portion is a true reserve and how much is, to North American eyes, hidden profit.
- Certain formal and informal regulatory barriers will need to be dissolved completely before true international equity markets can develop.
- Confidence in the fairness of many equity markets needs to improve substantially before they will receive substantial foreign investment.
- Maintaining listings on foreign exchanges is expensive. Meeting initial listing requirements and ongoing reporting are expensive, and maintaining investor relations in several countries and several languages is both costly and time-consuming. One Canadian company calculates it costs \$180 a year per shareholder to service its Japanese stock listing.

As a consequence, only world class firms with household names can now gain the interest of investors on a global basis. Even when these firms issue equity in multiple international markets, typically more than 90% of investors are from their home country. In practice, most firms we interviewed that are listed on exchanges outside North America made these international issues for marketing and political purposes, rather than to raise funds at a lower cost.

"We listed in Tokyo to give us visibility and credibility in selling our products in Japan. There was no financial benefit to listing. In fact, it has been a substantial net cost."

Chief Financial Officer, Canadian Multinational

"There will be a global equity market but only for the top 100 global firms like Toyota, Sony, American Express, and IBM. They will be able to raise money anywhere."

Senior Executive, German Bank

When equities are issued in a foreign country, they are frequently repatriated quickly to the issuer's home country. After the initial excitement of a new issue, the secondary market is often not developed or is non-existent for foreign shares. As a Canadian investment dealer in Tokyo confided:

We market the heck out of a Canadian issue to generate interest. However, once we stop driving all the action stops.

V.P. Capital Markets, Investment Bank in Tokyo

This limited interest, along with the lack of any real secondary market, has led several North American firms to 'de-list' from the Tokyo stock exchange recently.

In the end, global equity markets will be a long time coming. We interviewed a number of people engaged in international equity finance in North America, Japan and Europe. Not one believed a global equity market would equalize the cost of equity in the near future. Even if global markets

emerge far faster than informed opinion expects, this will still not make Canada's cost of capital comparable to that of the lower-cost group of countries.

Determining why this should be requires consideration of the forces that ultimately drive the cost of capital, and in particular the critical cost of equity. In a fully global market, a company's cost of equity would reflect the return available on a risk-free investment and the risk specific to the particular stock. The underlying risk-free rate would be common across all economies; arbitrage would see to that. However, the second factor, the risk premium, would not be the same for all companies or economies. Naturally, some company-specific risks are independent of the company's location. But other risks are related to the main locations in which a company operates.

The risks attached to Canadian companies are greater than the risk attached to companies in the low cost of capital countries. This inherently greater risk springs from three main factors: the structure of the Canadian economy, our economic performance and our institutional arrangements. Thus, even if the apparently level playing field of a fully global equity market did emerge, Canadian companies would still be at a disadvantage because of being Canadian.

Chapter III

THE CAUSES OF CANADA'S HIGH COST OF CAPITAL

But *why* is the cost of capital higher in Canada? This chapter examines the likely explanations and lays the groundwork for the discussion of its impacts (in Chapter IV) and of what may be done about it (Chapter V).

Three fundamental factors explain why our cost of capital is high relative to competitors like Japan and Germany:

- **Supply and demand** – If the demand for capital is high relative to supply, then in free markets its price (the required rate of return, or cost of capital) is higher.
- **Higher tax rates on investors** – The returns required from companies rise with the level of taxes investors must pay on these returns.
- **Greater risks** – Investors who face higher risks demand greater returns from their investments.

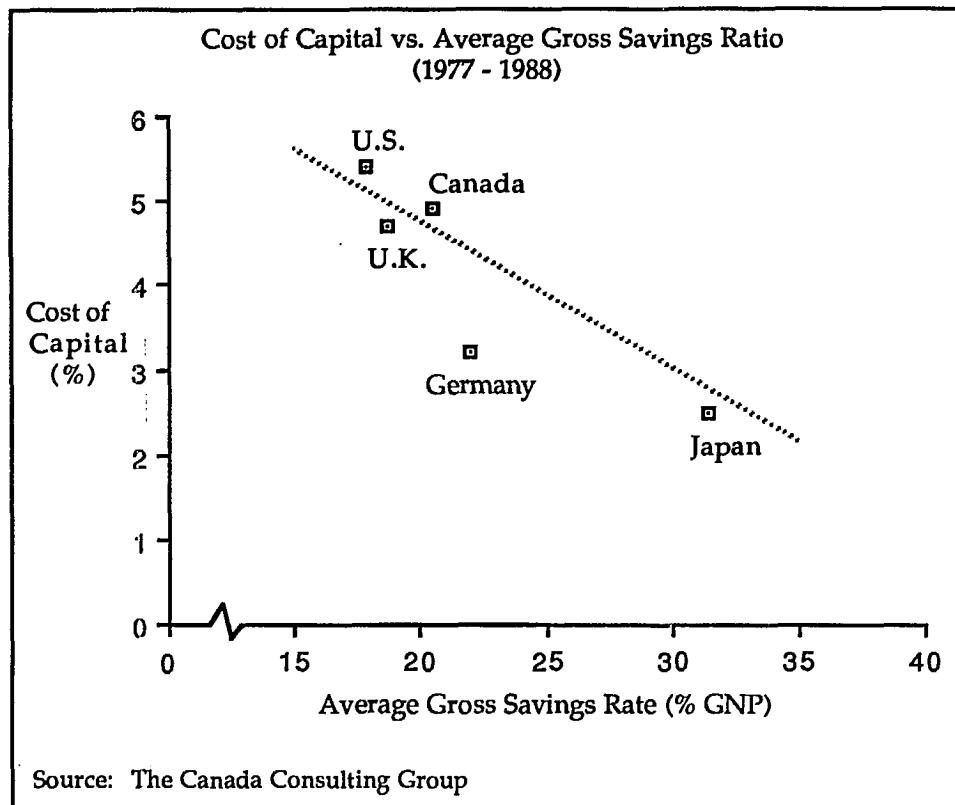
Debate about the cost of capital issue in the United States has focussed heavily on the first two factors – the poor U.S. savings rate and high relative taxes on equity investments – as the major explanations of the high U.S. cost of capital, especially relative to Japan¹. These factors have a role in explaining Canada's higher cost of capital – and that of other high cost countries, such as the U.K. However, in Canada's case, the third explanation – systematically higher risk – may be the much more critical explanation.

¹ Ando and Auerbach (1988), Chase Financial Policy (1980), Hall and Jorgenson (1967), Hatsopoulos and Brooks (1986).

THE SUPPLY AND DEMAND FOR CAPITAL

In a free market, the cost of capital reflects the balance between the supply and demand for capital. Consequently, there is a strong relationship between the cost of capital and the gross national savings rate in all the countries we looked at. The United States and the United Kingdom have the lowest savings rates and a high cost of capital, while Japan has by far the highest savings rate and the lowest cost of capital.

Exhibit III.1

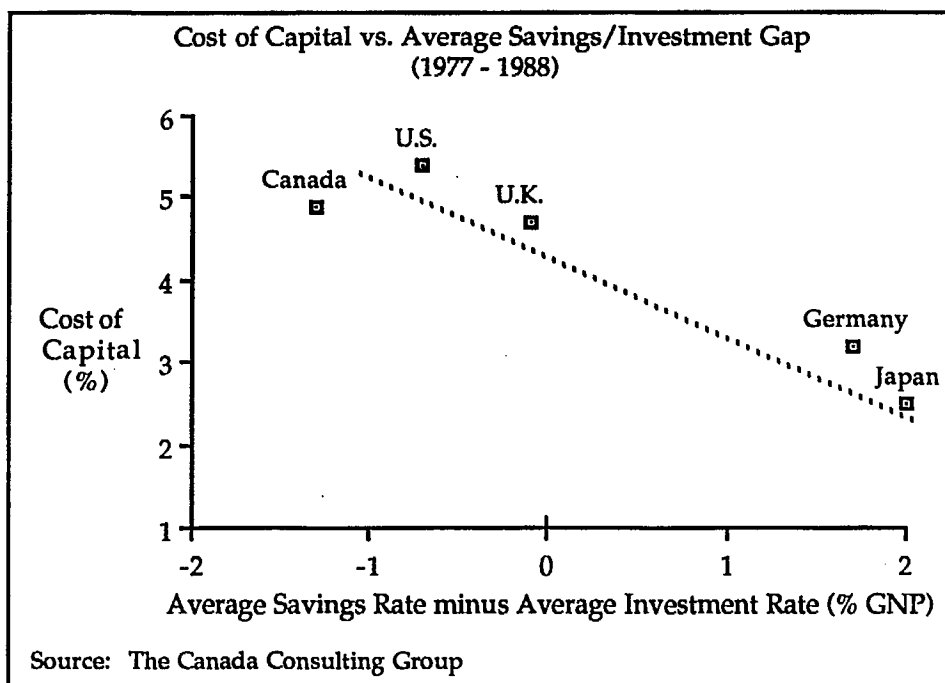


At first glance, Canada appears to be an exception to this pattern, since our savings rate is close to that of Germany, despite our higher cost of capital. However, while our private sector savings rate is high, the total supply of domestic capital in Canada is a function of net national savings, including the government contribution.

In Germany, the government has historically been a net saver, augmenting the overall supply of savings². In Canada, we have run large and persistent government deficits, effectively reducing the supply of capital available to the personal and corporate sectors, and increasing its price.

More important is the balance between the available supply of savings and the investment rate. Germany and Japan, in contrast to Canada, both have a savings rate significantly higher than their investment rate.

Exhibit III.2



The relative abundance of savings relative to investment helps keep the cost of capital down in Japan and Germany. In Canada, we see the reverse.

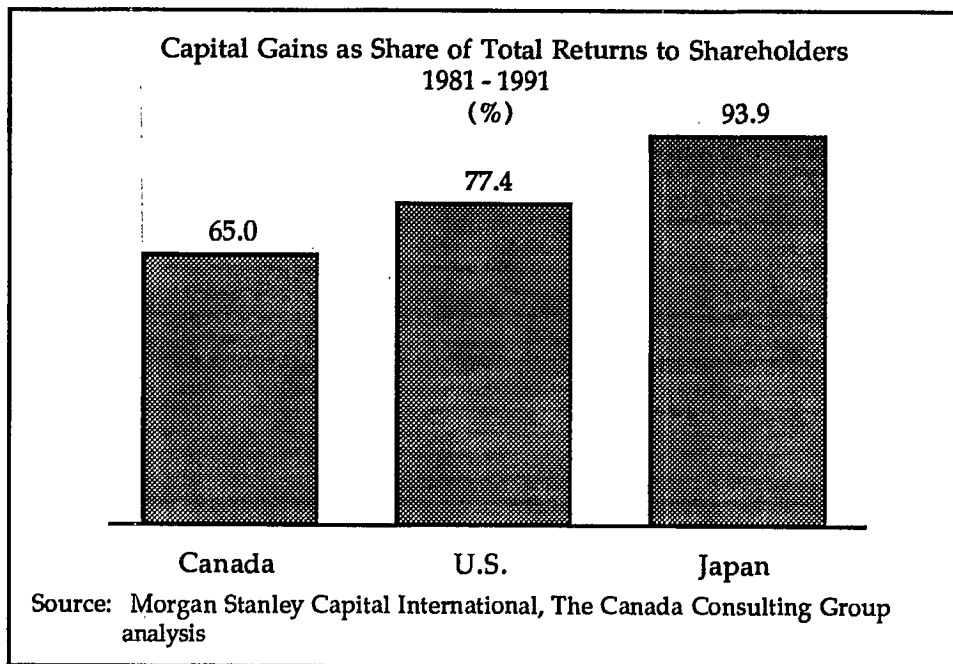
² The costs arising from the reunification of Germany will likely change this significantly for a few years.

TAX RATE DIFFERENCES

Since the cost of capital (and within it, the cost of equity) is really set according to the principle of supply and demand, anything that increases the minimum return required by investors raises the price that must be paid by companies. To the extent that investors need a given rate of return net of personal taxes, the higher the taxes, the higher the cost of equity to a company.

In practice, it is capital gains taxes that drive equity costs because gains represent the lion's share of the returns investors get from owning stock (See Exhibit III.3).

Exhibit III.3

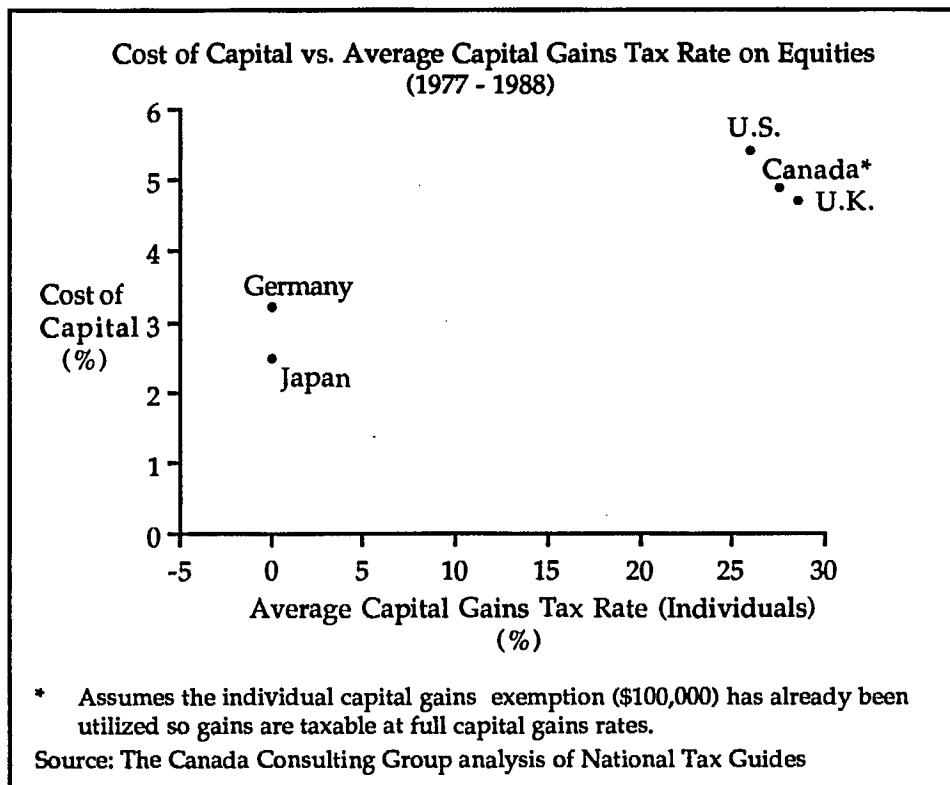


Striking evidence that investors change the level of returns they require from companies in response to changes in capital gains taxes can be found in the United States. When the capital gains tax rates were raised in 1976 from 35% to 49%, the value of traded equities fell by some \$200 billion within 16 weeks – approximately the present value of the proposed tax. The reduction of the capital gains tax in 1978 and its subsequent increase in 1986 also resulted in the cost of equity moving to maintain investors' net returns

in the face of a changing tax bite. Since it is the individual investor, not the company, who must pay the capital gains tax, the higher the capital gains tax rate, the higher the return the investor demands from the company as the price of equity.

Not surprisingly, therefore, differences in tax rates help explain Canada's high cost of capital. In the time period studied, Japan and Germany had no tax on capital gains from securities (with certain restrictions on the holding period and buy/sell activity) for individual investors³. (Nor do investors in Korea face capital gains taxes on securities.) The high cost of capital countries (the United States, the United Kingdom and Canada) tax capital gains at rates between 40% and 100% of their full marginal rates on other income. Canada sits near the top of this range (See Exhibit III.4).

Exhibit III.4



³ The 1989 tax reform in Japan created a tax on capital gains from equities that ranges from two per cent on an asset that doubles in value to 20% on equities that show small increases in value. These rates are still substantially below the marginal tax rates on ordinary personal income.

In addition, some countries differentiate types of capital gain. Japan, for example, taxes many "non-productive" capital gains at rates dramatically above those applied to equities. For example, short-term gains on sales of real estate are taxed at up to 50%. The effect of these differences is to encourage the already high-saving Japanese to put their money into equity investments, not speculative real estate investments.

RISK AND CANADA'S COST OF CAPITAL

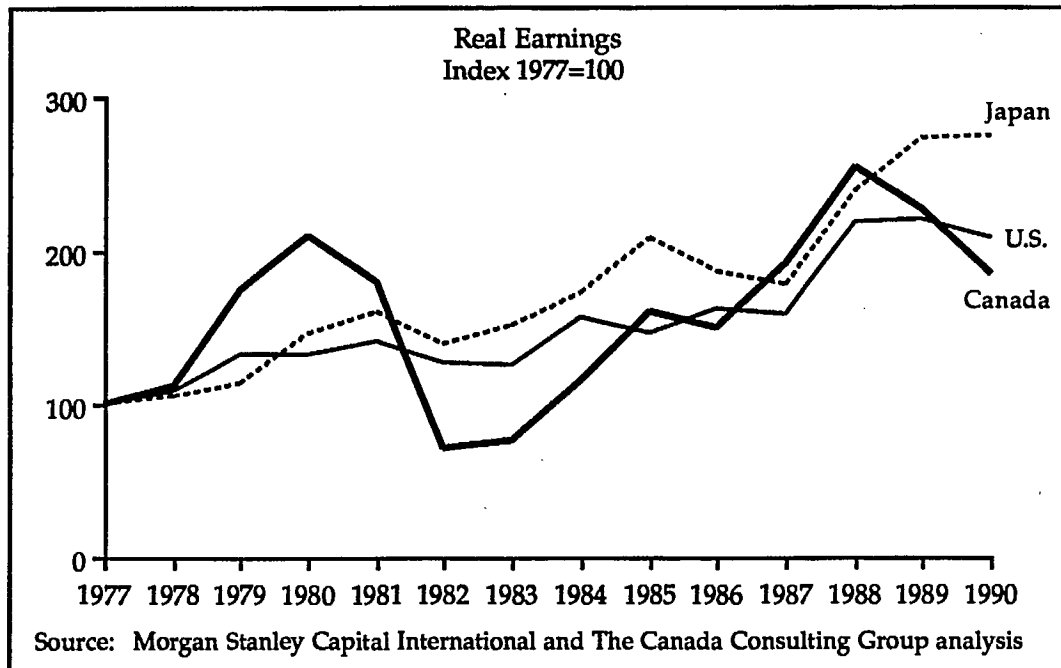
The third explanation for our high cost of capital is perhaps the most worrisome. It is Canada's higher level of risk that keeps our cost of capital higher than that of other countries, irrespective of our savings/investment deficit and our capital gains tax rates.

That investors facing higher risks demand higher returns is an axiom of modern finance. Countries where investors face higher risks will have higher costs of equity. Unfortunately, Canada is one of those countries. Ultimately, it is the inherently greater riskiness of investing in Canadian equities relative to investing in comparable equities in Japan or Germany that keeps our cost of capital high.

Cyclical and volatility

Canada is highly dependent on natural resource and commodity-based industries, where cash flows can swing wildly with movements in commodity prices or fluctuations in the business cycle. Moreover, much of our manufacturing base is heavily influenced by the auto industry, another strongly cyclical industry. This cyclical nature spreads throughout the economy as a whole, resulting in corporate cash flows being more volatile in Canada than in other countries.

Exhibit III.5



This volatility affects the cost of equity in a number of ways. To begin with, volatility in earnings means greater risk to the investor. It makes it much harder to predict the level of earnings at a given time, and the investor runs the risk of wanting to liquidate the investment at a time when its value is at a low point in the cycle. The investor will therefore require a higher return to compensate for such a risk.

In addition, volatility in cash flow limits a company's ability to use debt financing. Given that debt costs less than equity, this results in a higher overall cost of capital when debt and equity costs are blended together in the company's capital structure.

Finally, because cash flow is more uncertain, Canadian companies face a greater risk of insolvency relative to companies with the same average level of profitability, but less volatility.

Corporate structure and risk

While Canada's industry mix and resource dependence do increase the overall risk of investments in the Canadian equity market, this does not fully explain the consistently higher capital costs found in Canadian businesses compared to similar businesses in Japan and Germany. The explanation lies in differences in the corporate structure of Canada (also, for that matter, Britain and the U.S.) compared to Japan and Germany.

Corporate structures in the low-cost of capital countries lowers risk for investors in two key ways:

- **They reduce the information gap between the providers and users of capital.**
- **They reduce the underlying risks of business insolvency and substantially increase the likelihood of business success.**

Investing in equities involves making a certain current payment in the expectation of an uncertain future gain. The greater the uncertainty, the higher the return the investor will require. If accurate and relevant information flows freely, investors are in a better position to value an investment accurately. This clearly reduces the risk of the investment.

To suggest that investors in Canada lack information on companies compared to investors in Germany and Japan may seem odd. After all, Canada, like the United States and Britain, has relatively stringent rules requiring companies to disclose information to the public. Nevertheless, any stock market analyst in these countries will agree that a lack of timely and relevant information is still a major source of risk in the pricing of equities.

The situation in Japan and Germany is very different. Although they have less stringent requirements for the provision of information in their stock markets, information flows much more effectively between the providers

and users of capital in Japan and Germany, reducing both the risk and the cost of capital.

The institutional structures in Japan and Germany account for this freer flow of information. Both countries have much tighter integration between their financial and industrial structures than do Canada, the United States, or the United Kingdom.

The Japanese Keiretsu System

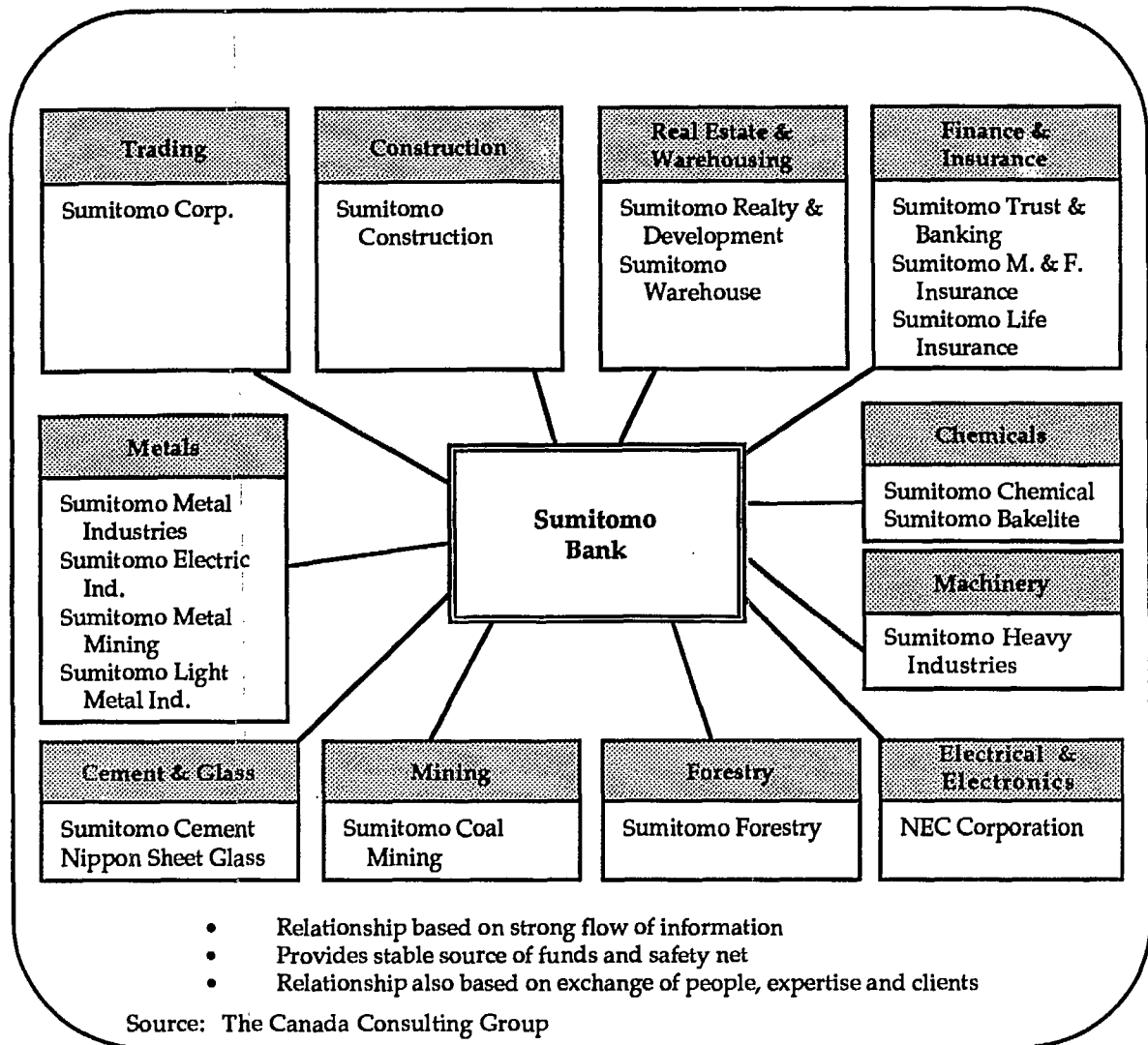
Japan's economy is dominated by massive corporate entities – *keiretsus* – bound together by a concept of relatively small but stable corporate inter-ownership and a tradition of cooperation, mutual support and information sharing. Each keiretsu has a main bank at its centre, which acts as the primary source of capital and a financial and strategic advisor for the group of companies.

The Sumitomo Keiretsu, the third largest in Japan, provides an example of the benefits of this industrial structure. The Sumitomo Keiretsu is composed of 130 firms, most of which are leading companies in their respective industries. Twenty of those firms are Hokusui-Kai members, or members of the group's presidential council. The council, made up of the CEOs of the companies, meets regularly to discuss joint strategies and collaborative projects. Noted for its cohesiveness and integration, the keiretsu is led by Sumitomo Bank and three industrial companies - Sumitomo Corp., Sumitomo Electric Industries and NEC. Exhibit III.6 illustrates the structure of the inner circle or president's council of the Sumitomo Keiretsu.

Being a part of the Sumitomo Keiretsu helps reduce the cost of capital for each of its member companies. The exchange of information among the firms and especially between the bank and member companies reduces the perceived riskiness of investments. Overall strategies and investment decisions of the main members of the Keiretsu are well understood by the bank and other cross-shareholders reducing the level of risk for these shareholders and thus the cost of capital.

Exhibit III.6

The President's Council of the Sumitomo Keiretsu



The benefits of being a member of such a keiretsu are apparent in the example of NEC. In the computer and communications industries, where competitiveness is driven by the ability to adapt and develop new and innovative technologies rapidly, NEC's ability to make investment decisions based on the importance of a technology, rather than on the investment's immediate returns, is a major competitive advantage.

NEC also benefits from the cross-holding of shares. Seventy percent of NEC's shares are held by Japanese corporations. Sumitomo Group companies own 24% of the shares. These cross-held shares bind the keiretsu together and allow for long-term stability. The remaining 46% of corporately-held shares includes shares that other companies acquired as a way of entering into or promoting business relations with NEC.

Senior management of NEC explains the importance of cross-shareholding in the keiretsu structure:

"Naturally, those shareholders with a long-term commitment will not be affected by short-term ups and downs. Rather, they are more interested in the long-term growth potential of the electronics industry and NEC's businesses."

Senior Executive, NEC

This perspective explains NEC's R&D expenditures and the way it approaches technological investment. NEC sets its R&D budget by having individual units within the corporation establish their R&D needs and those are then evaluated almost exclusively in terms of NEC's long-term strategic priorities. At NEC's Canadian competitor, Northern Telecom, a similar bottom-up process generates R&D requests from around the organization, but the overall level of R&D spending is set in part by what Northern Telecom can afford given all the other demands for its cash flow.

One of the demands which weighs heavily on R&D decisions at Northern Telecom is the earnings expectations of shareholders. Northern Telecom's cost of capital in 1982-1988 was 7.4%, while NEC's was 4.8%. It is inevitable given such a disparity in the cost of capital that Northern Telecom finds it more difficult than NEC to fund those R&D projects which may have good prospects, but which are not absolutely essential to its core business activities. In 1989, NEC spent 16% of sales on R&D; Northern Telecom spent approximately 13%.

The keiretsu structure also enables NEC to make critical investment decisions on a broader basis than that of a narrow financial analysis. For example, the strategic importance of the technology, not return on investment, was the key factor in assessing the investment the company made in FOTS (fibre-optic transmission systems).

"When it comes to key technologies, ROI (return on investment) is second in priority to investing and exploiting the technology itself."

Director of R&D, NEC

And the links go beyond the financial arena. Executive councils representing the group companies meet regularly to coordinate collaboration in finance, R&D, distribution, industry restructuring and other areas. Risks are pooled, and by sharing them, risks are reduced.

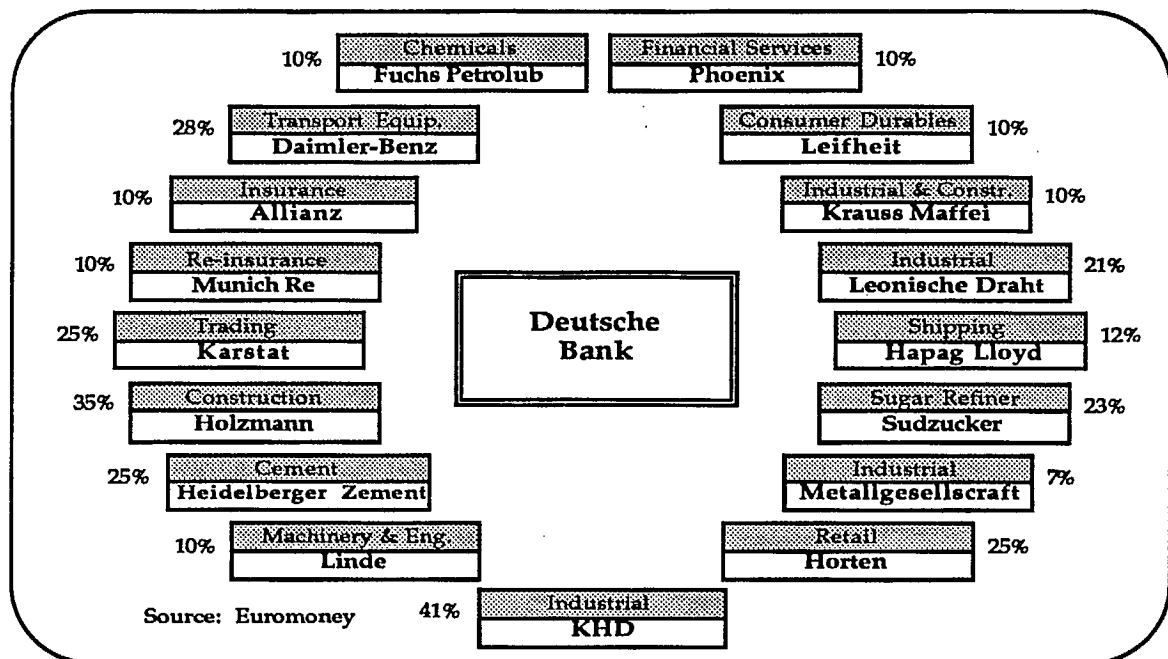
Less formally, the group provides a strong network of contacts, and ready-made customers and suppliers. Collaboration on R&D projects, for example, allows sharing of experience, information, investment and technology. The basic materials companies within the group have been collaborating with NEC to develop new electronic materials and new ceramic and organic materials. Close collaboration between supplier and user reduces the technical risks of the development. From a business perspective, NEC obtains access to the latest materials technology, while the materials companies have a secure and major customer to justify the investment in the research.

Similar Keiretsu support played an important role in assisting Sumitomo Heavy Industries to diversify away from its primary business, ship building, which was in decline, into high technology businesses like lasers. Sumitomo Heavy Industries eventually bought Canada's Lumonics in 1988, the world's third largest laser company. The Sumitomo Keiretsu supported Sumitomo Heavy Industries in its diversification efforts by providing cheap capital even when its dividend had to be suspended and by fostering marketing and technical links with member companies in support of Sumitomo Heavy's new technology-based businesses.

The German Main Bank's role

Germany's universal banking system is somewhat different from the Japanese keiretsu structure, but it exhibits a similar close linkage between the financial and corporate sectors. While Germany's web of inter-ownership is not as complex as in Japan, its universal banking system concentrates investment funds in the hands of banks, which consequently have major holdings in corporate equities⁴. This gives the banks important positions in the companies in which they hold stock. For example, Deutsche Bank executives hold more than 400 seats on the supervisory boards of German companies, as well as significant holdings in a number of key German enterprises. (See Exhibit III.7). Representatives of Deutsche Bank or the two other major German banks sit on the boards of about half of Germany's largest firms.

Exhibit III.7
The German Main Bank System
Selected Deutsche Bank Holdings in Related Companies



⁴ Banks directly own nearly 12% of equities in German public companies. Moreover, they also hold proxies from the shareholders. Together with their own shares, these proxies mean that German banks own over 50% of the equity of German companies.

The centralization of funds, combined with the bankers' intimate knowledge of their clients, facilitates a free flow of information, which both reduces risk and facilitates risk-sharing.

The result of these connections between industrial and financial institutions in both Japan and Germany is that major providers of capital are true insiders. Their risks are accordingly lower, and the return they require is reduced commensurately.

Finally, institutional links reduce the risk of corporate failure and bankruptcy by providing a support network – both financial and managerial – to a company in trouble. In Japan, for example, the primary lender is also a major shareholder. Patient capital and financial support, always available, are particularly valuable in times of trouble. Stable shareholding also provides financial strength for all group companies. The interdependence of the companies creates an institutional barrier to any threat of outside control or other pressure.

In the low cost of capital countries, the industrial-financial relationship is also part of a system characterized by much stronger ties between government and industry. In Germany, for instance, successful management of both emerging industries and declining ones depends on the relationships among industry, government, labour unions and the banks. These relationships reduce the overall risk to an industry by promoting the search for mutually beneficial solutions.

Canadian companies, by contrast, stand much more alone. Even when they are part of a wider grouping of companies, they typically operate more independently, and they certainly maintain a greater distance from their banks and shareholders. This relative isolation and lack of a safety net makes investing in them more risky than investing in comparable companies in the countries with a low cost of capital. And greater risk means a higher cost of capital.

A lower net savings rate, higher taxes on investment returns and, above all, greater risks deriving from a more volatile economy and less supportive

institutional structures are the causes of Canada's higher cost of capital. But what about its effects? Does a higher cost of capital really matter? As Chapter IV explains, the impacts are both widespread and worrisome.

Chapter IV

THE EFFECTS OF CANADA'S COST OF CAPITAL

A high cost of capital limits the growth and productivity of the Canadian economy. The precise impact of this cost burden differs, of course, from one type of investment to another, and one type of company to another.

THE INVESTMENTS THAT ARE AT RISK

The types of investment that companies must make is changing. In our more traditional resource-based and mature manufacturing businesses, low wage competition is increasingly forcing Canadian companies to move from commodity-type products to more sophisticated higher value-added products, thereby increasing the importance of R&D and product development. Similarly, as markets become increasingly international and global, firms are forced to invest more heavily in market development outside Canada. To be sure, many of these firms are also faced with the need to make heavy investments in machinery and equipment to remain competitive on a world scale, but the balance is shifting more in the direction of softer investments.

This shift in emphasis is even more marked when one compares the more traditional industries with newer more knowledge-intensive industries. Competing in the older industries, even with the changes described above, requires heavy investment in fixed assets and working capital. By contrast, many of the newer high-growth industries require only limited investment in tangible assets, but major expenditures in "soft" investment like R&D, engineering and marketing. (See Exhibit IV.1)

Exhibit IV.1

Investment Requirements in Three Types of Businesses (Assuming 10% annual sales growth)

Business Investment Area	Commodity Steel Product	Electronic Component	End-User Electronic System
Fixed Assets	55%	13%	7%
Working Capital	42%	32%	15%
R&D and Engineering	3%	55%	45%
Marketing and Sales	Minimal	Minimal	33%
Total Investment	100%	100%	100%

Source: The Canada Consulting Group and Telesis based on client studies

Furthermore, almost all industries face an environment where technological and/or competitive forces are shortening product life cycles. As this happens, there is inevitably a need for more product and technology development. This shift to areas of investment that rely on high levels of skill and education should benefit a country like Canada. At the same time, these areas are the ones where our cost of capital disadvantage hits the hardest.

Comparisons of the effects of capital costs at the project level must take into account the differences in incentives that various governments offer to different investments. These incentives are mainly in the form of preferential depreciation allowances, together with tax credits or grants. The impact of these is potentially significant enough to overcome a high cost of capital in a country.

To compare costs of capital at the project level, we calculated the pre-tax rate of return that an investment must make to cover debt and equity costs, the economic depreciation of the investment, and corporate taxes, taking into account any fiscal or other incentives.

While this calculation is complex, two broad results stand out:

- **The ranking of project costs generally follows the overall cost of capital in the country, leaving Canada in the high cost group.** The only significant exception to this general rule is that Canadian companies benefitted historically from the rapid depreciation of machinery and equipment that Canada allowed for tax purposes. This lowered the effective cost of capital for this type of investment in Canada below that of even Japan in the early eighties. However, this advantage has been eroded over the last few years. The change from a 50% depreciation schedule to a 25% declining balance schedule and the elimination of the investment tax credit has taken away Canada's previous advantage for machinery and equipment investment
- **The benefits of the lower German and Japanese cost of capital is most evident in longer life investments.** The shorter the life of the project, the less important are the funding costs, and more important the general corporate tax rate. The German and Japanese cost of capital advantage emerges and widens as the project's time horizon increases.

In addition, much research and development expenditure, and virtually all investments in market development, sales and marketing, are not capitalized and depreciated. Rather, they are expensed in the year in which they are incurred. This means that their full impact is felt in the current year's profit. Their required return is therefore driven by the cost of equity, and the cost of equity in Canada is about twice that of Japan. (See Exhibit II.3.)

Our higher cost of capital is most evident in precisely those types of investment that are increasingly important to our growth and competitiveness.

RESOURCE-BASED AND MATURE MANUFACTURING FIRMS

The world is becoming an increasingly difficult place for Canadian resource-based and mature manufacturing firms to thrive in. They are being squeezed between slower market growth on the one hand and increasing competition from both the industrialized and newly industrializing countries. They need to be increasingly productive to compete with the ever growing efficiency of the one, and the low wage costs of the other.

These pressures are leading to major restructuring in many of these industries. Significant new investments are required to replace old plants that are no longer competitive and do not meet environmental standards. Companies are forced to develop more highly automated production systems, together with new quality control systems. Greater marketing and sales sophistication and investment is required to gain and protect market share. And skills need upgrading at all levels in the organization - from the shop floor, through the technical functions, to the sales and marketing force.

Taken together, this means that many of our companies in these resource-based and mature manufacturing businesses are facing the need to make an array of significant investments merely to stay competitive. To justify this investment, companies need to make returns that exceed their cost of capital. However, the majority of the companies within this group are simply not earning their cost of capital. This means that if they continue to grow their assets in real terms, they will destroy shareholder value.

Exhibit IV.2

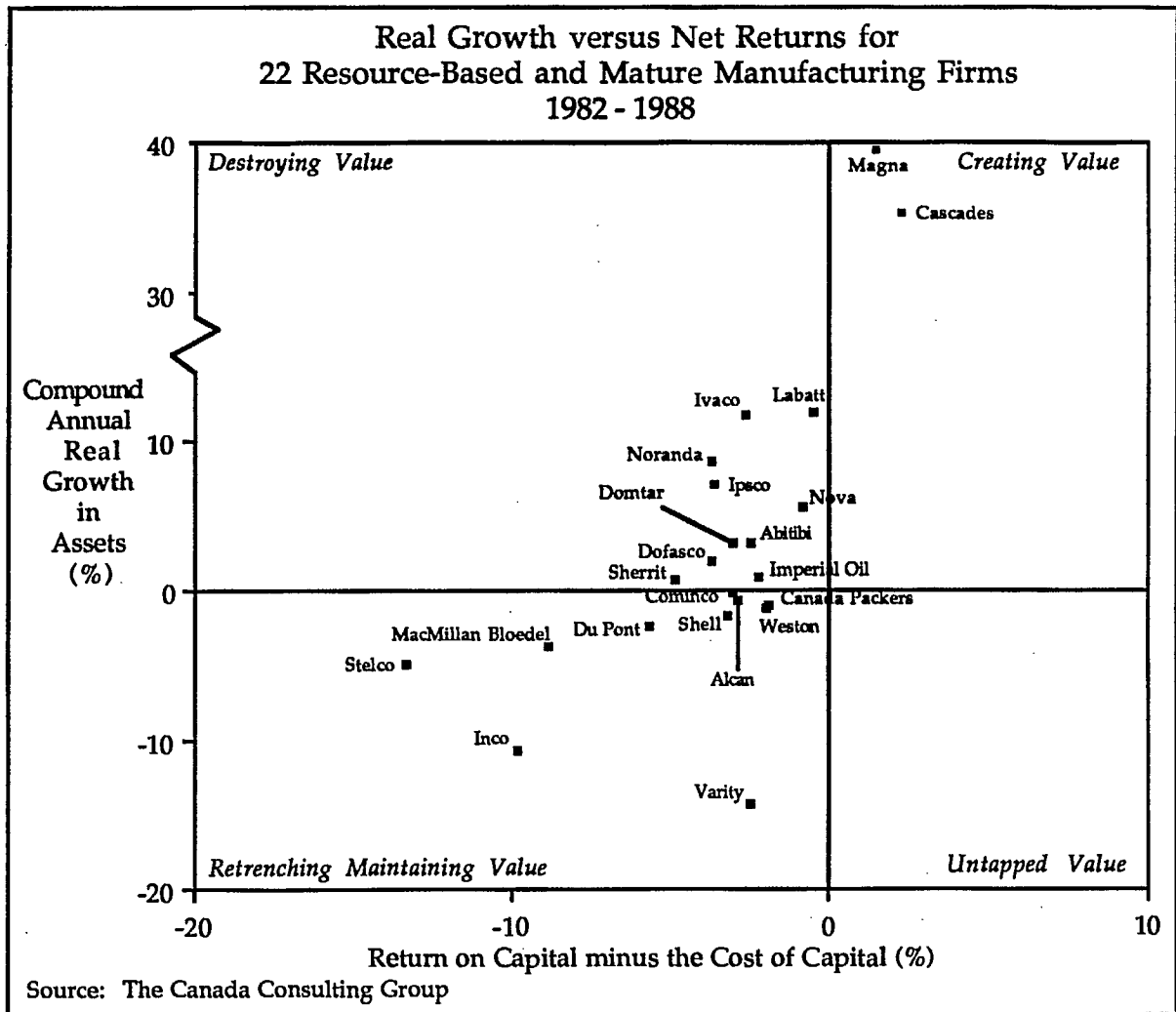


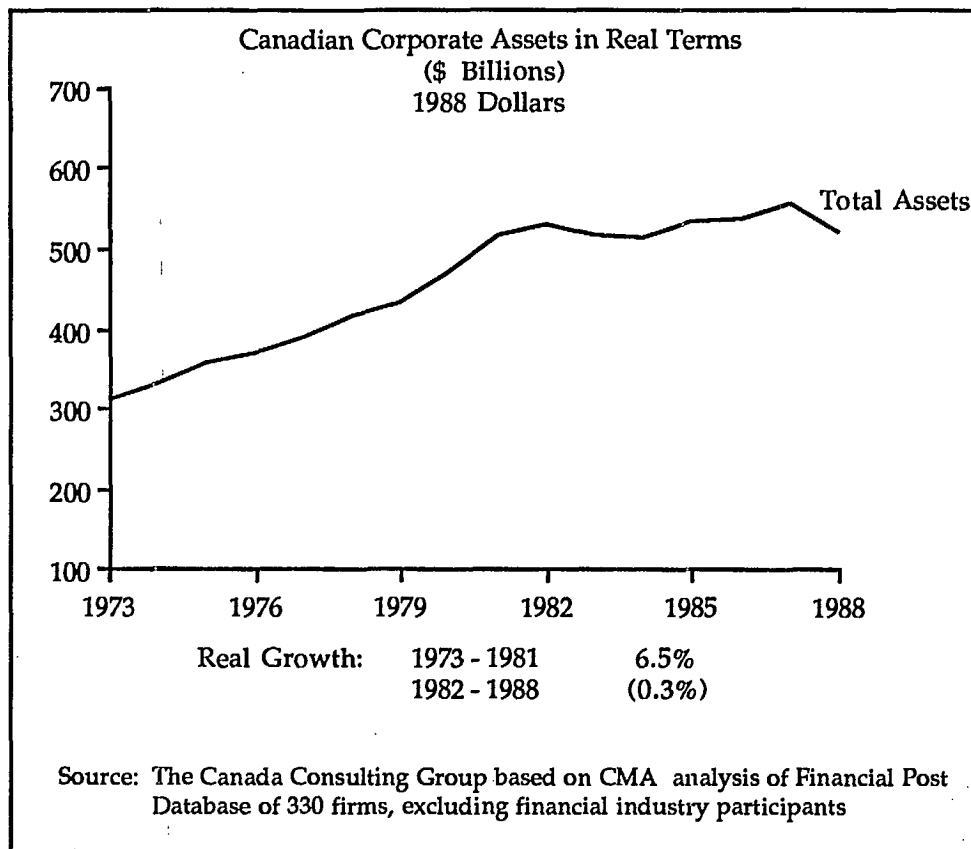
Exhibit IV.2 shows how 22 Canadian resource-based and mature manufacturing companies performed in the 1980s. Almost all the companies we studied were to the left of the vertical line, meaning that on average they earned less than their cost of capital. Many of these were also above the horizontal line, meaning that they were growing their asset base.

From 1982-1988, companies in the top left quadrant of the exhibit were destroying part of the value of their shareholders' investment by growing in real terms, but making less than the cost of capital on this investment. They were using more of their shareholders' money in order to grow but providing a return on it that is less than their shareholders could get

elsewhere. (As the return to debt is fixed and must be paid whatever the companies' level of return, it is the equity holders who bear the brunt of a company's failure to earn its cost of capital.)

The appropriate course for these companies, if they cannot increase their returns, is therefore to shrink in size, flowing money back to their shareholders to invest elsewhere. This is what firms in the bottom left quadrant were doing. They were still unable to earn their cost of capital, but at least they were limiting the damage. Since most mature manufacturing and resource based companies were not able to cover their cost of capital, they have needed to cut back in size to minimize the impact on their shareholders. One would predict that over time as markets realize that returns in these firms are not covering the cost of capital, asset growth will slow down.

Exhibit IV.3



In fact, that is exactly what has happened. (See Exhibit IV.3). In real terms, the assets of the top 330 Canadian publicly traded non-financial firms, which is a fair proxy for the resource and mature manufacturing companies, have not grown in total since the early 1980s. These companies are in a double bind. Their present assets are not giving them the minimum level of return that they need. At the same time, their high cost of capital hampers their ability to invest in projects which could create adequate value – projects which are often viable for foreign competitors with a lower cost of capital.

The cost of capital problem manifests itself in three very concrete ways for resource and mature manufacturing companies:

- Canadian companies find that they are unable to compete for acquisitions with Japanese, German, Korean, or Taiwanese firms
- Internal hurdle rates are sufficiently high that few new resource or manufacturing projects qualify in today's more competitive environment
- Attempts to diversify into new and more profitable lines of business are deemed too risky by the financial community condemning companies to stay within their narrow and perhaps fundamentally unattractive lines of business

Competing for Acquisitions

Our interviews identified a number of cases of Canadian resource companies competing against Japanese or German firms for acquisitions and being surprised at the high prices which these foreign competitors were able to pay. In most of these instances it did not appear that the foreign competitor was likely to be able to obtain greater profits from these assets but rather that the competitor was applying a lower discount rate to the investment.

"We are always surprised at how much foreign companies are willing to pay. It precludes us from entering a lot of new opportunities."

Canadian diversified resource company

"Some acquisitions are at prices that we think are outrageous. Either their cost of capital is much lower or they believe they can make much higher returns - or both."

Canadian Mining Company

"They [the Japanese] think of their cost of equity as being nil, and they act like it. For example, in bidding for one ore deposit, the Japanese bid 60 percent higher than the next highest bid."

Senior Executive, Australian resource company

Faced with this situation, most strong Canadian companies indicate that they will make strategically important acquisitions at returns below their cost of capital. (This partly explains why a number of the companies who are not earning their cost of capital are nevertheless growing in real terms.) But even if Canadian companies are prepared to shade their return requirements if strategic considerations are strong enough, this does not necessarily help: they are still outbid by Japanese and German firms who are prepared to accept even lower returns.

Clearing Internal Hurdle Rates

The second specific problem which a high relative cost of capital poses for Canadian firms is that many projects do not pass internal return hurdle rates which are set high enough to over the pre-tax cost of capital. Most Canadian resource-based and mature manufacturing companies use a hurdle rate system to evaluate new investments. Under such a system they calculate their company-specific pre-tax cost of capital and then add a premium for project-specific risk to create a hurdle rate which a new investment must clear to obtain financing. In most of the Canadian companies we interviewed, the hurdle rates used were in the 13-20% range.

In the Japanese and German companies we interviewed the hurdle rates concept was not used very widely and when used, rates were considerably below Canadian levels. Typically, hurdle rates would be in the 5-10% range.

"Eight percent pre-tax [the pre-tax cost of debt] is the bare minimum that our company's willing to achieve."

Japanese Company Executive

"We still may make an investment of five percent return [after tax cost of debt] if the investment is very important and there is no default risk."

German Company Executive

In many cases Japanese and German firms spoke of how they used hurdle rates and cost of capital calculations only as general guidelines in evaluating investments. The most important criteria for them were strategic, and on any specific investment they were prepared to go below their nominal hurdle rate guidelines if it was deemed strategically important.

"If the investment is large or doesn't make return requirements but it's important, we project consolidated statements two to three years to make sure the financial impact on the firm is acceptable. Then we do it."

German Company Executive

"We have only recently started using DCF (discounted cash flow) analysis, and it may not be such a good idea. It could be one of those many Harvard Business School things that lead to poor decisions."

Japanese Manufacturing Executive

Attempting to Diversify

The most pernicious cost-of-capital related problem for Canadian resource and mature manufacturing companies is the impediments it raises for diversifying into new products and businesses. For some Canadian companies, the inherent attractiveness of their business segments has turned decidedly negative in the past ten years. These firms have only two

real alternatives: stick to what they're doing and consolidate their activities around their most profitable assets in their core businesses or diversify into new more profitable business activities. The high cost of capital in Canada acts as a powerful disincentive to choose the latter.

If companies want to diversify, they need to convince the financial community that they are capable of doing it successfully and earning their cost of capital. The fact that a Canadian company may currently be unable to earn its cost of capital leaves it with a tremendous credibility problem in the first place. On top of that, it needs to convince investors that it could succeed at an entirely new business – a tall order even for a profitable and successful company.

"The sad reality is that the Street does not believe that any Canadian resource company has much chance of making it in a non-resource business – especially high tech. I'm afraid I'm also one who believes that."

Canadian Investment Banker

Given our current industrial structure, the fears of Bay Street financiers are probably well-founded. The Canadian corporate landscape is littered with resource and manufacturing firms which made foolhardy diversification efforts chasing opportunities in high growth industries. It may in fact be entirely rational to tell our resource-based companies to focus only on rationalizing and upgrading their current lines of business, but if they do, where will the new growth in higher value added industries come to take up the slack from our downsizing resource and mature manufacturing sectors?

We found in our interviews and quantitative analysis that Japanese and German resource-based and mature manufacturing companies are also facing great difficulties earning even their lower costs of capital. They are subject to many of the same competitive pressures as their Canadian counterparts. However, most of them are responding to their situations differently by investing aggressively in new business opportunities. The Keiretsu and German main bank structures assist them in their efforts both

by providing a low cost of capital and by increasing the likelihood of successful diversification through a variety of types of inter-company assistance. These can include sister companies identifying new market opportunities, testing proto-type products, providing technology, lending manpower, and opening doors to other firms at home and abroad. The case of Nippon Mining in Japan illustrates this process perfectly, but we heard many similar tales.

The Nippon Mining Case

Nippon Mining was a company in serious strategic and financial trouble in the late 1970s and early 1980s. Involved primarily in copper mining and oil refining, Nippon Mining was hard hit by the appreciation of the yen and the increasing levels of investment needed to meet anti-pollution requirements in Japan. With small scale refineries, Nippon Mining was in a weak position in a Japanese industry that was losing its competitive edge overall. Recognizing that its prospects were also limited within the declining Japanese copper industry, the company made the decision to diversify into higher growth and more profitable industries in order to survive.

Despite the company's poor financial performance, Nippon Mining made a dramatic commitment to the development of new products. To reflect this change in strategy Nippon began developing ten year plans, as opposed to three year plans, and conducted rigorous strategic analysis of a number of major potential R&D investments. Nippon Mining also made a very real financial commitment to the new strategy. From 1986-1990 the company invested US\$154 million in research and development annually which represented approximately 3.1% of revenues. Of this, about 85% was invested in the development of technologies which could lead to totally new businesses for Nippon Mining. Only about 15% was invested in Nippon Mining's existing business areas.

Contrast these figures with a prominent Canadian metals firm such as Alcan and the result highlights the problem facing resource companies in Canada. Alcan invested US\$162 million in Research and Development in

1988 which represented approximately 1.7% of revenues. A very small portion of this was spent on the development of breakthrough technologies which might lead to new products or businesses. The vast majority of the funds were spent on improving existing technologies in the aluminum industry. With a higher cost of capital, Alcan cannot afford a longer time horizon and the larger risk appetite that is required for breakthrough research and development. (See Exhibit IV.4.)

Exhibit IV.4

	Nippon Mining	Alcan
Revenue	US\$4.9 billion	US\$9.3 billion
R&D Expenditure	US\$154 million ¹ 3.1% of Sales	US\$162 million ² 1.7% of Sales
Cost of Capital ³	3.1%	6.2%
Prevailing R&D Focus	Downstream/Product	Upstream/Process
Technology Strategy	New Products and Businesses	Aluminum Technologies

1. 1986-1990 average

2. 1988

3. Real cost of capital 1983-88

Source: The Canada Consulting Group

Nippon Mining's recent purchase of Gould Corporation is a major outcome of the company's strategy to acquire or develop a key technology in a field related to its two core businesses. Gould, an American company, is the largest player in copper foil, a product used in the semiconductor industry. Nippon Mining viewed this acquisition as an opportunity to move into a downstream business closely related to the high growth computer industry. Nippon Mining had already developed a small business in this field through its R&D efforts.

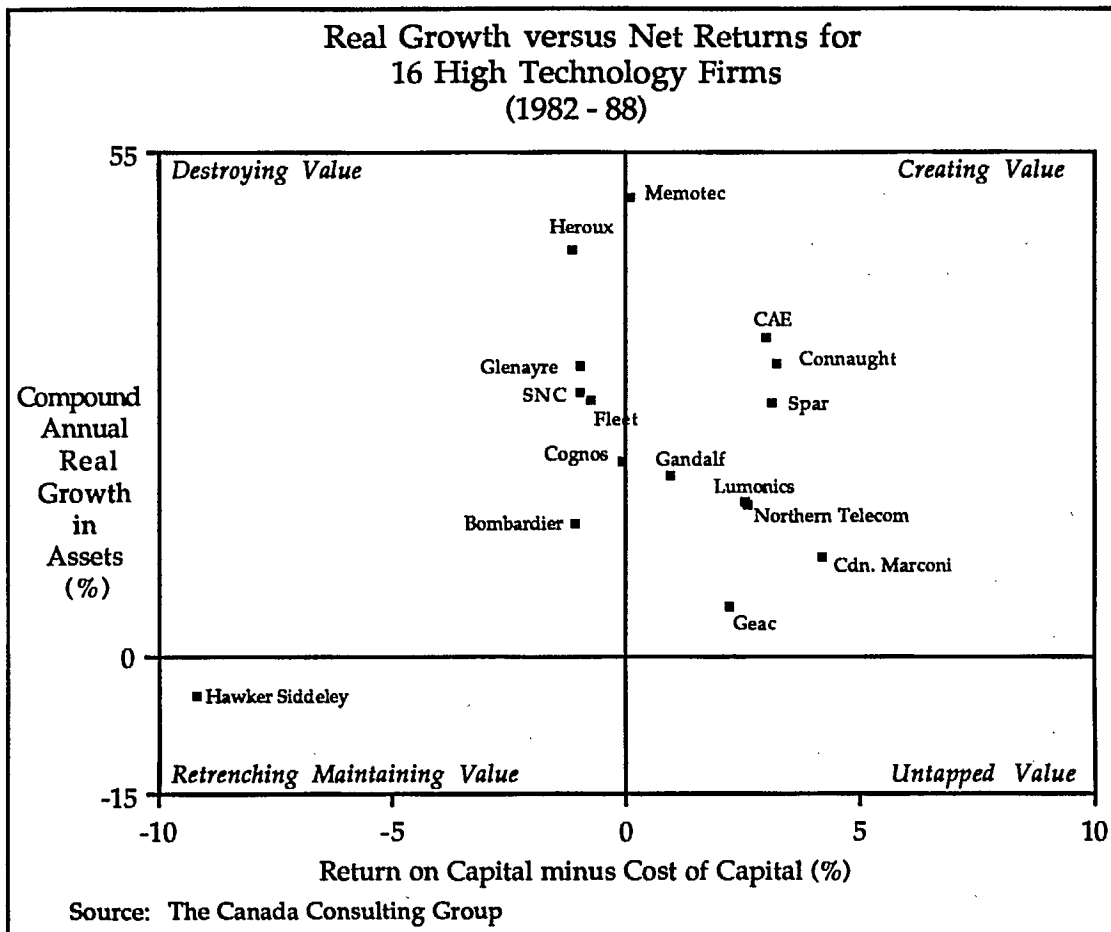
Nippon Mining is expecting a long-term payback on this strategic investment, and Nippon's low cost of capital (which is half of Alcan's level)

helped make it feasible. It was also critical to Nippon Mining's success in diversification that it had the backing and active support of its main bank and related companies for the execution of the strategy.

ESTABLISHED TECHNOLOGY-INTENSIVE FIRMS

In contrast to mature manufacturing-based and resource-based firms, we found that established technology-intensive firms in Canada are generally more able to earn their cost of capital and have therefore been able to grow without destroying value. Indeed, the high growth rates of these firms reflect the imperatives of their businesses: firms that do not grow strongly in most technology-intensive businesses fall behind in the competitive race and have weak prospects for survival.

Exhibit IV.5



R & D Schizophrenia

Despite this relatively stronger position, however, even these established technology-intensive firms are seriously handicapped. They often find that investors do not properly value the investments they make in "softer" assets like R&D and new market development. This is because R&D and market development are not capitalized but expensed. Thus, they directly affect short-term earnings. At the same time, many investors discount reported net earnings to determine a company's stock price. As a result, increased investments in R&D and market development can drive down the value of a company's stock. This leads to a situation where companies are often forced to choose between current earnings and long-term competitive needs.

"We have to make our bottom line, and 10%-12% of revenues is the most we can spend on R&D and still make our bottom line. We are forced to be schizophrenic - drive quarter to quarter performance to keep shareholders happy, but still have a long-term view."

Canadian High Technology Executive

"We are continually faced with the divergence between the priorities of the investment community, which tends toward improving current earnings, and the realities of our industry with the market and competitive environment offering only longer-term returns and demanding considerable investment in R&D and marketing simply to remain competitive."

Canadian High Technology Executive

In theory, there is no reason why investment in R&D and marketing should in fact reduce a company's stock price. The investments should only be made if they produce a return greater than the company's cost of capital, and therefore the future benefits from the investment would outweigh the short-term impact on earnings and the company's stock should in fact rise, not fall. Unfortunately, this does not happen in practice. Both the Canadian financial community and Canadian companies themselves agree that R&D and marketing investments are usually given negligible value by

the stock market, if any, thereby reducing the incentive to invest for the future.

"Investors don't have the information to be sure whether low earnings are a result of good investments or poor performance; they assume poor performance."

Canadian Investment Banker

This is not a uniquely Canadian problem. A recent study by the British Department of Trade and Industry was told, "The City [London] doesn't overvalue R&D or undervalue it; it just doesn't value it at all!"

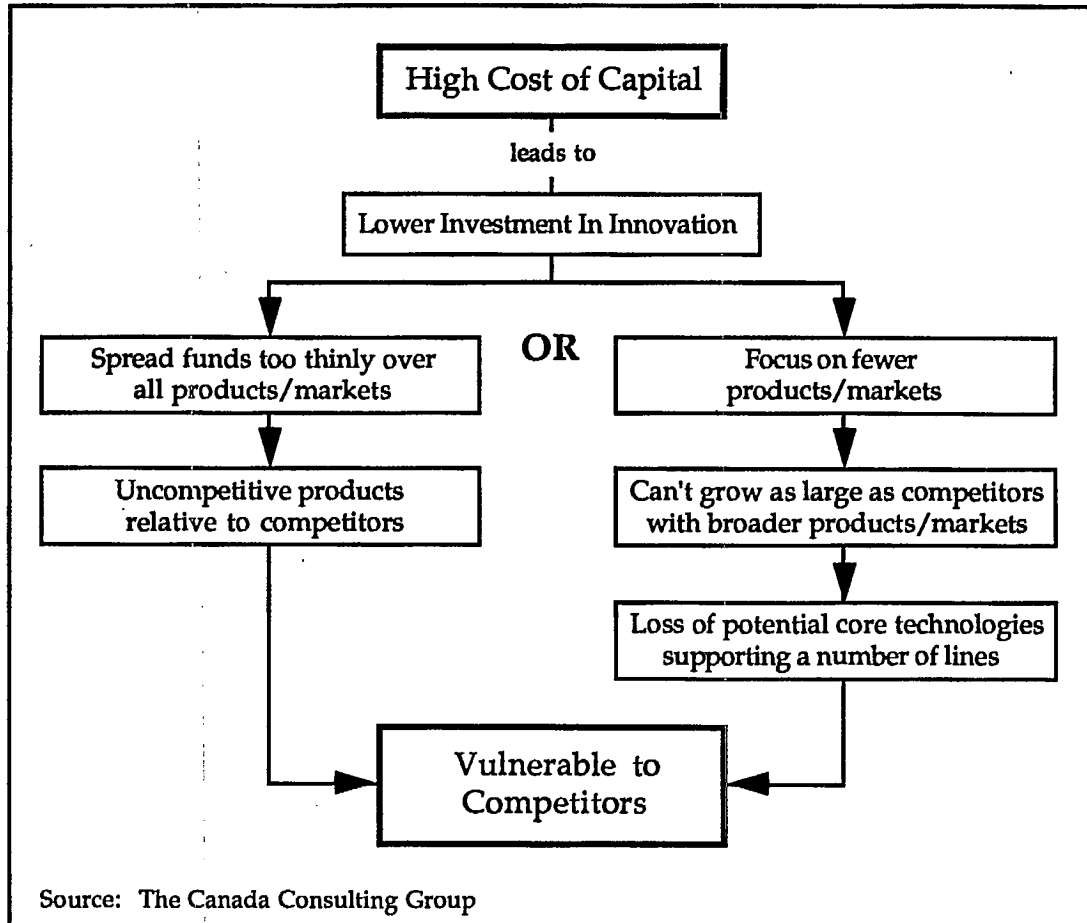
As a consequence, established technology-intensive companies are limited in their ability to invest in innovation to the extent that they believe that their competitive situations may demand. Many of these firms are left choosing between two options – either of which increases their vulnerability to competitors.

The High Technology Hobson's Choice

Many Canadian high technology companies described to us facing a Hobson's Choice of either narrowing their product focus or staying broadly focussed but funding all product developments too thinly. The first choice of focussing on a limited number of products or markets in order to be able to make the depth of investment needed to maintain quality and a competitive edge can alleviate the problem of limited capital and maintain a company's position in those chosen products and markets. However, for many firms this narrow focus will make them vulnerable to faster growing foreign competitors who can support investment in a much wider range of products and technologies. In particular they may find competitors able to fund a wider base of core technologies which can in turn support their total product needs.

Exhibit IV.6

The High Technology Hobson's Choice



As an example, one Canadian technology-intensive company we interviewed has a core technology area where only a few suppliers worldwide can support the Canadian firm's future product development. All but one of these suppliers has already been bought by the Canadian company's Japanese competitors. If the Canadian firm does not purchase the remaining technology supplier, it risks being unable to compete at all in that business segment. This Canadian firm has now elected to narrow its product range rather than attempt to buy the supplier and underfund other technology efforts. Nevertheless, it worries greatly that this decision to narrow its product focus may be fatal later.

Remaining in all products and markets by spreading investments thinly across them all avoids the problems of the first option above. However, it inevitably also risks a lack of competitiveness, as continual low investment relative to international competitors will result in uncompetitive products. This is a particular problem in the fast-moving technology-intensive industries where there is a high rate of new product development reflecting rapid advances in the underlying technologies. Lacking the resources to fund the proper development of the next generation of products, and in particular the ability to develop them faster, the company with inadequate resources to invest inevitably runs the risk of product obsolescence.

The solution to many of the problems facing these technology-intensive companies is to ally themselves with a source of low cost capital - or at least a source of capital that could recognize the future benefits of the investments being made today. In this regard, the foreign takeovers of Connaught and Lumonics often become inevitable alternatives to the problems facing these types of companies. Both of these companies were sold to foreign owners to overcome the investment problems they faced under Canadian ownership. In the short term, these takeovers by knowledgeable foreign corporations can provide access to cash and hence improve innovation, investment and competitiveness.

"We needed a sponsoring shareholder who understood our business and wanted to invest in a high-technology industry - hard experience says that Canadian firms don't want to invest in our area. That's why we were bought by a foreign firm."

Canadian High Technology Executive

"Given the near-term forces at work and despite a firm conviction about the long-term potential, we concluded that we must either change our ownership structure to match the current needs of the business or dramatically restructure the business itself, likely via divesting business units that would require the greatest future investment, or else risk falling short in the competitive battlefield."

Canadian High Technology Executive of Firm Acquired by Foreign Multinational

However in the longer run, foreign ownership brings risks that the high value-added activities will be transferred out of Canada. In the longest run, only true technological leadership that cannot be transferred can ensure that the high value-added activities remain in this country.

An example from another technology-intensive company bought fairly recently by a foreign company serves to illustrate the problem. The Canadian unit conceived a new product, pre-sold it to two or three major overseas customers, and built the development team required to take it from concept to market. Not long after the development work began, the new foreign parent found that its own development staff were about to have considerable spare capacity. Rather than lay them off, it transferred the development of the product in question from its Canadian operation to its foreign headquarters, and disbanded the Canadian development team. The Canadian manager in charge of the project noted, "They had spare capacity. We had a big, new, promising project. So it went to the U.S. and that was that. I hadn't even finished recruiting my team."

While the typical established Canadian technology-intensive business has been able to earn its cost of capital and grow its real assets, the high cost of equity in Canada, compounded by the financial community's inability to evaluate investments in such companies effectively, will make it increasingly difficult for these companies to maintain their performance as competition in their industries intensifies. Yet the position of these established high-technology companies is significantly better than that of similar firms at an earlier stage of development.

EMERGING TECHNOLOGY-INTENSIVE FIRMS

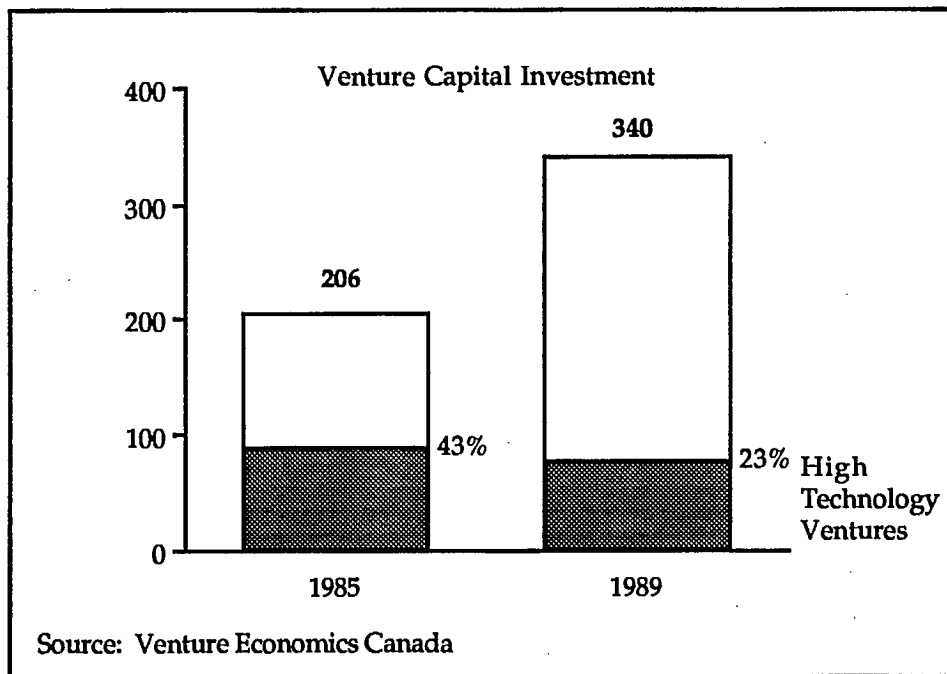
Emerging technology-intensive firms face the same problem as their more established counterparts. However, they also face an even more critical problem: frequently they find it difficult to acquire capital at any price.

Such firms must rely almost exclusively on equity to finance their operations. Significant quantities of debt are simply not available to them.

To begin with, they do not have the assets to offer as collateral for a loan. Moreover, the consistent cash flow necessary for debt repayment is usually not assured, and many of them have no income at all for long stretches of time. Furthermore, they rarely have a sufficient track record to provide comfort to a lender, especially given the default rate of small commercial loans. This dependence on equity financing raises their cost of capital sharply, since equity is significantly more expensive than debt. Even so, for many of them it is not the price of capital that is the problem, but its extremely limited availability for high-technology ventures in general and smaller high-technology companies in particular.

Over the last few years, venture capital investment in emerging high-technology companies has declined. For example, while total venture capital investment increased quite sharply between 1985 and 1989, the amount of investment in technology-based ventures declined, not only as a percentage of the total but in absolute dollars. (Exhibit IV.7)

Exhibit IV.7



In turn, this lack of investment means that Canadian high-technology industries lack critical mass. The problem begins with a small home market.

"Our home market is not large enough to sustain many businesses, so our small companies must make the move early on to expand their markets. U.S. firms can grow to a larger scale domestically before they need to look abroad."

Canadian Investment Banker

This task of moving rapidly beyond our home market is made more difficult by our limited resources. Furthermore, what high-technology investment there is tends to be fragmented, both in terms of technology and geography. As one investment bank analyst described it, "There is no such thing as a 'high-tech' industry in Canada. There are several Canadian high-tech companies, and an almost equal number of industries." And, as one venture capital firm added, "Each region wants to develop its own industries which makes it difficult to build an industry infrastructure."

This lack of critical mass leads to weak management and infrastructure. Management is often the missing link.

"The disappointing results are largely due to the lack of marketing and sales expertise in the high-tech area. We find we get into trouble when we try to replace senior people because we just can't find the expertise in Canada. Part of the problem is simply lack of critical mass."

Venture Capital Firm

"Good ideas are easier to find than good start-up company managers - we would back good people before a great idea with questionable management."

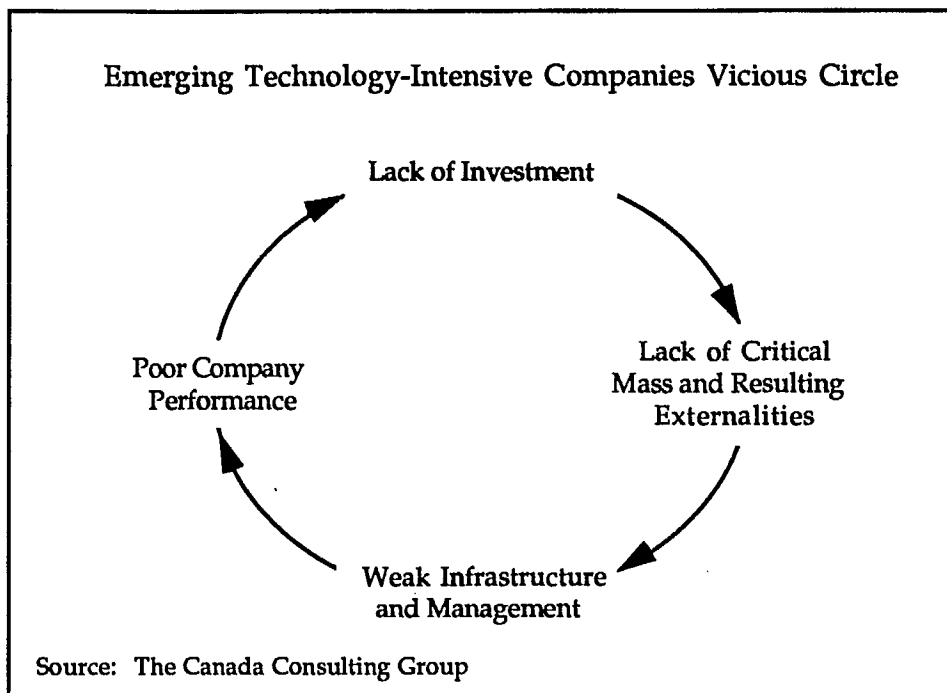
Venture Capital Firm

Since there are insufficient established firms to provide the cadre of experienced managers who can lead emerging firms, there is not a pool of skilled labour on which new emerging firms can draw. The emerging firm

does not have other technology-intensive firms close at hand that can serve as its suppliers and customers, or its partners in strategic alliances.

This lack of skilled management and the inherent risks associated with emergent technology-intensive businesses have meant that, from an investor's point of view, the performance of Canadian high-technology companies has been disappointing. Institutional investors are simply not investing in high-technology companies. The entire process is a vicious circle which goes round and round frustrating entrepreneurs and the financial community. (See Exhibit IV.8)

Exhibit IV.8



Because there is little investor interest, the financial community has not developed expertise in the high-tech area. As a result, investments that are made often do not produce acceptable results, which reduces investor interest, and so begins a second vicious cycle in the investment community. (See Exhibit IV.9.)

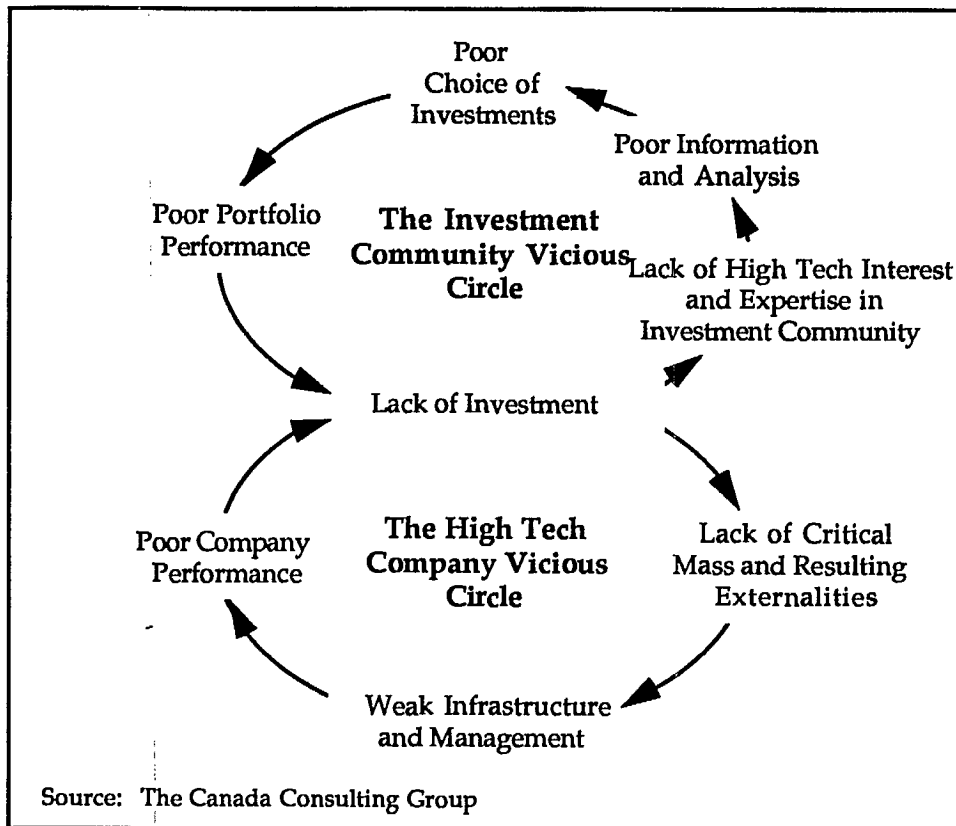
"Pension funds have been completely blind-sided by the performance of the high-tech stocks and so have removed themselves completely from the area."

Canadian Venture Capital Firm

"Because performances of high-tech and start-up investments have been so poor, we now only invest in these ventures for the social good of Canada. We can no longer justify the investments on any other grounds."

Canadian Life Insurance Company

Exhibit IV.9



The investment community vicious circle and the high tech company vicious circle each feed upon one another. The two vicious circles also help to explain the seemingly contradictory comments one hears from high tech entrepreneurs and venture capitalists:

"There is simply no knowledgeable venture capital in Canada. We had to get financed in the U.S."

Canadian high tech company founder

"We see very few good deals in Canada. The high technology community is weak and most firms we encounter have fatally flawed plans or management."

Canadian Venture Capitalist

The truth is that both Canada's high technology companies and Canada's high technology financiers are weak by international standards and will stay weak as long as our twin vicious circles keep revolving with their current inertia.

Some of these problems are endemic to new technology-intensive start-ups around the world. But the problem in Canada does seem to be significantly worse than in some of our major competitors.

High Technology in Japan and Germany

The significant difference between the situation in these countries and that in Canada is that large indigenous firms in Japan's and Germany's core industries are also leaders in high-growth and emerging sectors. Because of their larger scale, these companies not only usually have lower costs of capital but can also share the risk on new ventures and R&D among their divisions and subsidiaries. This leads to the creation of a strong industrial infrastructure. All these factors combine to make it far easier to bring new technologies successfully to market.

Moreover, the technology-based firms that are not large are often developed within a large industrial group such as a keiretsu or a bank holding group. Each of the major keiretsus has now established at least one keiretsu venture capital company. This provides stability, access to capital, risk-sharing mechanisms, and immediate access to contracts as other companies in the grouping become key customers. In addition, the more established infrastructure and critical mass generated by the large companies provide

additional support to the smaller company, even when those firms are independent and not part of a larger group.

High Technology in The United States

The United States shares some of the problems seen in Canada; it too has a high cost of capital and does not have the institutional structures found in Japan and Germany.

However, the U.S. has many large indigenous firms and core industries in high-growth areas, such as IBM, GE, and Hewlett Packard. The sheer size and strategic importance of such firms have contributed to the creation of a strong infrastructure in their respective areas. From this base, a significant technological/high-growth critical mass has developed in selected geographic core locations, such as Route 128 in Massachusetts or Silicon Valley in California.

Among the several benefits of this greater critical mass is the availability of an experienced management pool for these type of businesses. In turn, this larger critical mass has spurred the development of expertise in the investment community, which means there is greater understanding of technology related risks and industries. This has translated into more developed IPO (initial public offering) and venture capital markets. The greater liquidity in technology stocks and additional exit opportunities reinforces the strength of the investment community's interest. Thus, emerging high-technology companies in the United States have a much better chance of overcoming the debilitating problems that plague their Canadian counterparts.

FOREIGN MULTI-NATIONAL FIRMS

Multi-nationals, whether Canadian or foreign-based, generally use the cost of capital of their home country to assess investment prospects. Our interviews definitely established that the investment decisions of foreign

multi-nationals operating in Canada are not directly influenced by our high cost of capital – even in those cases where some public equity has been maintained in Canada.

However, these firms are indirectly affected by Canada's higher cost of capital in important ways. They often suffer because their supplier base is weak relative to other countries, as Canadian suppliers are sometimes unable to develop the scale and capability to become internationally competitive in part because of the cost of capital. Furthermore, the lack of a solid critical mass of technology-based businesses deprives many foreign multi-nationals of a large pool of scientifically and technologically skilled talent from which to recruit. This makes Canada a less attractive location for a firm's technology oriented operations and R&D efforts. Thus, while the cost of capital does not directly affect the activities of foreign multi-nationals here, it indirectly affects the attractiveness of Canada in a negative manner.

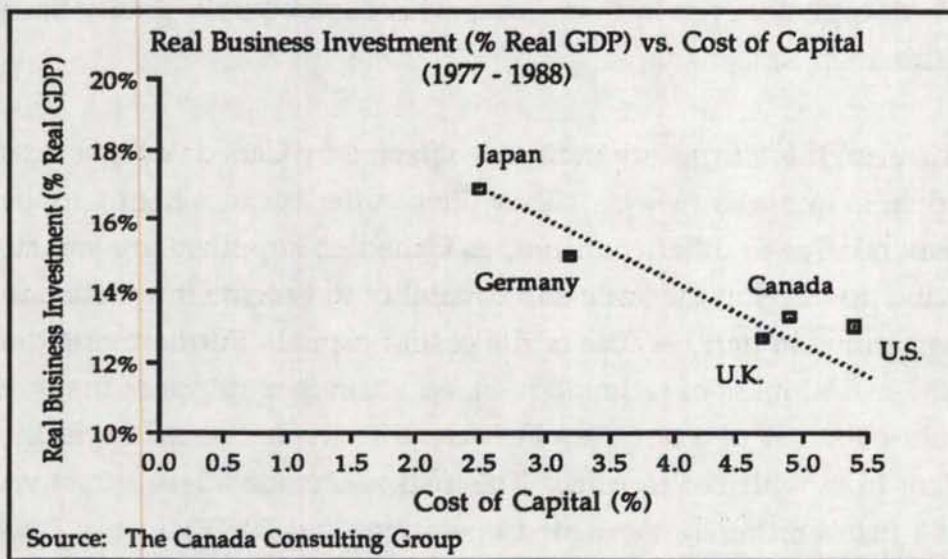
LOWER REAL BUSINESS INVESTMENT

In summary, the high cost of capital in Canada makes it difficult for Canadian-based firms to sustain the level of investment and innovation needed for them to continue to compete globally. And this impact is felt most keenly in the areas of "soft" investment that are the most critical for many of the high-growth technology-intensive businesses.

An analysis of real business investment as a percentage of GDP suggests that there is a strong relationship between the cost of capital and business investment.

This statistical relationship is supported by the interviews we carried out in each group of companies. With a higher cost of capital, the hurdle rate that any proposed investment must meet is higher. With a higher hurdle rate, fewer investment opportunities will be viable compared to those accepted by competitors with a lower cost of capital. This leads directly to a lower level of investment in Canada than in those competitor countries.

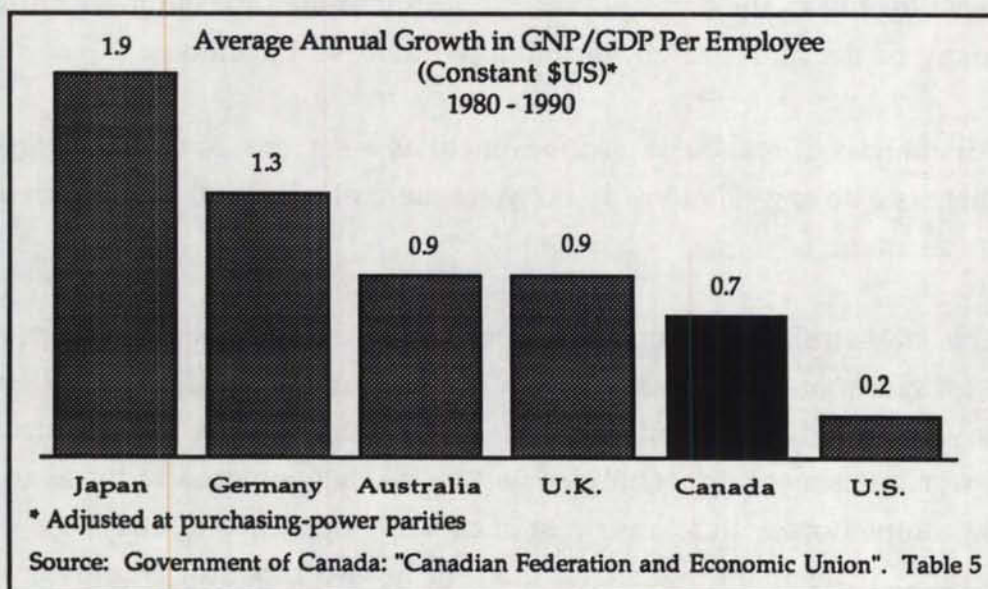
Exhibit IV.10



LOW GROWTH IN PRODUCTIVITY

The countries with high cost of capital, therefore, invest less than countries in the low cost group. In turn, this lowers the rate at which their productivity increases. As Exhibit IV.11 shows from 1980-1990 Canada's growth in GNP per employee, like that of other high cost of capital countries, fell well behind that of Germany and Japan.

Exhibit IV.11



This relationship fuels the argument that, over time, a high cost of capital will lead to lower investment, including in those areas which lead to greater manufacturing efficiencies and production quality. The long-term impact is continuing and self-reinforcing competitive decline.

A higher cost of capital is therefore causing major problems for all types of Canadian companies and affecting the competitiveness and prosperity of the country as a whole. What can be done to tackle the problem?

Chapter V

WHAT CAN BE DONE?

Canada's high cost of capital problem is neither new nor unique. We have lived with a relatively high cost of capital for many years and the cost of capital available for our leading firms is not very different from that available to leading firms in the U.S. and the U.K. Given that we have lived with this affliction for many years and that some of our largest economic competitors have the same problem, is that high cost of capital something we should really worry about?

Our answer is a decided "yes". In the past Canada's relatively high cost of capital was not a serious problem because we had other competitive advantages which made earning even a high cost of capital relatively easy. Our rich natural resource endowment, our proximity to U.S. markets, and the relatively high level of skills in our workforce enabled us to earn high returns to both capital and labour. Our companies made good profits and could pay good wages. In more recent years, however, our traditional sources of advantage have eroded.

In relative terms our competitive position in resources has declined as the resource wealth of many lesser developed countries has been unlocked. These new resources are often lower cost than those available in a highly developed country like Canada. Chile in copper, Brazil in eucalyptus pulp, and Saudi Arabia in nitrogen fertilizers (based on natural gas) are all new competitors which enjoy major cost advantages over Canadian resource producers.

Our proximity to the U.S., which was once such a major advantage for all our industries, is much less of an advantage today in a world of rapid air travel, low cost ocean shipping, and instantaneous phone, fax, and computer communication. Sadly, too, the major advantages we once obtained from our relatively high education and skill levels have been mitigated by the dramatic growth in education and skills levels in many

competitor countries. In fact our fortunes in this regard have reversed themselves: we now lag countries like Japan, Germany and Singapore in the average education level and skills of our entry level workers.

The erosion which has taken place in many of our former competitive advantages as a nation now causes the cost of capital to loom as a greater problem. This is especially the case as more and more of our industries have had to face international competition from low cost of capital countries. In the 1970's companies like Northern Telecom in telecommunications or Dofasco in steel did not have to worry much about Japanese, German, or Korean competition. But today companies from those countries are the leading competition.

As industries have globalized, Canadian firms have come face to face with the disadvantages which a relatively high cost of capital creates. They find that competitors can pay more for acquisitions than a firm with a Canadian cost of capital. They discover competitors can sustain a broader range of new product development than a comparable Canadian firm. And they grow increasingly frustrated by the long-term paybacks which Japanese or German firms can afford on new product and market development efforts.

Of course, companies from the U.S. and the U.K. also suffer from these difficulties. But it is small comfort to say to Northern Telecom that even though NEC and Siemens have a much lower cost of capital, at least the playing field is level with AT&T.

The cost of capital is a real and pernicious problem for our leading companies competing in global markets. It inhibits them from doing many of the strategically important things that the Japanese, German or Korean competitors do. And perhaps most importantly, the high cost of capital is a silent destroyer of jobs and exports. It influences all investment decisions but in a subtle and not easily identifiable way. It quietly kills countless projects which never get off the drawing boards - projects which would have gone forward if the decision was being taken in a Japanese and German boardroom.

WHY IS NOW THE THE TIME?

The cost of capital problem needs to be addressed now. The Canadian economy is in the early stages of a profound economic restructuring which will require significant new investments in plants, products, and people to secure the high standards of living to which we have been accustomed. The cost of capital will be a significant determinant of both the pace and outcome of this restructuring process.

During this period of economic restructuring, a large number of Canadian jobs, plants and whole companies will be destroyed. The Free Trade Agreement with the U.S. did not begin this process, but it has accelerated the restructuring and condensed ten years of probable branch plant closings into a period less than half that long. The North American Free Trade Agreement among Canada, the U.S. and Mexico will further accelerate this process and will have an especially large impact on the automotive and related sectors.

Unfortunately, most of the foreign companies which have closed sub-scale plants in Canada under free trade are not making concomitant investments in new world-scale facilities in Canada. There are exceptions, but generally the industries which were most protected under Canadian tariffs were also mature sectors where market growth has not justified major additions of new capacity. And when new capacity has been justified, Canada has all too rarely been the country of choice.

To replace the tens of thousands of jobs lost in our traded sectors due to free trade, it is imperative that Canadian companies in a variety of industries – resources and high tech, steel as well as software – invest substantially in establishing and upgrading positions of competitive advantage in their chosen fields. Investments will be needed in capital equipment, research and development, new market development, and training. In evaluating these investments, firms will continually be applying a cost of capital which is high relative to comparable companies in Japan, Germany, South Korea, or Taiwan.

In short, the cost of capital will be a critical determinant of how quickly and how successfully the process of economic renewal can be advanced in Canada. Lowering the cost of capital can be a primary means by which government hastens the process of renewal and ensures a successful outcome. The critical question for governments is whether to lower the cost of capital across-the-board or on a more selective basis.

LOWERING THE COST OF CAPITAL FOR ALL INVESTMENTS

These are a number of means by which the cost of capital can be lowered for all investments (see Exhibit V.1). One of the most common is to exempt capital gains from tax or apply a reduced tax rate to them. The Bush Administration is pushing for just such an approach in the U.S. Canada already has a lifetime capital gains exemption for individuals of \$100,000.

There are two difficulties with a capital gains exemption. In the first place it applies to all gains including investments in art work, land, and even pork belly futures. Thus, it does not focus government tax expenditures solely on those firms which compete internationally. The second problem is that it does not benefit pension funds and other tax-exempt institutions. Thus, its effect on the cost of capital is diminished by the level of tax-exempt holdings of equities.

A second general mechanism to lower the cost of capital is to reduce the level of corporate income tax. Australia has adopted a variation of this approach by eliminating the double taxation of dividends through its policy of dividend imputation. Under dividend imputation, an individual taxpayer may impute the corporate taxes already paid by a company paying him a dividend in determining his own taxes on that dividend.

Exhibit V.1

Selected Mechanisms for Lowering the Cost of Capital

For All Business	For Innovation Driven Businesses
<ul style="list-style-type: none">• Lower capital gains tax• Lower corporate income taxes• Dividend imputation or deductability• Accelerated depreciation or investment tax credit for machinery and equipment	<ul style="list-style-type: none">• Expanding the R&D tax credit• Capital cost incentives to innovation driven companies• Risk-sharing fund for product innovation• Increased strategic procurement

Source: The Canada Consulting Group

Canada Consulting's calculation of the cost of capital in Australia suggests that in the two years since its introduction dividend imputation lowered the Australian cost of capital for most companies by more than one percentage point (see Chapter II). Unfortunately, our case studies of companies in Australia indicated that they had great difficulty in determining to what degree dividend imputation lowered their specific company cost of capital and thus their hurdle rates for investments. This confusion in many cases meant that companies did not actually lower their hurdle rates for new projects despite the presence of dividend imputation. Over time this problem should diminish as firms get more experience with the approach. (It is also important to note that dividend imputation is only useful for firms which now pay or are likely to pay a dividend in the future.)

A third general mechanism for lowering the cost of capital is an investment tax credit or accelerated depreciation for machinery and equipment investments. However, in the interest of tax reform, Canada has abolished most such incentives. Exhibit V.2 illustrates how the abolishment of investment tax credits and the less favourable depreciation rules adopted in

1988 and 1990 effectively raised the cost of capital for machinery and equipment.

Exhibit V.2

Effect of Changing Tax Rules on the Cost of Capital for an Investment in Machinery and Equipment with a 20 Year Life

Year	Canadian Tax Rules	Cost of Capital*
1980	<ul style="list-style-type: none">• 50%/50% write-off and 7% investment tax credit (ITC)	5.2%
1988	<ul style="list-style-type: none">• 40% diminishing balances and 3% ITC	6.1%
1990	<ul style="list-style-type: none">• 25% diminishing balances and no ITC	6.9%

* Using 1988 Canadian cost of capital for all years as determined by FRBNY methodology
Source: Calculations by The Canada Consulting Group

Investment tax credits, accelerated depreciation, dividend imputation, and lowering the level of corporate taxes have the advantage over capital gains tax mechanisms of being solely focussed on lowering the cost of capital for business investments. However, all these mechanisms will lower the cost of capital for all businesses regardless of whether the specific businesses have to face international competition.

Given Canada's scarce public resources, it may be preferable that the cost of capital problem be addressed by a more focussed set of measures which lower the cost of capital specifically for those firms engaged in international competition. It is the firms competing in internationally traded businesses which face competitors from low cost of capital countries and which must invest aggressively to build positions of sustainable competitive advantage for Canada in new products and markets. Lowering the cost of capital for these firms and their investments to build positions of strength in traded

goods and services should be the main focus of any government effort to lower the cost of capital.

TARGETING COST OF CAPITAL INCENTIVES

Rather than trying to lower the cost of capital for all businesses and types of investment, the government could focus on lowering the cost of capital specifically for innovation-driven businesses or those companies which compete in international markets. The logic of a more focussed approach would be to reduce the cost of subsidies to the taxpayer and to focus any incentive directly on the type of economic activity which suffers most from competitor countries with lower costs of capital. At the same time targetted incentives should not place the government in the position of trying to "pick winners" and out-guess the marketplace.

There are four general ways that governments avoid the trap of "picking technology winners" but still achieve effective targetting of incentives:

- By providing a generalized incentive to a particular class of investments. The R&D tax credit is an excellent example of this.
- By providing a generalized incentive to a particular class of companies, such as the traditional flow-through shares incentive for Canadian mining companies.
- By creating risk-sharing funds at arms length from government which operate on a business-like basis to expand the supply of product development capital. These funds share individual project financing with companies and so allow them to proceed with projects that the companies would not be able to undertake on their own.
- By using government's natural procurement process to provide low cost up-front capital to suppliers to develop needed products for government that can be sold to other customers as well.

Each of these mechanisms has potential to reduce the cost of capital for innovation-driven businesses. In the following sections we examine each in turn.

Expanding R&D tax credit support can be achieved by eliminating the current cap on the credit (which affects several of the largest spenders), increasing the rate from its current 20%, or broadening the definition of R&D. These options are relatively simple to administer, as they build from the current system, are even-handed across all companies and their benefits are focused on R&D spenders. However, the impact could be fairly limited as many companies, wisely or not, do not factor these credits into their analysis of R&D projects, and in many cases R&D costs are only a small part of total product development costs. The change would also not affect non-taxable companies, and so would not help new companies which have not yet developed to a stage where they have positive, taxable income.

Creating a general capital subsidy for innovation-driven companies is a difficult concept to actualize. It requires defining the subset of firms to be supported which in practice means compiling a registry of such firms. The debate about who would qualify and who would not could be quite rancorous and debilitating. However, it can be done: Australia was successful in creating a company registry of firms eligible for subsidized venture capital investments under its MIC program. The key defining factor in that program was whether the firm provided goods or services which could be exported in significant volume.

Establishment of a risk-sharing fund would help reduce the effective cost of capital by giving innovation-driven companies access to financing for projects they might otherwise not be able to justify. The Swedish Industrifonden provides one model for such a fund. Government financed, but managed at arm's length from government by experienced private sector managers, it makes forgivable equity loans to companies, both large and small, to finance high-risk product development projects.

The Industrifonden does not, however, provide cheap money. While loans are forgivable if a project fails, the rate charged on successful ventures – paid either as interest or in the form of royalties – is set a couple of points above the going commercial rate. This has two effects: it ensures that companies do not use the fund as a cheap source of money for projects they could finance through regular means; and it provides the fund with sufficient revenue to earn a return on investment. The Industrifonden has averaged a return on capital above 7% over its decade of existence. Such a fund implies a high degree of project selectivity, and its success ultimately depends heavily on the quality of its staff and Board.

Japan, France and Israel (through its Bi-National Research and Development (BIRD) Fund with the U.S.) have also achieved success with product risk-sharing funds. Australia has recently established a risk-sharing fund under Austrade to perform a similar role in sharing the investment risks with companies of opening up overseas markets. While Canadian governments have experimented widely with direct grants, industrial loans, and tax incentives, no arms length risk-sharing fund of the type described above has ever been tried.

Strategic procurement can be very effective if it is done well: identifying areas where Canada has, or could develop the required capabilities; setting requirements in line with global needs rather than more narrow local specifications; involving Canadian suppliers early enough in order to help fund their R&D and prototype development, and then helping them down the learning curve through government purchases. When government is the customer, it is part of the legitimate market and no longer in a position of "picking winners" in businesses it does not understand.

Done in this way, strategic procurement can build national advantage while saving the federal and provincial governments money. The activities of Hydro Quebec in consulting engineering and the French government in

building off-shore oil technology and high speed trains attest to the potential of this approach¹.

However, employing more extensive strategic procurement successfully will be difficult, particularly given the traditional federal government Supply and Services mentality, and the lack of federal-provincial coordination. Moreover, if it is done clumsily, the option could seriously contravene the Canada - U. S. Free Trade Agreement.

IMPROVING ACCESS TO CAPITAL FOR SMALLER, INNOVATION- ORIENTED FIRMS

Small innovation-oriented firms have an additional problem with regard to capital: getting it at any price. There are numerous ways to achieve such an objective. Three of the most propitious are:

- Introducing tax incentives for registered venture funds
- Exempting "Founders' shares" from capital gains tax
- Developing tax incentives to direct funds towards initial public offerings (IPOs)

Tax Incentives for Registered Venture Funds

Under this idea, venture capital funds would qualify for special registration, entitling them to capital gains exemptions or tax credits, if they met criteria such as only investing in internationally tradeable goods and services businesses, investing a high proportion of their funds in early stage investments, and having an active and participative management role in their investments. As mentioned above, Australia was successful in

¹ For a more extensive discussion of the potential for strategic procurement see Chapter V of 'Competing in the New Global Economy', Report of the Premier's Council in Ontario and the report of the NABST Government Procurement Committee.

launching its venture capital industry through such a mechanism. In addition, the resources and skills of these venture capitalists would be directed to the type of company most needing assistance.

A number of factors, however, could reduce the attractiveness of this option. It is difficult to create an incentive for investments by non-taxable institutions such as pension funds, which are so significant in the Canadian market. In addition, there will inevitably be difficult definitional problems, and the selection of the investments eligible for the registered funds could be seen as unfairly restrictive

Exempt "Founders' Shares " From Capital Gains Tax

The effect of this policy would be to increase the rewards to successful entrepreneurs, and hence increase the numbers of people starting new ventures, and provide successful entrepreneurs with additional cash with which to start additional ventures. However, we have no evidence to suggest that the numbers of people starting new ventures is a key leverage point. In addition, this option is limited in impact since it would not increase the cash available to new firms after their initial start-up phase

Develop Tax Incentives to Direct Funds to IPOs

This option envisages a plan allowing individuals to deduct, from their otherwise taxable income, part of the cost of buying newly-issued shares. The incentive can be focused according to specific criteria, such as small capital companies, tradeable goods and services only, and so forth. Its main benefits would be in making more funds available for these types of companies at this early stage. In addition to helping IPOs it would also encourage venture capitalists to invest at earlier stages, since a more vibrant IPO market expands their exit opportunities.

This IPO investment tax incentive is also, however, subject to potential abuse, and may encourage weak firms to be brought to market. It may also add to the volatility of the market by pricing IPOs too high. As well, it would represent a high-risk investment for individuals.

THE LONG-TERM SOLUTION: CANADIAN KEIRETSUS

As discussed in the previous chapters, the strength of institutional relationships in Germany and Japan contribute significantly to their lower costs of capital. If Canada were somehow able to replicate the institutional linkages found in those countries, we could make headway towards the reduction of the cost of capital. In point of fact, new institutional arrangements between the providers and users of capital may be the best long-term solution to our cost of capital problem.

Canada's banking industry is already dominated by five large banks. These institutions could provide a logical point from which to leverage the creation of more keiretsu-like organizations. The banks could be encouraged to increase their equity holdings in their clients, and the clients could increase their holdings in the banks and other bank clients where potential synergies exist. Conversely, the industrial groups that currently dominate the Canadian economy could be encouraged through changes in arms-length legislation and banking regulation to strengthen their existing institutional ties. This could move Canada towards a more integrated corporate structure where the flow of information between providers and users of capital could improve, thereby reducing the cost of capital through the reduction of risk. In theory, other synergies, such as the sharing of contacts, customers and risk, would also emerge.

However, there are some major disadvantages to this approach. Beyond the increased potential for self-dealing and conflict of interest, strengthening existing institutional interrelationships encourages further corporate concentration, probably at the expense of smaller companies and perhaps individual investors. These risks might be worth taking, but only if the

potential benefits justify them. However, there is no reason to believe that such changes would influence Canada's existing industrial groups to invest in more innovative companies or projects. They already have considerable potential to turn themselves into "keiretsu-like" organizations, but have shown no real signs of acting like keiretsus.

A further option for changing institutional relationships would be to create a **"Bank for Industrial Innovation"** as a main bank in the Japanese sense to serve innovation-based businesses. It could be specially licensed to take equity holdings in and make loans to innovation-based businesses and might require public as well as private shareholders. But like the Industrial Bank of Japan, it could eventually become a purely private institution.

Creating such a bank would be a difficult and risky undertaking. It would need to be run as a private sector organization by private sector managers. If the bank's decisions became affected by other priorities, such as regional development, or by other political considerations, it would be ineffective. It would also have to establish a logical and mutually supportive rationale for the collection of companies it financed. In the keiretsu fashion it would need to promote more than just financial services.

Nevertheless, this approach, if successful, could have major benefits. Such a bank could lower the cost of capital and improve the performance of its participating companies through the sharing of risks, information and expertise, and could in time form the nucleus of a home-grown keiretsu in Canada.

* * * * *

Canada faces a major challenge because of our high cost of capital. Our firms are at a disadvantage compared with their competitors in countries where the cost of capital is lower. Failure to respond to the problem risks a decline in our competitiveness in the global economy, a decline that will ultimately lead to a reduction in our standard of living. There are remedies that can combat the problem, but they will need to be chosen with care and implemented with wisdom if they are to be successful.

APPENDICES

**Appendix A: Companies Whose Cost
of Capital Was Analyzed**

**Appendix B: Companies Interviewed
for Case Studies**

**Appendix C: Financial Industry and
Policy Interviews**

Appendix D: Methodologies

Appendix E: Calculating the Cost of Capital

Appendix A

Appendix A
Companies Whose Cost of Capital Was Analyzed

Sector	Canada	U.S.	U.K.	Sweden	Germany	Japan
Metals & Mining	Alcan Inco Cominco Sherritt Gordon	Alcoa Phelps Dodge Asarco				Mitsubishi Mtls
Steel & Iron	Dofasco Stelco Ivaco Ipsco	Inland Steel			Thyssen AG	Nippon Steel Kawasaki Steel
Forest Products	Abitibi Price MacMillan Bloedel Domtar Cascades	Weyerhaeuser Boise Cascade	-	Svenska Cellulosa	-	-
Oil & Gas, Petrochemicals, Chemicals	Imperial Oil Shell Canada NOVA DuPont Canada	Exxon DuPont Monsanto	ICI	Trelleborg	RWE-DEA AGF	Mitsubishi Petrochem Sumitomo Chem Nippon Oil
Food Processing	George Weston John Labatt Canada Packers	Anheuser Busch	Hillsdown Holdings			Nippon Meat Packers
Diversified Resources	Noranda		Hanson	Stora Kopperberg	PWA	Sumitomo Corp. Nippon Mining
Auto Parts	Magna	Dana				
Heavy Manufacturing	Varity	Deere & Co.			Kloeckner- Humbolt	Nippondenso

Appendix A
Companies Whose Cost of Capital Was Analyzed
(cont'd)

Sector	Canada	U.S.	U.K.	Sweden	Germany	Japan
Telecommunications	Northern Telecom	AT&T	Plessey	Ericsson Trelleborg	Siemens	NEC
Data Communications	Memotec Gandalf	Infotron			Philips Kommunikations	
Computer Hardware, Software	Digital Equipment GEAC Cognos	Oracle				Fujitsu Ltd.
Electronics	CAE Glenayre	GE Flight Safety Int'l				Toshiba
Heavy Manufacturing & Aviation	Bombardier Hawker Siddeley Canada		Hawker Siddeley			Yamaha Motors
Aerospace, Defence, Sonar, Radar, etc	Pratt & Whitney Canada Spar Aerospace Fleet Aerospace Heroux Canadian Marconi	G.E. Molex	British Aerospace	Ericsson SKF	Siemens	
Biotechnology, Pharmaceuticals	Connaught Quadra Logic		ICI Smithkline Beecham		Bayer	Takeda Chemicals
Lasers	Lumonics	Coherent		Nobel		Toshiba Sumitomo Hvy Industries
Consulting Engineering	SNC Group	Fluor Corp			Hochtief AG	

Appendix B

Appendix B

Companies Interviewed for Case Studies

Canada
Alcan Bombardier Cognos Dofasco DuPont of Canada Glenayre Electronics John Labatt Lumonics MacMillan Bloedel Noranda Forest Noranda Inc Northern Telecom NOVA Pratt and Whitney Canada Quadra Logic Technologies

Japan
Sumitomo Light Metal Nippon Mining Sumitomo Heavy Industries Kawasaki Heavy Industries Nippon Steel Kawasaki Steel

U.S.
Inland Steel Hewlett Packard Xerox General Electric G.E. Aerospace Spectra Physics

UK/Europe
Hillsdown Holdings Hanson British Aerospace Hawker Siddeley Eriksson Stora Thyssen Klockner-Werke PWA Trumpf

Appendix C

Appendix C

Financial Industry and Policy Interviews

Canada	Germany	Japan	Sweden	United Kingdom	United States
Bank of Nova Scotia Toronto-Dominion Dai-ichi Kangyo Bank Royal Trust BC Central Credit Union Ventures West Management Noranda Enterprises Alta-Can Telecom Vencap Equities Venture Economics London Life Sun Life Beutel Goodman Lincluden Wood Gundy Burns Fry Prudential Bache Scotia McLeod Hees International	Deutschebundesbank Ministry of Finance Ministry of Economics - Small and Medium Business Assistance Deutsche Bank Commerzbank	Industrial Bank of Japan Fuji Bank Mitsui Taiyo Kobe Bank Nomura Securities Kangyo Kakumaru Investments Deutsche Bank Japan Bank of Japan Ministry of Finance MITI - Industrial Policy Bureau - Agency of Industrial Science & Technology Science and Technology Agency Keidanren	Riksbanken Ministry of Finance Industrifonden Scandinaviska Enskilda Bank Euroventures Nordica Enskilda Fondkommission	Salomon Brothers Morgan Grenfell Development Capital 3i Technoventure Management Bank of England H.M. Treasury Confederation of British Industry	Citibank Chemical Bank Smith Barney Merrill Lynch Donaldson, Lufkin & Jennette Alex Brown & Sons Hambrecht & Quist

Appendix D

Appendix D

Methodologies

To estimate the cost of capital for Canada and our key competitor countries, we employed two models at the country level (macro) – the Federal Reserve Bank of New York and the Stockholder's Required Return Approaches – and one model at the company level (micro) developed by Callard, Madden and Associates (CMA).

The purpose of these appendices is to provide supporting documentation on the models used and our selection criteria for Canadian and foreign companies studied.

There are three sections:

- 1. Macro Methodological Discussion**
Provides a description of the Federal Reserve Bank of New York and the Stockholder's Required Return models
- 2. Micro Methodological Discussion**
Explains Callard Madden and Associates discounted cashflow model and its benefits over other micro-level approaches
- 3. Criteria for Selection of Interviews**
Describes our rationale for choosing the interview companies and the firms for which we performed cost of capital calculations, as well as the criteria for the section of financial institution and policy interviews

1. MACRO METHODOLOGICAL DISCUSSION

To determine whether Canada has a higher cost of capital than its major industrial competitors, we followed two complementary and reinforcing approaches. We developed a country-level estimate of the cost of capital in Canada relative to various competitor countries and compared the costs of capital of a matched sample of individual companies within these economies. Using estimates derived from three theoretical perspectives helps to overcome the practical difficulties with the measurement of capital costs and creates a robustness of evidence that is difficult to disregard.

COUNTRY LEVEL COMPARISONS

While there is conceptual agreement regarding the definition of the cost of capital, the technical difficulties of estimating the cost of capital for a given economy has led to a broad range of different methods for measuring it. Each approach represents a compromise between the theoretically desirable and the practically possible. These technical difficulties are compounded when making international comparisons. In view of this, it is dangerous to draw conclusions of Canada's relative cost position based on the result of one approach, and care was taken to choose appropriate methods for international comparison.

It was beyond the scope of our study to develop a new approach to the problem of estimating the cost of capital, and indeed, there is no reason to believe a better approach is feasible given the data limitations that exist. Rather, we sought to identify an existing approach that could be extended to Canada and to provide a reasonably accurate comparison of the Canadian cost of capital with that of other countries. Essentially, our selection criteria were that the approach had to be theoretically acceptable, provide credible estimates, be applicable to all the target countries, and be computationally feasible within the time frame of our study.

Given the lack of a single accepted methodology, we chose to use two approaches to estimating the cost of capital in the various countries of particular interest to NABST. Each begins from a different perspective and served as a cross-check on the other. The one approach provides insights from a market value perspective, while the other provides insights on taxation as it affects an investor's required return. In theory these two perspectives should yield the same result, as they are the point where the supply and demand of capital meet. To the extent that the results differed, the analysis of the source of the difference was of value. The approaches that we used were the Federal Reserve Bank of New York (FRBNY) approach and the Stockholder's Required Return approach. Each approach will be described in the remainder of the first section.

THE FEDERAL RESERVE BANK OF NEW YORK (FRBNY) APPROACH

The Federal Reserve Bank of New York published a study in 1989 that compared the cost of capital for non-financial firms in the United States, the United Kingdom, West Germany and Japan over the period of 1977-1988. ¹

The approach adopted followed the common business approach of estimating the cost of debt and equity financing separately, then calculating their weighted average. ²

We did not replicate the calculations for the countries covered in the FRBNY study, but concentrated upon applying the methodology to Canada, in order to provide results that were comparable to the four other economies. We consulted extensively with the authors of the FRBNY paper, Robert McCauley and Stephen Zimmer, to understand the detailed approach they used. The remainder of this appendix describes their approach and explains the process by which we applied it to Canada. (Refer to Attachment I for technical detail and Attachment II for assumptions and sources of information.)

The Cost of Debt

The cost of debt is defined as the real after-tax rate of interest faced by non-financial corporate borrowers. The estimation of this measure begins with the nominal interest rate paid by corporations on their bank debt and the yield on corporate bonds. The bank debt is adjusted to account for the hidden cost of compensatory balances that are required to differing extents in the five countries. ³ The weighted average of the adjusted interest rate and the bond yield is used as an estimate for the nominal cost of debt. The real after-tax cost can then be calculated by factoring out the tax shelter provided by allowable deductions against corporate tax, then correcting for the impact of inflation.

¹ The Federal Reserve Bank of New York methodology (McCauley and Zimmer, 1989) draws upon the work by Ando and Auerbach (1988), Chase Financial Policy (1980), Hall and Jorgenson (1967) and Hatsopoulos and Brooks (1986).

² FRBNY defines the cost of capital as the minimum before-tax real rate of return that an investment project must generate in order to pay its financing costs after tax liabilities. While Canada Consulting Cresap looks at project-specific costs of capital, we adopt a more widely used definition of the cost of capital – the weighted average of the costs of debt and equity – which the FRBNY terms the cost of funds.

³ Technically, corporate borrowings are not limited to bank debt and corporate bonds. Research by the FRBNY, confirmed by our research in Canada, indicates that about 20% of indebtedness comes from other sources. However, information on the composition and cost of these other liabilities is not available on a consistent and accurate basis. Accordingly, the FRBNY and we are forced to assume that the cost of bank indebtedness and bonds is a reasonable estimate of the effective cost of the other 20% of corporate liabilities. Neither the absolute nor the relative cost of capital is sensitive to this assumption.

1. **Bond yields** are relatively easy to observe in each of the five countries. They are estimated using the simplifying assumption that for each country the nominal cost of bonds is equivalent to the yield to maturity on a newly issued, mid-term AA corporate bond.
2. **Bank indebtedness costs** are slightly more difficult to estimate, since the nominal interest rate may reflect only a portion of total costs to the corporate borrower. The most significant additional cost affecting the absolute cost of bank indebtedness, and its relative cost across borders, is a bank's requirement that the borrower hold a certain level of compensatory liquid balances, which yield less than market rates. This requirement is particularly prevalent as a means of raising the effective cost of loans in countries where bank interest rates are regulated.

The interest rate on a five-year loan for a AA borrower in each country is used as the estimate for the interest cost of bank debt. To overcome the distortions that non-interest costs of bank borrowing could cause, this rate is then adjusted to reflect the propensity of the corporate sector in a given country to hold cash balances, relative to the other four countries.

3. **Weighting bank and bond debt.** The interest rate on bond debt and the bond yield are weighted by their respective proportions in the country's non-financial corporations' mix of debt to arrive at a nominal cost of debt.
4. **Tax shelters on interest payments.** In calculating the tax deduction on interest payments we assume that corporations are taxed at the statutory income tax rate. While in each of the five countries examined a substantial number of firms avoid paying corporate income taxes because of past or current losses, these corporations rarely face zero marginal tax rates. The effect of tax carry-forwards and carry-backs is such that a firm does not avoid paying taxes but rather only delays paying them. The FRBNY provides some analysis of the use of effective versus statutory tax rates and concludes that the sensitivity to the use of an effective tax rate is negligible and that insufficient data exist to make this calculation effectively.⁴
5. **Inflation.** The final step in calculating the real after-tax cost of debt in a country is to subtract inflation from the nominal after-tax cost of debt. Theoretically, it is the expected rate of inflation that should be subtracted. In practice, since credible and consistent information on inflation expectations is unavailable, the actual rate of inflation, estimated by the GDP deflator in Canada, is used.

⁴ The Federal Reserve Bank of New York base their analysis on the work developed by Auerbach and Poterba (1986) and Shoven and Tachibanaki (1988).

The Cost of Equity

The methodology adopted by the FRBNY begins with the fact that the owner of a corporate share has a claim upon the future cash flows of the corporation. The current market value of the company's stock is therefore the present value of the company's future cash flows discounted at the cost of equity.

To capture this concept for a whole economy, the FRBNY uses the inverse of the price/earning ratio for a selected sample of the work traded on the leading exchange in the countries in question.⁵

Reported earnings are only a broad proxy for cash flows, however, and different accounting and tax conventions make comparisons across countries difficult. Accordingly, the earnings/price ratio for the various markets is adjusted to remove the distortions of inflation, tax and unique country accounting conventions.⁶

1. **Current Cost Adjustment:** The E/P ratio brings together reported earnings, which are measured on a historical cost basis, with a stock price that is measured in units of current purchasing power. In an inflationary period this seriously distorts the true economic relationship of prices and earnings and makes comparisons between countries with very different inflation experience impossible. To remedy these problems, the earnings are adjusted to a current cost basis by adjusting for inflationary effects on depreciation, inventories and net nominal liabilities.

An adjustment to depreciation is necessary to capture the distortion of earnings arising from the inflationary erosion of historical values of capital stock. Because replacement values of plant and equipment exceed the historical values used for tax and accounting purposes, economic earnings are overstated in an inflationary environment. At the same time, in most industrialized countries the use of accelerated tax depreciation allowances partially offsets this distortion, so earnings must also be re-adjusted upward to reflect this timing difference. To make these adjustments for Canada we used three special runs by Statistics Canada to capture the differences between Canada's non-financial corporations' historical cost, current cost and tax depreciation.

⁵ FRBNY uses the Morgan Stanley Capital International Index E/P ratios. Our analysis suggests that, at least for Canada, the results would not be significantly different if the TSE 300 index were used. The use of this, or a similar index, provides a sample that covers stock representing a high proportion of the stock trading activity in a country. It does not cover non-traded stocks.

⁶ As indicated in the FRBNY study and investigated by Canada Consulting Cresap, most of these adjustments are discussed in Ando and Auerbach (1988) and Hatsopoulos and Brooks (1986).

In a similar adjustment, inventories are revalued to remove any accrued inflationary gains due to a firm's method of accounting for its inventory. For example, in an inflationary period, a corporation using the first-in, first-out (FIFO) inventory accounting system will understate its cost of goods sold and therefore overstate its earnings. A corporation using last-in, last-out (LIFO) accounting will also understate its cost of goods sold, depending on the extent to which inventory is run-down and the age of the inventories. This adjustment is relatively straightforward for Canadian corporations, as Statistics Canada provides inventory revaluation figures for the non-financial private sector.

Finally, because of the effect of inflation, real borrowing costs are overstated on corporate income statements, which results in the understatement of profits. In an inflationary environment interest costs cover two components – a real interest payment and a payment to compensate the lender for this decline in the real value of the principal of the loan. The compensation for inflation, however, is not a current cost but rather a capital loss; its effect should therefore be removed from the corporation's 'true' borrowing costs. This adjustment, which is the counterpart of the inventory adjustment, is made by factoring inflation out of the non-financial corporations' net nominal liabilities.

2. **Country-Specific Adjustments:** Differing accounting conventions among countries mean that earnings can be defined differently. The FRBNY, following others who have addressed these issues such as Ando and Auerbach (1988), reviewed a number of possible adjustments, but concluded that all but one had an insignificant impact on the results. The one adjustment they did make was to reflect the understatement of Japanese profits caused by the extensive inter-ownership of corporate shares. A Japanese corporation that holds less than 20% of another corporation includes the crossheld shares on its balance sheet but does not include the retained earnings of the latter firm in its profits. The market capitalization of the combined firms is therefore overstated relative to reported profits. P/E multiples in the Japanese stock market are overstated, and the inverse, the E/P, is understated. This distortion is especially relevant in an economy where firms tend to make significantly longer-term investments and where investors have a much lower realization rate than in other countries.⁷ Furthermore, because listed firms own a large and increasing portion of all outstanding shares in Japan, this adjustment is of particular significance in estimating the cost of equity. For a more detailed understanding of this adjustment refer directly to the FRBNY study.

We made one adjustment to Canadian earnings to make them internationally comparable. This is needed because the natural resource

⁷ Japan has a very low realization rate. According to McCauley and Zimmer (1989), the turnover rate on stock ownership by Japanese corporations is under 5%.

base of the Canadian economy makes corporate earnings more volatile than in other countries. Stock prices are much less volatile, however, as investors value companies by understanding the long-term underlying cash flows. This means that, given a constant real cost of equity, the E/P ratio would systematically overstate the cost of equity at the peak of the cycle and understate it in the trough. To compensate for this distortion we relate the annual stock price in Canada to a five-year centred moving average of earnings. Given the extremely low levels of Canadian profit in the early 1980s, even this adjustment does not compensate fully for this approach's understatement of the Canadian cost of equity in that period.⁸

Cost of Capital

To provide the final estimate of the cost of capital, the cost of debt and the cost of equity are weighted according to the proportions they represent in the aggregate capital structure of Canadian non-financial corporations. Theoretically, the weighting should be done using the market values of debt and equity. However, the market value of debt is not readily available. Because of this, and because the FRBNY found on a sample basis that using the book rather than the market value of debt did not produce significantly different results, they and we have used book debt and market equity to weight the cost of capital.

The Canada Consulting Group recast the leverage figures for Germany to reflect more accurately the true aggregate leverage for corporate Germany. Examination of additional data sources and discussions with McCauley and Zimmer and German companies led us to conclude that the FRBNY study overstated true German leverage. This caused the reported cost of capital to be too low because of the overweighting of low-cost debt and underweighting of higher-cost equity. We pursued a similar but modified approach to measuring German leverage, beginning with debt and equity figures aggregated from actual German company balance sheets (not national accounts-based) by the OECD. We converted the book equity figures to market values. In addition, we adjusted for the inclusion of pension assets and liabilities on German company balance sheets to make leverage calculations comparable across countries. This new calculation lowered the proportion of debt in the capital structure to approximately 56% from 75% in the FRBNY study and therefore increased the average cost of capital.

The final step in the analysis of the cost of capital is the evaluation of the impact of tax incentives, credits and accelerated depreciation on the cost of capital for specific investments. Valid comparisons of financing costs between countries cannot be made without considering differences in taxation. While the cost of capital as defined above provides a powerful sense of the required payments to

⁸ Another adjustment considered was compensation for the Canadian method of accounting for foreign exchange losses and gains. Rather than claiming the foreign exchange loss or gain immediately, Canadian accounting regulations stipulate that they are amortized over the life of the financial instrument. Our analysis indicates, however, that the adjustment would be negligible (generally less than 1% of profits) and therefore not worth making.

debt and equity holders in various countries, it provides only partial information regarding financing costs and can therefore be misleading. Comparisons that deal solely with prices in the capital markets ignore the major impact that tax incentives and accelerated depreciation can have on financing costs. The most relevant international comparison is therefore between countries' pre-corporate tax required rates of return, which capture both market price and fiscal differences. Canada Consulting Cresap again replicates the FRBNY approach and calculates the real pre-tax rate of return required to cover the cost of funds, taking into account any tax benefits applicable to a given investment, as well as the effects of inflation on future cash flows.

THE STOCKHOLDER'S REQUIRED RETURN

To provide an estimate of the cost of capital based on a different approach, but one that should in theory provide the same answer, we calculated the cost of equity in Canada and our competitor countries using the stockholder's required return methodology. (Refer to Attachment III for technical detail and Attachment IV for assumptions and sources of information.) This estimate is then weighted with the cost of debt that is derived from the FRBNY analysis to provide a second cost of capital estimate.

The stockholder's required return starts with the rate of return required by the investor in equities, after taxes and inflation. The cost of equity for a company or economy can be determined from this rate by calculating the gross return, in nominal terms and before personal taxes, that equities must achieve to provide the given real net return to the investor. (This reflects the identity between a company's post-tax returns and its stockholders' pre-tax returns.)

For each country and each year under consideration the real net return required by investors is established. We estimate this "target real after individual tax required return" as the rate of growth in GNP based on the logic that, on average, investors in an economy can expect their wealth to grow at the rate of growth in the economy as a whole.⁹ Individual investors may earn less or more than this, but the average for the market will track growth in GNP.¹⁰

The next step is to determine the nominal net return that this rate represents. Ideally, the rate of inflation used would be the investor's expectations each year. As this information is not available, we used a five-year centred rolling average

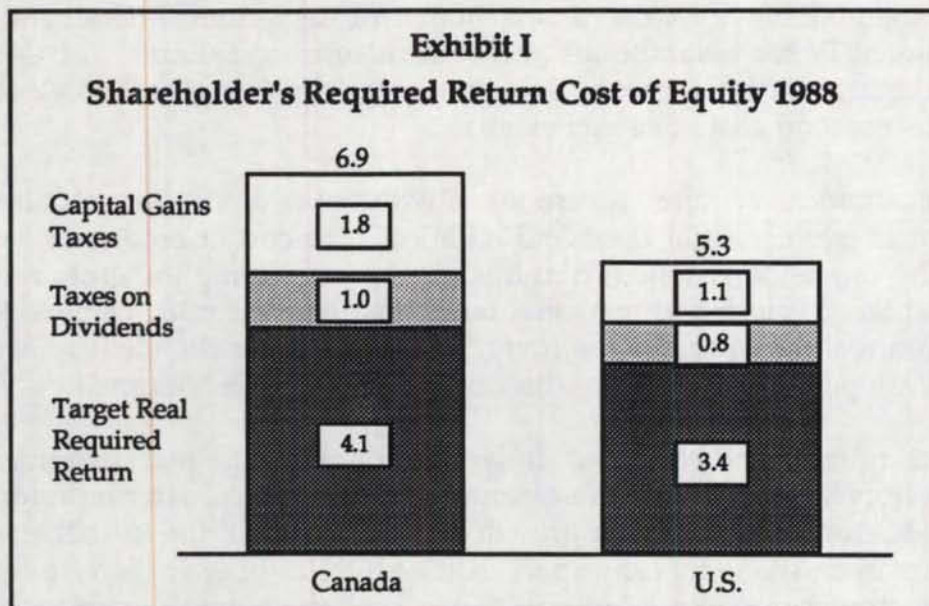
⁹ The notion of the marginal productivity of capital is discussed in greater detail and complexity in the work of Barro, Dornbusch and Fischer, Goldberg (1984), Maddison (1979), Miller and Ipton (1974), Solow (1970), Summers (1981) and Tobin. Charles Callard of Callard, Madden and Associates has tested the empirical validity of this assumption through historical analysis for the United States.

¹⁰ We use the OECD statistics, which use growth in GNP and growth in GDP interchangeably. GNP is used for Japan, the U.S. and Germany. GDP is used for Canada, the U.K., and Sweden.

of the GNP deflator as a proxy. This reflects the assumption that investors base their expectations on knowledge of recent and current inflation experience and have some reasonably accurate forecasts of likely near-term inflation rates.

The impact of the 'tax wedge' is then calculated. We use the statutory rates of taxation for a wealthy individual in the various countries and for the years we examine. The dividend yield on equities is used to calculate the dividend tax premium. The remainder of the required return must be in the form of capital gains, and the tax on this residual is then calculated.

The final cost for equity is calculated by summing the real net rate, the rate of inflation and the dividend and capital gains tax premia. This provides a nominal cost of equity. Subtracting the inflation rate converts this into the real cost of equity. As noted above, the cost of capital can be derived by calculating the cost of debt and the weighted average cost of debt and equity following the methodology set out in the section on the FRBNY approach. Exhibit I outlines an example of the mechanics of this approach.



The choice of the wealthy individual as the basis for the calculation of the 'tax wedge' rests on the assumption that this represents the marginal investor in the market. This assumption seems logically and empirically correct in the United States. However, this assumption is not self-evident for all countries we are studying over the whole period we are considering. We have therefore run the calculation using other assumptions for the appropriate tax rates to be used. These assumptions were as follows: the highest tax payer sets the price in a given economy; the dominant investor, measured in terms of the proportion of stock owned, sets the price; and the tax applicable to a country's set of investors is the weighted average rate born by the various investor groups within the market. The different assumptions provide different absolute results, but in general do not affect the relative ranking of countries.

Attachments

- I. FRBNY Methodology
- II. Assumptions and Sources of
Information for Canada
- III. Stockholder's Required Return
- IV. Assumptions and Sources of Data
Stockholder's Required Return Method

Attachment I

FRBNY Methodology

Attachment I

FRBNY Methodology

Calculation of Cost of Debt

The following equation details the weighting of a country's mix of debt and its adjustment for liquid balances:

$$i_e = \left\{ \frac{(i_r \times D_b) - (i_l \times l_a)}{D_b - l_a} \right\} \times s + \left\{ i_b \times (1 - s) \right\}$$

where

- i_e = effective nominal interest rate
- i_r = bank lending rate
- i_l = interest rate on liquid assets
- i_b = yield on mid-term bonds
- D_b = book value of bank debt
- B = book value of outstanding bonds
- l_b = cash and short-term deposits
- l_c = average of l for the five target countries

$$s = \left(\frac{D_b - l_a}{D_b - l_a - B} \right), \text{ share of bank debt}$$

$$l_a = l_b \times \left\{ 1 - (l_c \times \left[\frac{l_b}{B + D_b} \right]^{-1}) \right\}, \text{ Canada's propensity to hold liquid assets}$$

relative to other countries

The real after-tax cost of debt is then calculated by factoring inflation out of the nominal cost of debt and subtracting the allowable corporate tax deductions for nominal interest payments.

$$r = \left(\frac{1 + i_e}{1 + \pi} \right) - 1 - (i_e \times t_c)$$

where

- π = inflation
- t_c = corporate tax rate
- r = real after-tax rate of interest

Attachment I

FRBNY Methodology

Calculation of Cost of Equity

The E/P ratio is adjusted for inflation's effect on depreciation ¹.

$$e_d = c_e - [(c_e - e) \times (C / H) \times (H / T)]$$

where

- d_i = adjustment to earnings/price for inflation's erosion of historical values of capital stock
- e = earnings/price ratio
- c_e = cash earnings/price ratio
- H = the sum of economic depreciation based on historical values of the non-financial, non-government capital stock
- C = the sum of current cost depreciation based on replacement values of the non-financial, non-government capital stock
- T = the sum of tax depreciation based on historical values of non-financial, non-government capital stock
- e_d = earnings/price ratio adjusted for depreciation

... inflation's effect on inventory ² ...

$$e_{di} = e_d - \left(e \times \frac{\text{inv}}{\text{PR}} \right)$$

- e_{di} = earnings/price ratio adjusted for depreciation and inventory valuation changes
- inv = adjustment to inventory values due to inflation
- PR = dollar value of after-tax, depreciation-adjusted profits

... and inflation's effect on net nominal liabilities

$$e_v = e_{di} + \left\{ \left[\frac{\pi_t}{1 + \pi_t} \right] \left[\frac{N_{ft-1}}{E_t} \right] \right\}$$

where

- e_v = earnings/price ratio adjusted for depreciation, inventory and net nominal valuation changes
- N_{ft-1} = net financial liabilities in prior period
- E_t = market value of equity at time t

1. The U.S. Department of Commerce provides this adjustment. We attempt to recreate the U.S. adjustment through running series of capital stock on a historical basis, current cost basis and income tax basis.
2. FRBNY relates the inventory adjustment to a profit rate which we define as the non-financial, after-tax profit rate.

Attachment I

FRBNY Methodology

Calculation of Cost of Capital

The cost of debt and cost of equity are weighted to arrive at a cost of funds:

$$c_f = (d \times r) + \{ (1 - d) \times e_v \}$$

where

$$d = \frac{D_b + B - 1}{E_t + D_b + B - 1}$$

c_f = after-tax cost of funds

A cost of capital for various projects is calculated using the following equation:

$$\begin{aligned} & \sum_{t=0}^{\infty} \left(\sum (P_t \times [1 - t_{ct} \times (1 + inv_t)]) \times \prod_{i=0}^t (1 + \pi_i) \right) \\ & - \left([e_v \times \prod_{i=0}^t (1 + \pi_i)] \times (1 - d_t) \right) \\ & - [i_{et} \times d_t \times (1 - t_{ct})] \\ & + z_t + \{ [1 - (z_t \times \theta_t)] \times \partial_t \times t_{ct} \} \\ & \times \left(\prod_{i=0}^t (1 + cf_i) \times (1 - \pi_i) \right)^{-1} = 0 \end{aligned}$$

Solve for P_t

where

- P_t = cost of capital for a given project
- P_t = P when $t \leq$ length of project life
- P_t = 0 when $t >$ length of project life
- z_t = investment tax credit at time t
- θ_t = share of investment tax credit used in reducing depreciation base
- ∂_t = depreciation allowed for tax purpose

Attachment II

**Assumptions and Sources of
Information for Canada**

Attachment II
Assumptions and Sources of Information for Canada
Cost of Debt

Item	Assumption	Source
Bond Yield	<ul style="list-style-type: none"> • 1980-88 year-end weighted mid-term AA corporate bond yield • 1977-79 year-end AA corporate bond yield 	Scotia McLeod's Handbook of Canadian Debt Market Indices, 1947-89 Bank of Canada Review 1980-90
Bank Lending Rate	<ul style="list-style-type: none"> • Year-end 30 day Bankers Acceptance rate for AA credit 1986-88 3/8 credit spread 1983-85 1/2 credit spread 1980-82 5/8 credit spread 1977-79 3/4 credit spread 	Bank of Canada Review 1980-90 Credit spread based on discussions with the FRBNY and Canadian corporate bankers
Deposit Rate	<ul style="list-style-type: none"> • Year-end savings deposit rate 	Bank of Canada Review 1980-90
Bank Debt	<ul style="list-style-type: none"> • Non-financial private corporations • Book value of bank and other loans, short-term and finance paper and mortgages 	National Balance Sheet Accounts #13-214, 1987-88
Bonds	<ul style="list-style-type: none"> • Non-financial private corporations • Book value of Canadian Corporate Bonds 	National Balance Sheet Accounts #13-214, 1987-88
Cash & Short-term Holdings		
Canada	<ul style="list-style-type: none"> • Non-financial private corporations • Canadian and foreign currency deposits and book value of outstanding bonds (C\$ mm) and bank debt 	National Balance Sheet Accounts #13-214, 1987-88
U.S.	<ul style="list-style-type: none"> • Non-financial corporations • Deposits and book value of outstanding bonds and bank debt (US\$ bn) 	OECD, Non-financial Enterprises Financial Statements, 1988
Japan	<ul style="list-style-type: none"> • Private non-financial enterprises • Deposits and book value of outstanding bonds and bank debt (¥ bn) 	OECD, Financial Statistics, Part 2, 1989
West German	<ul style="list-style-type: none"> • Private non-financial enterprises • Deposits and book value of outstanding bonds and bank debt (DM bn) 	OECD, Financial Statistics, Part 2, 1989
United Kingdom	<ul style="list-style-type: none"> • Non-financial corporations • Deposits and book value of outstanding bonds and bank debt (£ mm) • 1977-79 figures are assumptions based 1980 • 1987-88 figures are assumptions based 1986 	OECD, Non-financial Enterprises Financial Statement, 1988
Inflation	<ul style="list-style-type: none"> • GDP Deflator 	OECD Economic Outlook, December 1989

Attachment II
Assumptions and Sources of Information for Canada
Cost of Equity

Item	Assumption	Source
Corporate Tax Rate	<ul style="list-style-type: none"> • Maximum corporate tax rate • Combination of federal, and provincial and territory average • 1977-83 includes an Alberta, Ontario, Manitoba and Saskatchewan average only 	Canadian Tax Reports, CCH Canadian Ltd, 1989
Earnings/Price and Cash Earnings/Price Ratios	<ul style="list-style-type: none"> • Year-end figures 	Morgan Stanley Capital International
Depreciation Adjustment		Discussions with Philip Smith, Director, Income and Expenditure Accounts, Statistics Canada, and John Musgrave, Bureau of Economic Analysis, U.S. Dept. of Commerce
Historical and Current Cost	<ul style="list-style-type: none"> • Total economy excluding governments, institutions, finance, insurance and real estate 	Special series run by Peter Koumanakas, Director, and Richard Landry, Investment and Capital Stock Division, Statistics Canada
Tax	<ul style="list-style-type: none"> • Total incorporated excluding financial, real estate, government and non-taxable crown 	Special T-2 series run by Richard Dornan, Industrial Organization & Finance, Statistics Canada Special T-1 series run by Jean LeDuc, Industrial Organization and Finance
Inventory Adjustment		
Business Profits Direct Business Taxes Inventory Adjustment	<ul style="list-style-type: none"> • Corporate and government business profits, taxes and inventory adjustment 	National Income Accounts, 1988, #13-201
Net Nominal Liability Adjustment	<ul style="list-style-type: none"> • Non-financial private corporations • Net financial liabilities 	National Balance Sheet Accounts, 1987-88, #13-214
Market Value Equity	<ul style="list-style-type: none"> • Non-financial private corporations • Book value equity 	National Balance Sheet Accounts, 1987-88, #13-214
Price/Book Ratio	<ul style="list-style-type: none"> • Gross up book value equity by market to book figures 	Morgan Stanley Capital International
Growth Rate	<ul style="list-style-type: none"> • GNP or GDP growth rate 	International Monetary Fund, 1988
Weighting	<ul style="list-style-type: none"> • Book Debt/Market Equity 	National Balance Sheet Accounts, #13-214, 1987-88 and Morgan Stanley Capital International

Attachment II
Assumptions and Sources of Information for Canada
Cost of Capital

Item	Assumption	Source
Depreciation Schedules and Investment Tax Credits		Canadian Tax Reports, CCH Canadian Ltd, 1988 and Ernst and Young
Equipment & Machinery	<ul style="list-style-type: none"> • Assume general ITC rates • Assume 1988-89 Declining Balance years 1 - 5, Straight-line years 6 - 10 	
Factory	<ul style="list-style-type: none"> • Assumes general ITC rates • Assume 1978-88 Declining Balance years 1 - 10, Straight-line years 11 - 30 • Assume 1977 Declining Balance years 1 - 10, Straight-line years 11 - 20 	
R&D Project	<ul style="list-style-type: none"> • Assume 10-year payoff lag • Assume general ITC rates • Assume 100% immediate write-off 	
Expensed Item	<ul style="list-style-type: none"> • Assume 100% immediate write-off 	
Land	<ul style="list-style-type: none"> • Assume infinite life 	

Attachment III

Stockholder's Required Return

Attachment III

Stockholder's Required Return

The following equation details the calculation of the stockholder's required return:

$$k_n = k_s + [t_g \times (k_s - y) / (1 - t_g)]$$

$$k_e = k_n - i$$

where

k_s	= $r + i + (y \times t_d)$
k_n	= nominal cost of equity
k_e	= real cost of equity
t_g	= capital gains tax rate
y	= dividend yield
i	= inflation
r	= pure interest rate
t_d	= dividend tax rate

Attachment IV

Assumptions and Sources of Data
Stockholder's Required Return Method

Attachment IV
Assumptions and Sources of Data
Stockholder's Required Return Method

Item	Assumption	Source
<p>Target Real Required Return</p> <p>Inflation Expectations</p> <p>Ownership Structure of Equity Capital</p>	<ul style="list-style-type: none"> • 5-year average annual growth in real GNP/GDP • Annual GNP or GDP deflator • Canada 1976 data used for 1977 and 1978 • United States 1980 data used for 1977 - 1979, 1981 data for 1982 and 1987 data for 1988 • Japan Prior to 1980, banks and other financial institutions were not reported separately. We assume that the mix in 1977 - 1979 is the same as for 1980 - 1988. • West Germany 	<p>OECD Economic Outlook</p> <p>OECD Economic Outlook</p> <p>Financial Flow and National Balance Sheet Accounts, 1988 (#13-214)</p> <p>OECD, Financial Statistics, Part 2: Financial Accounts, 1981 - 1988</p> <p>Tokyo Stock Exchange</p> <p>OECD, Financial Statistics, Part 2: Financial Accounts, 1981 - 1988</p>
<p>Taxability of Equity Owners</p>	<ul style="list-style-type: none"> • United Kingdom 1979 data used for 1977 and 1978, 1985 data for 1986 and 1987 data for 1988 • Sweden 1980 data used for 1977 - 1979, 1985 data for 1986 and 1987 data for 1988. • Non-financial companies, banks, one half of non-residents and other financial institutions (excluding pension funds) are considered taxable at corporate rates. • Households and one half of non-residents are taxable at personal or individual rates. • Governments and pension funds (except West Germany) are tax exempt • Pension funds represent the same proportion of financial institutions in other countries as they do in Canada 	<p>OECD, Financial Statistics, Part 2: Financial Accounts, 1981 - 1988</p> <p>OECD, Financial Statistics, Part 2: Financial Accounts, 1981 - 1988</p> <p>TPF&C Research</p>

Attachment IV
Assumptions and Sources of Data
Stockholder's Required Return Method

Item	Assumption	Source
Marginal, Capital Gains and Dividend Tax Rates for Individuals and Corporations	<ul style="list-style-type: none"> • Canada • United States • Japan • Germany Rules and rates for 1980 were used for 1977 - 1979 • United Kingdom • Sweden 	<ul style="list-style-type: none"> • A Fiscal History of Canada - The Post War Years, J. Harvey Perry, Canadian Tax Foundation • U.S. Master Tax Guide, 1977 - 1988, CCH Publishing Ltd • Guide to Japanese Taxes, 1977 - 1984, Zaikei Shoho Sha • Tokyo Stock Exchange • Coopers & Lybrand, International Tax Summaries, 1980 - 1988 • Coopers & Lybrand International Tax Summaries, 1980 - 1988 • U.K. Master Tax Guide 1987 • Butterworth's U.K. Tax Guide 1986 - 1987 • Tolley's Income Tax 1977 - 1986 • Coopers & Lybrand International Tax Summaries, 1980 - 1988 • Coopers & Lybrand International Tax Summaries, 1980 - 1988

2. MICRO-METHODOLOGICAL DISCUSSION

The macro-methodologies develop average costs of capital for a large sample of companies in each country. However, these cost are averages and reflect peculiarities of individual economies, such as sector mix. To achieve a more meaningful comparison of the cost of capital for individual Canadian companies and their competitors and comparable companies, we calculated cost of capital for some 100 companies: 42 Canadian and 60 foreign. Individual calculations also provide corroboration of macro-level analysis.

CHOICE OF METHODOLOGY

A wide choice of options exists for calculating cost of capital at the company level because more specific company information is available.

One of most common, the Capital Asset Pricing Model (CAPM), has been one of the cornerstones of modern financial theory since the early 1960s. CAPM assumes that in an efficient market an investor expects to be compensated in direct proportion to the degree of risk inherent in a security's future cash flows; i.e., the assumption of greater risk requires greater expected return to compensate for the increased level or risk. The simplest version of the model starts with the expected return of a virtually risk-free security – such as the interest rate on a government bond – and then adds a premium to compensate for the riskiness of the specific security under consideration. This risk premium is a function of the expected variability of the future yields of a given investment derived by multiplying the stock's "beta" by the average expected return for a market portfolio – "the market risk premium".

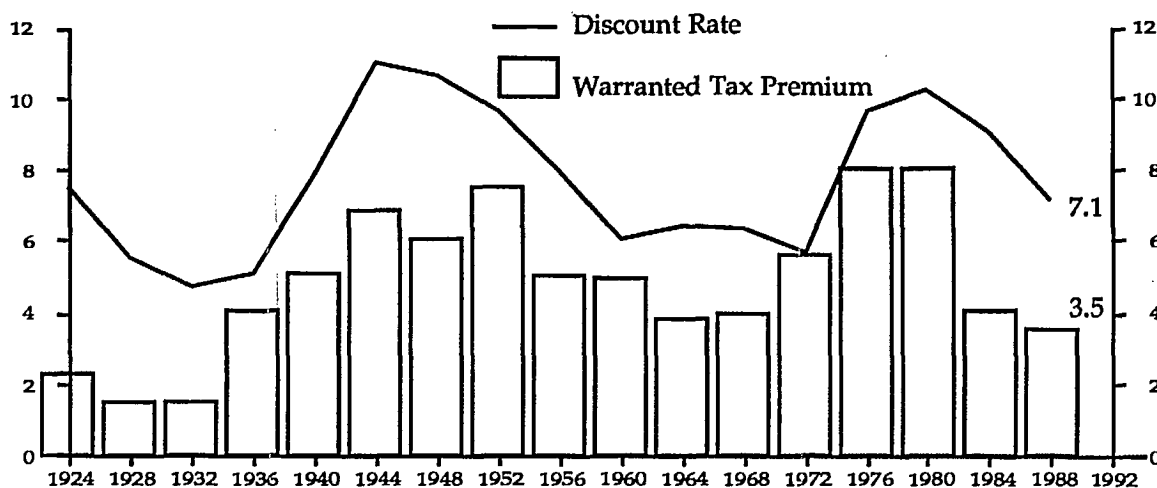
The CAPM method is simple and intuitively appealing and seems to work reasonably well for stable firms in North America whose risk premia do not change over time. While this method is easily applied, it has disadvantages that make it a poor methodological choice both for inter-company comparisons within a country and for international comparisons.

Inter-company comparisons within a country: Despite CAPM's intuitive appeal and inherent simplicity, there are several factors that suggest its results are unreliable.

- The equity market premium is a historically derived figure which is very sensitive to the period of time chosen for observation. Choosing a long period for observation means that today's cost of equity is dominated by past rather than current (or expected) risk factors. Conversely, choosing a short period of observation means that the equity market premium may include distortions due to volatility or short-term aberrations in the market.

- Our research shows that a significant portion of the historically derived premium is not solely a risk premium, as asserted by CAPM, but is in fact a tax premium. Because of the way in which CAPM defines its equity premium, risk is overstated and taxes are understated. Exhibit 1 demonstrates the strong relationship between taxes and the cost of equity (derived using the CMA approach) in the United States. The warranted tax premium is defined as the return required by an investor to cover the maximum tax on dividends and capital gains.

Exhibit 1
Real After Corporate Tax Discount Rate
with Warranted Tax Premium
(%)



Source: CMA

The recognition of taxes as a cost driver is especially critical because expectations about future tax rates are dominated by current rather than past tax rates. Use of a long historical sample period can therefore lead to erroneous conclusions.

- The results do not properly reflect the reality of risk in a period of falling stock prices. If stock prices fall, the average risk premium by this method will also fall (since the difference between stock returns and the risk-free instruments will have narrowed) implying that the overall cost of equity capital has declined. In reality, however, the falling stock price indicates that investors regard the stock as increasing in risk (or expecting lower returns than in the previous period) and are unwilling to pay the previously higher price for assuming a higher degree of risk, causing the actual cost of equity to rise.

- The notion that risk-free debt instruments and equities relate to each other is unproven. Evidence from observation of ownership patterns in the United States suggests that since 1924 most equity capital has been owned by wealthy taxable individuals while T-Bills and other government debt instruments have been absent from their portfolios. Furthermore the groups that dominate the pricing of government instruments (e.g., central banks) do not own equities. This suggests that the relationship between the risk-free rate and equities implicit in CAPM is not self-evident and may not be the most appropriate for the comparison of alternative returns.
- CAPM's proposition that all sources of risk are captured in a single risk premium (beta) defies analysis and may not adequately capture all of the factors that are critical to arrive at an appropriate cost of capital. The Arbitrage Pricing Theory (APT) extends the reasoning behind CAPM by allowing for a set of risk premia, each related to a different factor influencing the stock price. However, in practice academics differ on the method used to derive the factors and in theory differ on the number, nature and appropriateness of the factors. The difficulties in applying APT are compounded when making comparisons across borders. Disagreement on whether the same factors should be used to derive the cost of equity in each economy makes it an unrealistic methodological option.

International Comparisons: The problems with the use of CAPM as a method to estimate equity costs becomes even more serious when making international comparisons. The method by which risk is measured does not allow international comparisons of risk to be made accurately. Comparing the derived costs of equity capital among countries using CAPM raises the problem of comparing the beta of individual equity markets. By definition the beta of an economy is one. By assigning a beta of one to each economy, CAPM cannot account for the inherent riskiness of each economy relative to other economies. For example, it is highly unlikely that the riskiness of the market in Argentina, which has a beta of one, would be the same as the riskiness of the market in the United States, which also has a beta of one. In theory different betas could be assigned to each country to reflect risk, but there are currently no accepted methods for doing so. Using a single historical average equity market risk premium for a particular country in effect collapses differences in risk between countries.

There is also a family of models and approaches available to calculate the cost of capital directly. Since cost of capital is the rate at which future cash flows are discounted by the market to arrive at a current value of the company, the cost of capital can be calculated if you know current value, which is observable, and future flows – which are difficult to predict. However, because leading-edge companies are increasingly using this type of approach, and because of its theoretical strengths, we have adopted it. Not only does a direct method reflect best business practice, it also provides a better check on macro-methods since it

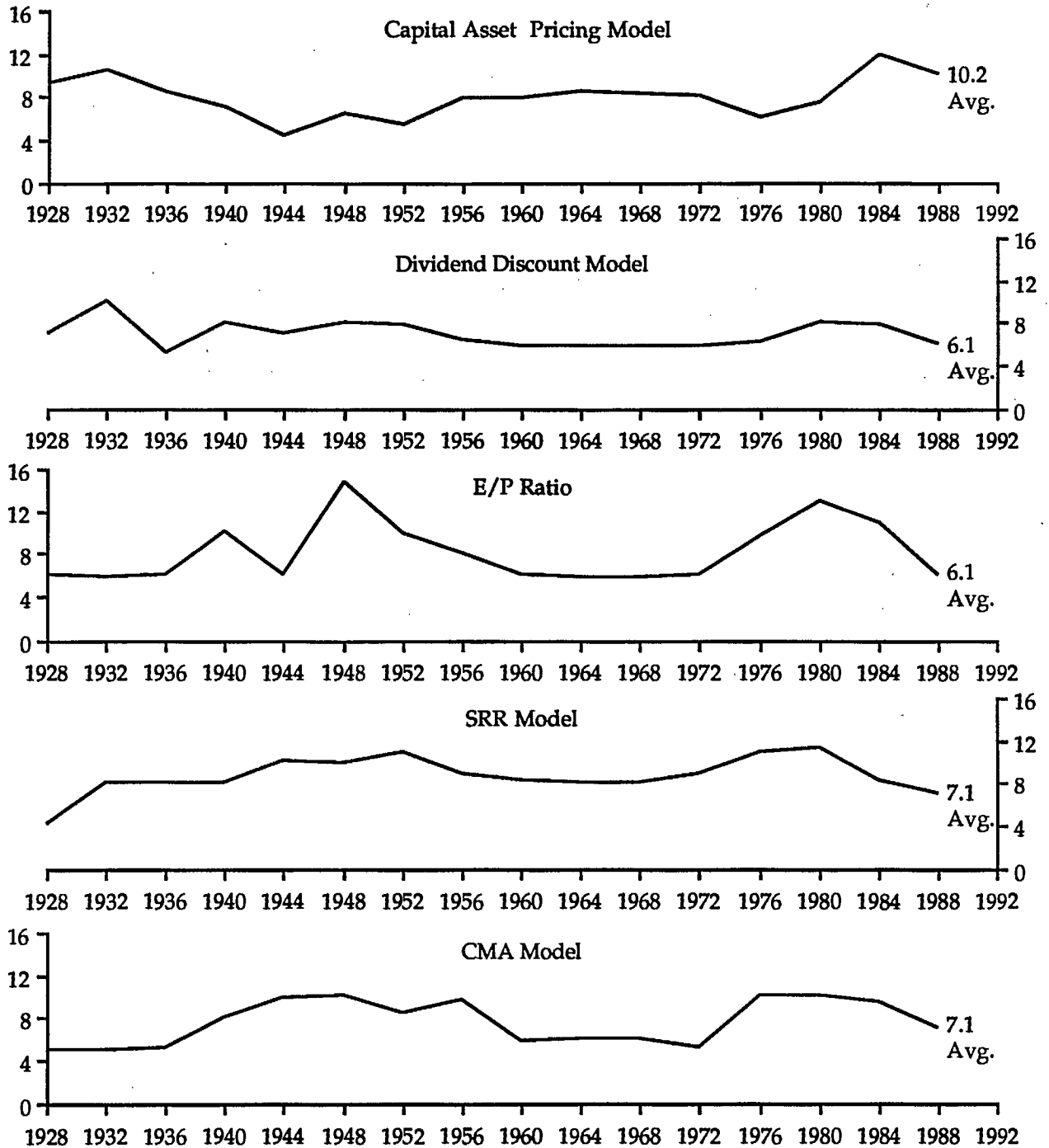
calculates the same thing but in quite a different way. The indirect methods are proxies for the direct methods.

Various approaches differ in how they estimate future cash flows. Balance is essential between easy but overly simple forecasts and more complex approaches that project more fully but perhaps less credibly.

Of the methods identified to calculate the cost of capital, the approach developed by CMA produces superior decision-making information and empirically-based results. The CMA approach overcomes the problems with CAPM and with methods that calculate the cost of capital indirectly. This model has been used extensively in the U.S. and also in Britain and has shown a high degree of accuracy. The most powerful evidence in support of the CMA results is that it has been empirically proven over a long period of time. The model's accuracy can be historically shown through an iterative process that takes projected cash flow, a cost of capital estimation and "solves" for the stock price. The calculated stock price can then be compared to the actual price. Performing this over a number of periods provides a broad sample with which to verify the accuracy of the CMA results. It should be noted that to be valid the model does not need to project actual future cash flows; rather it needs to simulate the market's expectation of these flows.

It is critical to note that all other methods provide reasonable agreement with the CMA approach about broad trends in equity capital costs over time - except CAPM. This difference could be due to any of the factors outlined in the CAPM discussion and suggests that CAPM systematically overestimates the cost of equity. While Exhibit 2 demonstrates this relationship in the United States, empirical comparisons have been made for the United Kingdom and Canadian markets and yield similar results.

Exhibit 2
Alternative Estimates for the Inflation Adjusted
Cost of U.S. Equity Capital
 (%)



Source: CMA

CMA MODEL

CMA's model uses Modigliani and Miller's propositions as its starting point for valuing firms. The model is based on the assumption that shareholders value their portion of the future cash flows of the corporation. The current market value of the company (market value of equity plus debt) is therefore the net present value of the company's future cash flows discounted at the cost of capital. The cost of capital is equal to the rate at which the cash flows must be discounted to achieve the market value of the firm. Given any two of the three key variables, one can solve for the third.

The model's procedure is to determine in turn:

- The real value of a company's assets in today's dollars at the start of the forecast. In order to remove the distortion that inflation creates in accounting results, all subsequent calculations are in constant dollars
- The cash flow return on investment (CFROI) earned on these assets – again in constant dollars
- The real growth in the company's assets
- The company's future real cash flows, based on its CFROI and its projected level of assets
- The cost of capital that equates these cash flows with the current market value of the company

The rest of this attachment sets out in more detail how this is done and then describes how the approach was modified to account for the different accounting practices in the various countries we studied. As the model is proprietary, like a number of these types of model, this material is descriptive but does not provide the precise formulas used by CMA to calculate some of the variables.

INITIAL REAL ASSETS

A company's financial statements describe the company's assets in a way that records their value in the dollars current at the time they were bought. This nominal figure could represent a wide range of real assets depending on the age mix of the assets. To remove the distortion that inflation makes in a company's reported results, the model first calculates the real value of the company's physical (depreciating) assets and its non-depreciating working capital assets in today's dollars. The following simplified example illustrates how the adjustments are calculated. The actual calculation of the inflation adjustments is more complex because asset growth must be taken into account to calculate a more accurate asset age and model the ages of the assets.

Consider the inflation adjustment under a zero growth assumption. The company reports \$100 in gross assets, \$40 in net assets and \$20 depreciation this year. The assets therefore have an average life of 5 years ($\$100/\20) and are, on average, 4 years old ($\$40/\100×5 year life). We can model the asset history to show how year-by-year investment led to the reported asset position. We know that the gross assets remain constant at \$100 because we have assumed zero growth. Therefore, with lives of 5 years, depreciation will be \$20 annually, and each year \$20 in assets will expire and \$20 in new investments must be made to maintain zero gross asset growth.

Year of purchase	Investment	Accum. Depreciation	Net Assets
-5	\$20	\$20	\$ 0
-4	\$20	\$16	\$ 4
-3	\$20	\$12	\$ 8
-2	\$20	\$ 8	\$12
-1	\$20	\$ 4	\$16
	----	----	----
Total (year 0)	\$100	\$60	\$40
	Gross Assets	Accum. Depreciation	Net Assets

Since the asset life is equal to five years there is no need to model back farther than five years because assets acquired before then will have been retired and their gross values and accumulated depreciation removed from the accounts.

This historic investment and depreciation pattern can then be translated into constant today's dollars to estimate the real value of the company's assets. In practice, the model inflates the assets and the depreciation at the actual consumer price index for each year, but as an example a constant 4% inflation each year is assumed:

Year of purchase	Investment	Inflation Factor	Revalued Assets	Revalued Acc. Depreciation*
-5	\$20	1.04 ⁵	\$24.3	\$24.3
-4	\$20	1.04 ⁴	\$23.4	\$18.7
-3	\$20	1.04 ³	\$22.5	\$13.5
-2	\$20	1.04 ²	\$21.0	\$8.6
-1	\$20	1.04 ¹	\$20.8	\$4.2
<hr/>				
Total (year 0)	\$100		\$112.6	\$69.3
	Gross Assets @ Book		Gross Assets in Constant \$	Accumulated Depreciation in Constant \$

The resulting real dollar asset value is added to the non-depreciating working capital assets to form gross real investment for first year of the valuation. Working capital does not need to be adjusted for inflation because these assets are already at, or close to, today's dollars. "Gross Assets" refers to the real gross assets adjusted as described, plus non-depreciating working capital.

CASH FLOW RETURN ON INVESTMENT (CFROI)

These cash flow and the real assets calculated in the first step are combined to calculate a cash flow return on investment. The cash flow return on investment (CFROI) variable then drives the projected future cash flows on existing and future investment projects.

CFROI is the implicit return on investment if the firm were to invest its gross assets today and achieve the same level of cash flows each year for the life of the assets. The CFROI is the discount rate at which the net present value of each year's cash flows achieved over the life of the assets equals the gross assets. The calculation requires solving for i , in a simple annuity equation:

* Note: Revalued accumulated depreciation is calculated by dividing the revalued asset by the asset life and multiplying the result by the asset age. For example the four-year-old investment of \$20 with an inflation-adjusted value of \$23.4 has a revalued accumulated depreciation of \$18.7 ($\$23.4 / 5$ year life \times 4 year age).

$$\text{NET PRESENT VALUE} = \frac{P(1-(1+i)^n)}{i}$$

Where: NPV = Current cost adjusted assets
P = cash flow
i = cash flow return on investment
n = asset life

The CFROI is calculated for each year historical statements are available. The CFROI input into the model is then smoothed using a three-year moving median to remove any single exceptionally good or bad year since investors would not expect exceptional returns to continue. In addition a minimum 4% CFROI is used in the model if the median CFROI is less than 4%. Investors would not invest in the stock if they did not expect a reasonable return above the risk-free rate of about 4%. This assumption is supported by empirical evidence.

GROWTH IN GROSS ASSETS

Shareholders also expect the firm to invest in new projects in the future. Growth in real gross assets, total depreciating and non-depreciating, is calculated each year. The model bases the rate at which the firm is expected to grow on the three-year average of a five-year median, discarding the highest and lowest growth rates. For example if a firm's total asset base grew at 5%, 25%, 8%, 10%, and -10% in 1984, 1985, 1986, 1987 and 1988 respectively, the 1986 forecast growth rate would equal 7.67%, the average of 5%, 8% and 10%.

The projected growth rate is then used to forecast annual additional investment in new projects. However, if the achieved CFROI is less than the projected real growth, the model limits the company's growth to the CFROI level. This limitation is based on the premise that a firm earning less than its cost of capital will not be able to grow at a rate that is higher than its cash from operations allows, since shareholders would not invest incremental capital for growth if their return expectations were not being met.

FUTURE CASH FLOW

Now, the model has calculated all of its necessary inputs to generate cash flow projections. Cash flows from existing assets over their remaining life can be calculated from their real value and their CFROI. The cash flow from additional assets can be calculated from the growth in assets. The cash flow generated from these new investments is calculated using the same CFROI as for existing assets.

However, there is an additional adjustment needed. The CMA model projects future cash flows of a business for a 35-year period. But, the model does not assume that a firm can maintain its CFROI over the entire projection period. It is assumed that investment opportunities will decline as time goes on, as

competition drives returns toward the norm. The calculated CFROI is used to project cash flows for the entire lives of existing assets and all new investments made before year 9. For investments made after year 9, the CFROI declines to 4%, straight-line, over the next 27 years. For example, a firm with an ROI of 10%, will have cash flows at 10% for life for all investments made before year 9. Year 10's investment will earn 9.78%, 0.22% less, (1/27th of 10%-4% minimum) over the entire life of the investment, year 11's investments will earn 9.56% for the entire life of the investment, and so on to year 35. Investment rates are also projected to slow over the life of the company, again reflecting the impact of competition. The original growth rate is projected to be maintained for the first eight years, declining straight-line to 2% by year 35.

COST OF CAPITAL

The firm's cost of capital can then be calculated by identifying its current market value and calculating the discount rate which equates it with the cash flows calculated by the means describe above.

The market value of the firm is based on the market value of the equity plus the book value of the debt. (Estimating market values of debt is extremely time consuming and does not significantly change the cost of capital measurement.) The market value of the equity is based on the 12-month average share price multiplied by the common shares outstanding at year-end. Taking an average of monthly share prices means that the market value is no longer a point in time estimate of value. However, CMA has concluded that it is more important to use a short-term average share price than one point in time measurement because of the day-to-day volatility of share values.

Once the operating and investment cash flows are projected and the market values are calculated, the last step is to impute the implicit cost of capital that equates the cash flows with the firm's market value. The resulting cost of capital is the real cost of capital since all flows are projected in constant dollars.

MODEL ADJUSTMENTS FOR DIFFERENT COUNTRIES

For consistency, we have tried to maintain the same assumptions in the model for all company calculations. However, different accounting rules in different countries make it important to adjust some of the data in order to ensure comparability. Because of similar accounting policies in Canada, the U.S. and the U.K., no data adjustments were necessary for these countries. (Some U.K. firms revalue land on their books in some instances, but none of the firms in our sample did.) However, some adjustments were required for the German, Sweden and Japan data and model because of significant differences in accounting policies. (Many of these adjustments mirror the adjustments made a the macro level.)

The model is based on straight-line depreciation of assets. However, several countries including Germany, Sweden and Japan allow accelerated depreciation to be used in annual reports to shareholders. CMA and The Canada Consulting Group did several sensitivity analyses to measure the impact of accelerated depreciation on the ultimate cost of capital calculation. From our results we concluded that accelerated depreciation will not materially affect the cost of capital calculation for the companies we examined. The ROI and the cost of capital will be less than 1% lower for firms using accelerated depreciation. While accelerated depreciation can seriously affect the financing costs of an individual project, for a company whose assets comprise those that are depreciated on an economic basis and those depreciated on an accelerated basis, the impact is negligible. Our analysis and conclusions on cost of capital differences between countries takes into account this minor systematic bias in the cost of capital for these firms, but no adjustment has been made to the data or the model.

In Germany and Sweden, tax and shareholder financial statements are identical. The objective of paying low taxes, by having as low an income figure as possible, overrides the objective of showing high income levels to shareholders. In Germany, tax authorities allow companies to establish reserves for expected future losses and expenses such as bad debts, taxes, etc.

The various types of equity reserves must be treated in different ways. In both Germany and Sweden pension liabilities are also established as equity reserves. In our interviews, firms agreed that most of the non-pension "liability" reserves will never be realized. In Germany we have not included these reserves as debt but as book equity. Our Swedish companies did not have any non-pension equity revenues. The effect of this change is to decrease the market value of equity plus debt since the market value of equity is obtained from share values. Thus, with the same cash flows and a lower market value, the cost of capital will be somewhat higher than it would have been without the adjustment.

The pension reserves, in contrast, have been left as a liability and included in debt. Pension liabilities in these countries are treated differently than they are in North America. In North America, the present value of the firm's pension liability and matching liquid assets must be removed from the balance sheet and treated separately, at arm's length, from the firm's financial accounts. The only liability shown on the balance sheet with respect to pensions in North America is the amount of any unfunded pension liability. In Germany and Sweden, firms are not required to set aside liquid funds matching the pension liability; a firm can invest these funds in the firm in whatever way it wishes. Thus, in Germany and Sweden, the total value of the pension liability is a real unfunded liability that the firm must ultimately pay and should be treated as debt.

Non-equity reserves are also allowed in both Sweden and Germany. These amounts are deducted from earnings but are non-cash items. In order to estimate cash flows, the non-cash non-equity expenses have been added back to income. These balance sheet non-equity reserves are much smaller than the

equity reserves, but for consistency we have treated them in the same manner as "other reserves" and not included them as debt for the market value calculations since they would not be considered liabilities in North America.

In Japan reserves are small and are mainly pension-type liabilities, so no adjustment was necessary. Non-equity reserves, again relatively small, were treated in the same manner as for Germany and Sweden. However, Japan has two other unique factors that necessitated adjustments.

Japanese companies do not claim income from minority investments if they hold less than 20% of a company's equity, but they do include the investment in assets. As a result, Japanese CFROI would be understated because cash flows from operations reflect cash flows from only part of the firm's entire investments. For several of the firms under study, the value of the book investment on the balance sheet represented 15%-20% of net assets. Since Japan is the only country that does not claim minority interest income and the level of minority interest is extensive, we felt an adjustment was required. We removed the value of investments in corporations from the gross assets for the purpose of valuation.

The impact of this adjustment is to raise cost of capital. Without the "investment" account, gross assets are lower, CFROI is higher and thus cash flows are higher. With higher cash flows and the same market value, a higher discount rate is required to discount the cash flows to the market value. For Sumitomo Corporation, the largest minority interest holder in our sample, the CFROI and the cost of capital increased about 1.5% because of the change. A change on average of 1% is consistent with the impact of the Federal Reserve's adjustment for minority interest income. The smaller the size of the investments relative to total assets, the smaller the impact on the cost of capital.

The second adjustment we felt necessary for Japan was to remove the limitation made for other countries, that growth cannot be higher than the CFROI. From our interviews and company analysis, we concluded that Japanese investors do not limit growth if returns are low or expectations not achieved, and we felt that this limitation would bias the Japanese results.

The impact of this growth rate adjustment allows for higher growth rates and thus higher cash flows for the same market value. The cost of capital to discount these flows to the market value must therefore be higher as a result of this adjustment. This change had only a minor effect (less than 0.5%) on the cost of capital.

3. CRITERIA FOR SELECTION OF INTERVIEWS

Appendices A, B & C above set out the companies whose cost of capital we analyzed; the companies interviewed for Case Studies; and the list of financial and policy interviews that we conducted.

This section describes how these companies and the others we interviewed were chosen.

THE CHOICE OF COMPANIES

Our country-level analysis provides a broad perspective on whether and to what degree Canadian companies have a cost of capital disadvantage compared to their competitors in other countries. However, countries do not invest in innovation, companies do. The country-level analysis looks at the cost of capital for a sample of 42 Canadian companies and 60 of their foreign competitors and/or similar companies in other countries. In addition we undertook case studies and interviews with a selection of companies, financial institutions and policy makers in order to understand in detail how companies make decisions on investment in innovation, and the extent to which these decisions are influenced by the company's cost of capital relative to that of its foreign competitors.

The first step in identifying the specific Canadian companies to be studied was to identify the sectors from which we would draw the sample. This step was guided by four criteria:

- Given that the scope and timing of our study limited the number of companies that could be studied, we faced a major trade-off between depth and breadth in our choice of companies. Clearly, it is desirable to have as broad a coverage of the various sectors in the Canadian economy as possible. In order to be able to draw strong conclusions about the impact of country-level costs of capital on individual firms in a given sector, we chose a sample with 3 or 4 companies from each major sector.
- We studied companies in sectors which, when aggregated, cover the bulk of the Canadian manufacturing economy.
- While we wanted to achieve a broad coverage of the economy, we have chosen companies that disproportionately represent the sectors that require higher-than-average levels of investment, whether in hard or soft form, and we have over-weighted companies in higher-tech industries.

- Finally, our sample is biased toward industries whose products are internationally traded, since it is on the performance of these sectors that Canada's relative prosperity ultimately depends.

Once we had established the set of sectors from which our sample companies would be drawn, we selected companies pragmatically to provide a representative group within the sector. In some sectors individual major companies had to be included, simply because of their importance to the industry and to the economy generally. Consequently, for example, the metals and mining sectors must include Alcan, while the steel sector must include at least either Stelco or Dofasco. At the same time we have tried to include a range of different companies within an industry. So, we have included mini-mills in our steel group, and our choice of pulp and paper companies includes companies who are more heavily focused on the somewhat higher value-added products such as fine papers, as well as those reliant on more commodity-type products such as newsprint.

Our choice of companies was biased also toward Canadian-owned and controlled companies. At the same time we have included a number of foreign-owned and controlled companies. There are two basic reasons for this. First, this type of company is very important to the Canadian economy as a whole, and to ignore them would be to ignore a significant component of our manufacturing base. Second, we are interested in the effect that a foreign parent, issuing equity in its home market, has on the cost of capital for its Canadian subsidiary.

Finally, the choice of companies was limited to those that are publicly traded in order to provide access to the depth of publicly available financial data necessary for calculating a company's cost of capital. Privately held firms do not provide sufficient public data for any meaningful financial analysis.

THE CHOICE OF FINANCIAL INSTITUTION INTERVIEWS

In choosing the Canadian financial institutions to interview, The Canada Consulting Group set three objectives. First, we wished to discuss the globalization of the capital markets with individuals who worked in the global capital markets daily and who were therefore best equipped to understand the current trends in financial market integration and the extent to which further integration would continue. Second, we were seeking to understand the structure of the Canadian financial industry and in turn to determine what effect that structure might have on the overall cost of capital for Canada, and in particular for high tech and innovative companies. Finally, through our interviews we hoped to understand the decision-making processes, general attitudes and pricing decisions of Canadian financiers, especially with respect to the financing of innovation.

To meet these objectives we felt it was necessary to interview a group of financial institutions that represented the various functions in capital provision in Canada - commercial banks, investment banks, institutional investors, venture capital funds, etc. with particular emphasis on the financing of high tech and innovative firms. Within reason, we also attempted to interview members of the Canadian financial industry with an eye to geographical representation. The Canadian firms we interviewed are listed Attachment III.

In choosing the international financial institutions to interview, The Canada Consulting Group worked to meet the same objectives outlined above, but in a much more focused fashion and for comparative purposes.

THE CHOICE OF POLICY INTERVIEWS

The choice of government and quasi-government organizations to interview was determined by the necessity to understand the types of monetary and fiscal policies that may affect the costs of capital. Our focus was to understand the policies that affected the general cost of capital in these countries, and to understand the measures that had been taken specifically to assist in the financing of small companies and companies involved in R&D and science and technology.

We targeted the central banks, ministries of finance, ministries of science and technology (or their equivalent) and organizations that were of particular importance to a given country. These institutions, and the appropriate individual within each, were determined through our internal analysis, the firm's prior experience in these areas, the expertise of our international offices and through the assistance of Canadian consulates abroad.

Appendix E

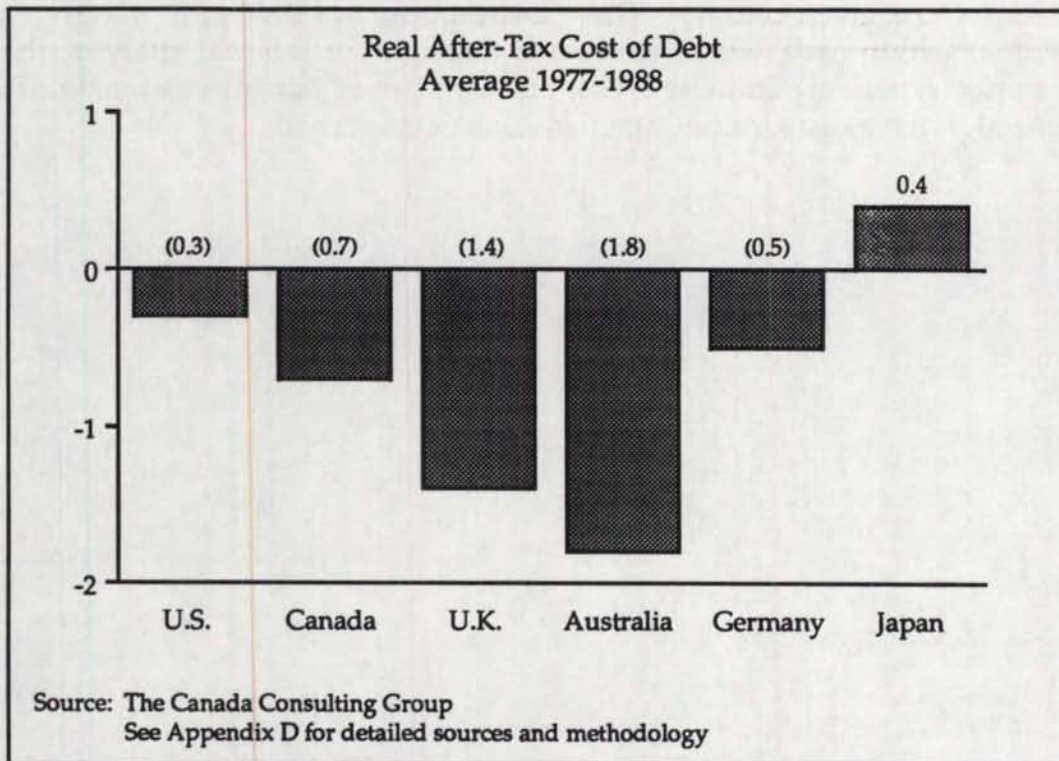
Calculating the Cost of Capital

In Chapter II, we set out our findings on the cost of capital in Canada and seven of its competitors. The numbers shown there are an average of the two methods we used to compute the cost of capital. This appendix sets out the analysis that generated those numbers, while the Appendix D provides a more technical description of the methodologies used.

Under both the methods we used – the Federal Reserve Bank of New York (FRBNY) method and the Shareholders Required Return (SRR) method – the cost of equity and the cost of debt are calculated separately. They are then weighted by the proportion of debt and equity in the average capital structure of companies in the appropriate country to establish the cost of capital.

The value for the *cost of debt* is the same for both approaches. As Exhibit E-1 shows, while the cost of debt varies from country to country, all the countries studies fell within a relatively narrow band. Once the effects of inflation and tax shelters have been removed, all the countries had average debt costs in the range of 0.4 to (-1.8) percent. (Companies are allowed to offset the nominal cost of debt against earnings for tax purposes. When the resulting after-tax cost of debt is beneath the rate of inflation the companies are actually paying a negative real rate of interest.)

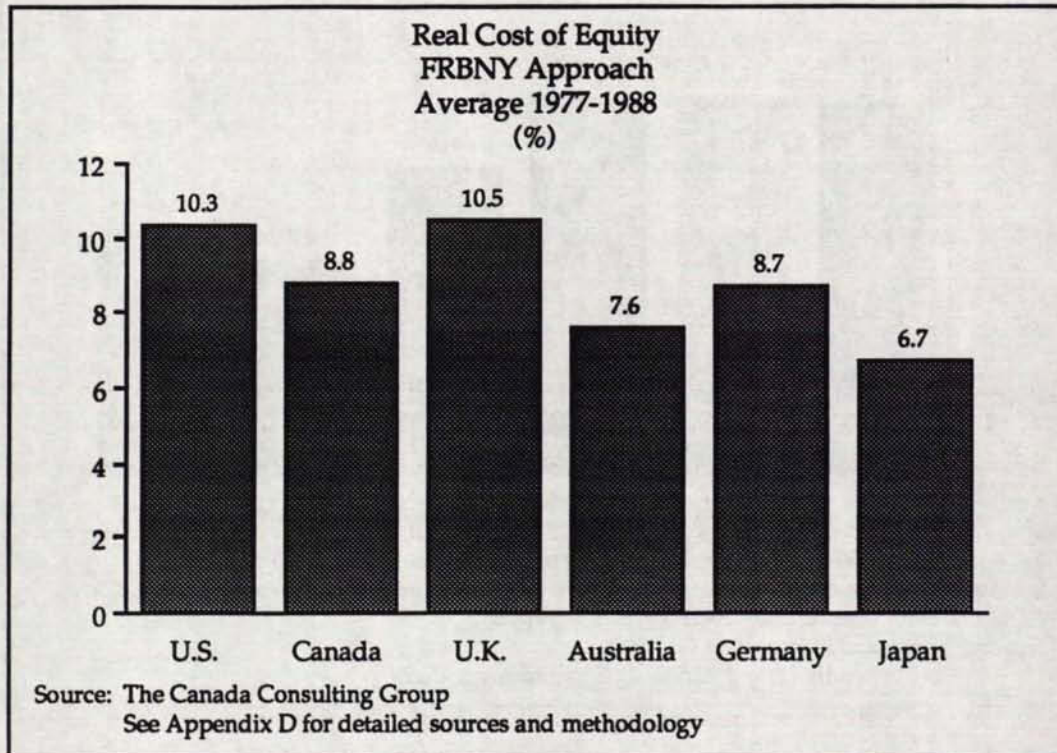
Exhibit E-1



The *cost of equity* for each country differs under two approaches used but, except in the case of Australia, the pattern is quite consistent. (The reasons for the difference in Australia are explained in the main text.)

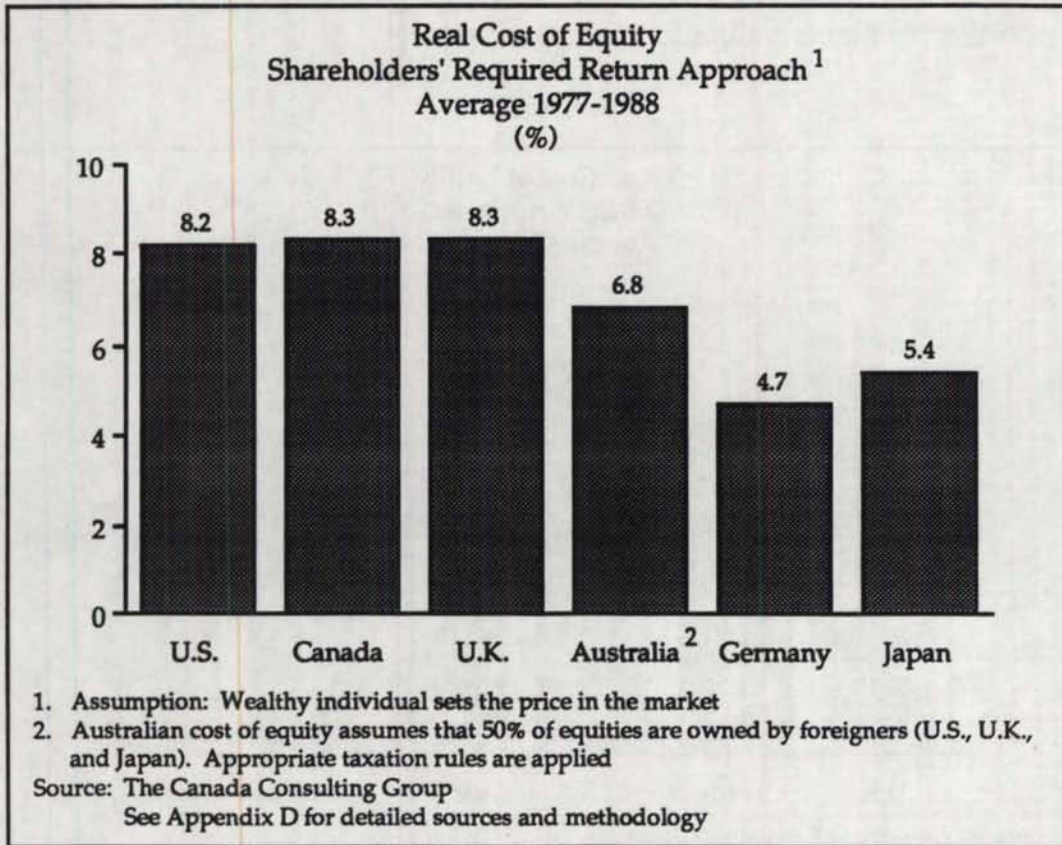
The FRBNY gives higher values for the cost of equity:

Exhibit E-2



The SRR cost of Equity is typically a point or two lower:

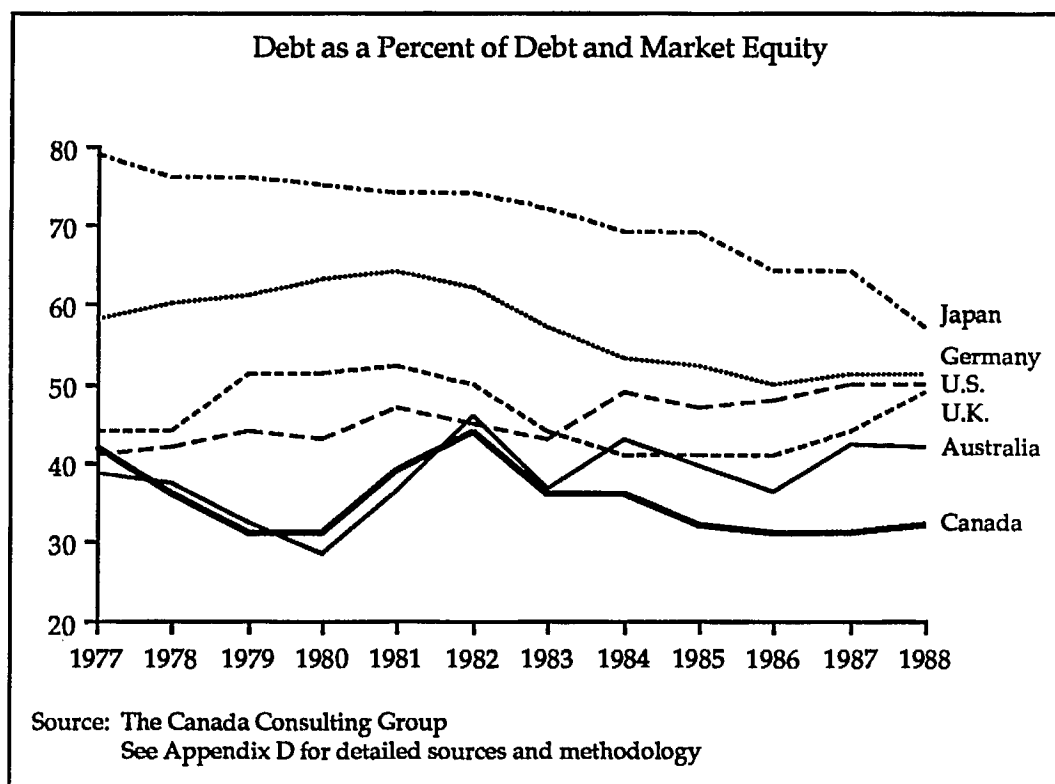
Exhibit E-3



Under either method, the cost of equity in all countries is well above their cost of debt, and the cost of equity in the high cost of capital countries is above that in the low cost of capital countries.

The final element in calculating the cost of capital is the *relative weight of debt and equity* in the capital structure of the average company in the country concerned. As can be seen from Exhibit E-4, in the period on which our calculations are based, Japan and Germany had much more debt in their capital structure than countries in the high cost of capital group.

Exhibit E-4



From these exhibits it is possible to see just how Japan and Germany derive their advantage. They have a cost of equity that is lower than other countries and they are able to use significantly more debt than their competitors. They do not need to have debt that is cheaper than elsewhere for this to be a major advantage. Since debt is typically 6-8 percent cheaper in real terms than equity, depending on the method used to calculate equity costs, a higher proportion of debt will lower the cost of capital, even though the cost of the debt itself, as in the case of Japan, is slightly more expensive than in other economies.

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