

**HAS FINANCIAL SECTOR DEREGULATION EASED
COMPETITION POLICY CONCERNS OVER BIG BANK
MERGERS IN CANADA?**

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Abstract

By reducing competition, regulation may increase the stability of the financial system and prevent bank failures. This has been challenged in the theoretical literature, and policy makers have responded by relaxing the regulations restricting competition. The large Canadian bank merger proposals in 1998 generated a large discussion as to whether mergers of this scope should be allowed. This paper addresses whether the recent deregulation of the financial sector created an environment where large bank mergers would not be harmful to the economy. It discusses the evolution of the financial sector through the recent revisions of the *Bank Act*, as well as issues relevant to competition in banking. The paper then estimates the level of competition in Canadian banking using the Bresnahan and Lau (1982) technique. The paper concludes that concerns over the potentially anti-competitive impacts of large bank mergers have not been mitigated by increases in contestability of financial markets.

Dedication

To my family

Acknowledgements

I would like to express my gratitude to my committee members, I benefitted greatly from their guidance. I owe special thanks to Richard Schwindt. I would also like to thank my friends and family for their help, encouragement and bowls of hot soup.

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1 INTRODUCTION

Public policy towards banking has been concerned with more issues than in most other industries. One can make a wide range of arguments as to why governments should intervene in the financial sector. The traditional arguments outlined by Dale (1994) include the risk of financial collapse. Of these, this risk arises in free markets because of two market failures (Brander, 1994, pp. 402-4). One of the market failures is asymmetric information. Depository institutions are better informed about the characteristics of investments they make with depositors' savings than the depositors. This gives them an incentive to invest in riskier assets than would otherwise be prudent. The second market failure occurs because there is a pecuniary externality that banks do not take into account when making decisions about the level of risk they should take on. When a bank or near bank fails, it creates a lack of confidence in the system, which can lead to a contraction in the process of intermediation and thus lead to further failures despite the level of prudence by other banks. Characteristics of financial firms, like their high leverage position, enhance the risk of bankruptcy, which can be quite costly.

An approach Canada has taken to guard against bank and near bank failures is to protect the industry from competition. The idea is that when competition is lacking, firms earn economic profits that keep them above the break-even point. The profits also give existing banks and near banks additional incentive to survive in the long term to continue earning economic rents. It is argued that an environment that allows for concentration and economic profits is less likely to experience failures among financial

enterprises. However, reducing competition creates another market failure since firms with market power do not allocate resources efficiently. The tension between the risk of bank failure and risk of a non-competitive financial sector is evident in the regulation of the Canadian financial sector. While the current trend is the relaxation of regulation previously designed to enhance the stability of the industry, government policy towards competition in banking has become more stringent than in the past. The literature on competition in banking has begun to argue that there may not need to be a conflict between the two objectives since it may be possible to have a competitive and stable environment without a great deal of regulation aimed at competition or stability.

Competition policy, and more specifically, merger law, has traditionally been concerned with ensuring efficiency by examining the potential anticompetitive effects of proposed mergers. To do so it has relied on economic theory describing how firms behave under various conditions. The focus has generally been to determine how a merger will potentially reduce economic welfare. Welfare is reduced through a combination of the firm's increased market power, called unilateral effects, or increased coordination by firms in the market, called interdependence. The extent of the reduction in welfare is recognized to depend on market structure, in light of various characteristics that help or hinder the ability to profitably raise price above the cost of provision. The banking industry presents challenges to the traditional approach because of the uniqueness of the industry and the services it provides. The literature on competition in banking has also addressed the difficulties in the traditional approach and extended the issue to whether or not the industry is contestable.

Currently in Canada, both the *Competition Act* and the *Bank Act* govern bank mergers. The *Competition Act* is administered and enforced by the Competition Bureau, which is specialized in interpreting the *Competition Act* and representing the government with regard to competition issues. It also assists the public in understanding how Canadian law is concerned with competition and how potential mergers will be dealt with. To achieve this, the Competition Bureau has created the *Merger Enforcement Guidelines* (1991), which are a non-legislative and more practical interpretation of the *Competition Act*. This is where the economic ideas about concentration, market shares and other market characteristics are set out. The Competition Bureau has also produced a special set of merger guideline for banks.

In the last couple of decades there have been some significant changes in the way banks and near banks perform the task of intermediation. There have also been significant changes to the *Bank Act* throughout the period as well as the creation of the *Merger Enforcement Guidelines as Applied to Banks*. (Competition Bureau, 1998a) The *Bank Act* has gone through revisions that have progressively removed the restrictions bank face on commercial activities they are allowed to perform, as well as ownership and capital requirements. In general the motivation of deregulation has been to remove the barriers both to competition amongst the banks and near banks and to competition from abroad. The revisions of 1980, 1987 and 1992 were quite significant as they gave the banks and other financial institutions greater freedom to conduct various commercial activities, which they responded to.

Compared to most other industrialized countries, Canada's banking industry has been relatively concentrated with few banks accounting for a large part of intermediation.

This is in part a result of the regulation regarding banks under the *Bank Act* prior to the recent revisions. The tight restrictions regarding what types of firms could act as banks helped shelter existing banks. One response by banks and near banks to deregulation was the desire to merge. There was a substantial level of product-extension type mergers when banks were allowed to engage in insurance, trust and direct financing activities. There were also applications for horizontal mergers among the large chartered banks. The most notable of the mergers approved over the period was that of Toronto Dominion Bank and Canada Trust. This would have been minor had either of the 1998 proposed mergers of the Royal Bank with the Bank of Montreal or the Canadian Imperial Bank of Commerce with the Toronto Dominion Bank been approved. If these mergers had been approved the industry would be much more concentrated than it currently is, and would approach a pure duopoly.

The 1998 proposed mergers were rejected by both the Competition Bureau and the Minister of Finance. The Competition Bureau informed the banks that it would likely find that there would be a significant lessening of competition in some of the markets these large banks participated in. (Competition Bureau, 1998b and 1998c). This was based on analysis described under the *Merger Enforcement Guidelines as Applied to Banks* (MEGB). The banks were then challenged to show that there would be substantial efficiency gains to offset the anticompetitive effects of the mergers. The Minister of Finance, acting under the *Bank Act*, also declared that he would not endorse mergers of this size. This was based on advice of both the Competition Bureau and a report by a research group, The Task Force on the Future of the Canadian Financial Services Sector, designed to analyse the impact of such mergers on the Canadian economy. Most of the

concern was focused on industry concentration and the condition of entry into the industry. The banks were asked to come back with a new and more convincing argument in favour of the large mergers before the mergers would be reconsidered. The banks have yet to respond with anything significant.

A review of the literature on competition in banking suggests the analysis should be concerned with contestability (Northcott, 2004). Contestability depends on the threat of potential entry, which is determined by ease of entry. This literature has shown that the traditional idea that less concentration leads to more competition does not necessarily hold. Regulations regarding entry and commercial activities are argued to be quite important for contestability in banking. It has been argued that as a result of deregulation, the level of concentration in banking at the time of the proposed mergers was irrelevant. This argument suggests that the mergers would not harm the Canadian economy because there was sufficient competition in banking services and this would continue to be true after the mergers.

Estimation of the level of competitiveness over the period will help link the competition theory with the changes in Canadian banking regulation. This paper will estimate the level of competition in Canadian banking from 1965 to 2001. A natural place to check for changes in competition is in 1980 and 1990 since the most significant revisions of the *Bank Act* in the recent deregulation process took place around these points in time. Those that supported the mergers stressed the irrelevance of industry concentration because the regulatory hurdles had been removed. The estimation results will be used to support or refute this argument by determining whether competition was strong or not.

This paper will proceed as follows. Section 2 discusses the evolution of the banking industry in Canada in order to understand the current structure of the Canadian financial sector. This includes the deregulation program with the trend in activity that resulted from it, as well as changes in technology and the general economic environment. Section 3 presents an analysis of competition in banking with regard to the changes described in the previous section. This is followed by estimation of the level of competition using the technique proposed by Bresnahan (1982) and Lau (1982). Section 5 provides a conclusion and summary.

2 INDUSTRY STRUCTURE

2.1 Banking Industry Prior to 1967

Banks play a large role in most activities that comprise the financial sector. Their activities are by no means limited to the traditional role of intermediation where they accept household deposits and issue loans to businesses and consumers. They have come to participate in most types of financial services to some extent. While this has not always been the situation, it is similar to the current structure of financial markets elsewhere, which also tend to exhibit few boundaries between financial activities. However, Canada is somewhat unique in that its financial sector is made up of relatively few firms, and this has been fairly constant through time. Compared to other countries, the Canadian financial sector can be characterised as being concentrated with a few large banks holding most of the assets within the sector.

To understand how and why the industry structure is as it is today, it is useful to proceed through the evolution of the industry from before the recent revisions of the *Bank Act*, which began in 1980. The last half of the twentieth century is characterised by some significant changes in regulation and market conditions. The causal relationship between the two is somewhat blurred since there are examples of regulation reacting to changes in financial markets as well as the reverse. While the goals of the restructuring accomplished by the series of amendments of the *Bank Act* were extensive Daniel, Freedman and Goodlet summarize the objectives as follows:

The intention of the legislative restructuring of the financial industry has been to provide a regulatory environment that promotes both efficiency and the soundness of the financial system. (Daniel et al., 1992, p. 45)

This illustrates that Canadian policy makers have been mindful of the role regulation plays in promoting both competition and stability. To have a meaningful discussion about competition it is useful to be aware of how the economic environment is characterised in terms of the players and regulations and how these interact. This section will proceed first by describing the industry prior to 1967, followed by outlining the deregulation initiative, then by discussing the evolution of the banking industry, which leads naturally to a description of the current state of the industry.

To correctly analyse competition an idea of the market structure is required. As will be discussed in Section 3, this can be a difficult task since there are a number of considerations to account for when defining antitrust markets. This section will therefore describe the banking industry and the financial sector, not any type of antitrust market. It is useful to discuss both because the banks compete with other financial institutions to varying degrees depending on the specific commercial activity. By examining the size and extent of the commercial activities of banks and other financial firms this paper will be able to characterise the environment.

Since the beginning of the twentieth century Canada's banks have been large with only a few dominant firms in the industry. This trend was started by a series of mergers across the country in the late nineteenth century, leaving only a few banks with large branch networks. Prior to deregulation, maintenance of the dominance of the large banks was aided by regulation that restricted entry in two ways; ownership requirements and segregation of the financial sector into the five "pillars". These restrictions have been the

key issue as trends globally and domestically have pushed policy makers to rethink what is required for a healthy financial sector. Traditionally, Canada had limited its financial institutions to participate in just one of the following activities: commercial banking, trust and mortgages, cooperative credit unions, insurance, or securities. Although it is not altogether clear, the motivation for separation seems to come from jurisdictional supervision and existing practises. Ownership limits however were inspired by the desire to retain Canadian ownership of financial institutions and to prevent links with non-financial firms.

Dean and Schwindt (1976) provide an analysis of the period just before and after the 1967 revisions of the *Bank Act*. They report that concentration in the banking industry was “very high” (Dean and Schwindt, 1976, p 10). This is based, among other things, on a 91 percent five firm share of bank assets in 1962. If the industry definition is expanded to include near banks (mortgage loan companies, trust companies and credit unions and *caisse populaires*) then the concentration of total assets is not as severe. As shown in Table 1, in 1967 the five largest banks held 67.9 percent of total assets; with trust companies, mortgage loan companies, credit unions and *caisse populaires* each holding an approximately equal share of the remaining assets.

When describing an industry for the purpose of competition analysis the purpose is to capture the size and relative importance of the participants within a market. Since calculating asset shares does not completely accomplish this, it is useful to examine the characterisation of the industry by commercial activity type. Table 1 also reports the shares of commercial activities: savings and demand deposits, consumer credit and mortgages. The situation for the banks with respect to some of the major commercial

activities is similar to that of asset share. The chartered banks, especially the five largest banks, held most of the savings and demand deposits. The exception was the share of consumer lending and mortgage loans, where the banks held 34.6 and 12.8 percent of these financial activities respectively. These low shares were a result of restrictions that previously kept the banks from fully participating in these activities. Until the 1967 revision of the *Bank Act*, banks were largely prohibited from offering mortgage loans and there was a ceiling on interest rates that further restricted the banks' ability to offer consumer loans. However, for the most part the banks had a significant presence in the major activities that they engaged in.

Table 1: Bank and Near Bank Assets, 1967

Percentage of Total*	Chartered Banks	Largest Five Banks	Trust Companies	Credit Unions and Casses Populaires	Mortgage Loan Companies	Quebec Savings Banks	Sales Finance and Consumer Loan Companies, Retail Dealers, and Life Insurance Company Policy Loans
Assets	67.9		12.7	9.8	8.1	1.5	
Savings Deposits	64.3	58.8	14.3	11.3	8.1	2	
Demand Deposits	85.3	79.2	7.5	5.2	2		
Consumer Credit	34.6	32.1		12.7			52.4
Mortgages	12.8		36.9	14.9	31.7	3.7	

Source: Dean and Schwindt (1976)

*Total for each category includes only the institutions with a value listed

The extent of the concentration in the banking industry can be attributed to the barriers to entry that existed at the time. Given that the banks were earning above average profits, in the absence of barriers, there should have been entry into the industry by new firms or competition among existing firms until the profits were dissipated. Dean and Schwindt (1976) argue that there were barriers from product differentiation and incorporation. The incorporation barrier came from the resources required to start a bank and attain charter status. The product differentiation barrier was a result of the extensive

branch network of the large national banks. The banks had a high density of branches across the country. Dean and Schwindt (1976) report that by 1974 there was one branch for every 3,362 persons. Customers benefited from the perceived safety due to sheer size and the convenience of the network. Competitors of the large national banks would have to offer lower prices or incur substantial costs in order to offset the advantage to the branch network. There were also regulatory segmentation barriers between banks and near banks due to the separation of financial activities into the aforementioned “pillars”.

2.2 Deregulation

The following description of the changes in regulation follows the summary contained in Freedman (1997). The revisions in 1980 can be considered the first major changes in the modern reform, but there were some changes in 1967 that were also important. It was in 1967 that the “widely-held” ownership rule was established. This meant that an individual or firm was not allowed to hold more than 10 percent of any class of shares of any particular bank. Aggregate ownership by foreigners was also limited to 25 percent. In 1967 the banks were granted the power to offer mortgages. In addition to ownership and activity regulation, the 1967 revisions removed the ceiling on the interest rates banks charged for loans and paid on deposits. Calmes (2004) suggests the removal of the interest rate ceiling was a necessary condition for the banks to expand into the area of higher risk consumer lending. Using a comparison with the US situation he shows that in the presence of the inflation and uncertainty in North America at the time, Canadian banks would not have moved into areas like mortgages and consumer loans so aggressively without the deregulation of interest rates. Also of interest in the

1967 revisions is the addition of a regulation prohibiting banks from agreeing on interest rate levels.

The 1980 amendments to the *Bank Act* are viewed by many to be some of the most significant in the series of revisions. They allowed banks to own subsidiary companies involved in venture capital and mortgage lending. This was the first change that allowed the penetration of the banks into direct financing. It also removed the advantage mortgage companies had over banks in offering mortgage type loans. Unlike banks, mortgage and loan companies were not required to hold fractional reserves, as were banks at that time. The subsidiary companies that banks established were exempt from holding such reserves. Schedule II type chartered banks were introduced in 1980. This enabled foreign banks to set up subsidiary banks within Canada avoiding the “widely-held” requirements of the Schedule I banks. Additionally, Canadians could establish Schedule II type banks that were then given a grace period of ten years to meet the “widely-held” requirement.

The 1980 amendments were not only important because of the actual changes in restrictions but also because they began the series of changes that continued throughout the 1980s and 1990s. Although restricted to commercial activities within one of the financial pillars, there were examples of firms trying to indirectly participate in all types of activities. These examples, combined with advances in technology revealed that there would be pressure to head towards a more universal banking system. Prior revisions of the *Bank Act* introduced a sunset clause which required re-evaluation of regulations every ten years. The sunset clause reflected the fact that the government recognized that

banking was a dynamic industry and the government was committed to adapt accordingly.

The revisions of 1987 continued the movement towards increasing the banks' involvement in direct financing. They removed restrictions prohibiting banks from underwriting activities. The 1987 *Bank Act* revisions were combined with relaxation of provincial legislation that governed securities markets. Although there is a range of motivating factors for each of the *Bank Act* revisions, the 1987 revisions were based largely on changing market conditions described as follows:

Among the key factors motivating the changes in legislation were the increasing use of market borrowing by corporations at the expense of bank lending, the trend to globalization, and the concern that securities dealers would not be able to generate the larger amounts of capital that would be needed in the future. (Freedman, 1997, p. 10)

There was fear that the previously sheltered Canadian securities market would not be able to compete internationally. It was argued that the banks needed to diversify if they were going to compete globally with universal type banks of other countries. The case can also be made for the synergy effects of one financial firm being able to offer all the financing options a non-financial firm may need. Whatever rationale is considered, the effect was to help the banks avoid substantial loss of market share to securitization, as discussed below.

Next in the sequence were the revisions of 1992. Like the 1980 revisions, it has been argued that the 1992 revisions were the next most significant changes to the *Bank Act* in the last half-century (Freedman, 1997). In general, this set of amendments finished the deregulation started by the amendments of 1980 and 1987. The changes dealt with both ownership and financial powers while addressing the issues of self-dealing and

conflict of interest problems inherent in a universal banking system. After the changes of 1992 there were relatively few limitations on the financial powers of the banks compared to the period before 1980.

Ownership requirements were loosened to allow non-financial institutions to own and operate Schedule II banks without having to become “widely-held” after ten years. The benefit of removing restrictions on ownership and upstream linkages is the reduction in entry barriers, which encourages competitive behaviour. Daniel, Freedman and Goodlet (1992) suggest these linkages introduce a potential problem of self-dealing, but that this can be dealt with by better corporate governance. After the revisions of 1992, banks were no longer prevented from owning trust companies or life insurance companies as subsidiaries. Additionally, trust companies were allowed to hold insurance companies as subsidiaries and insurance companies were allowed to own trust companies as subsidiaries. Along with the increased span of activities permitted through subsidiaries, there were also changes that expanded the ability of financial institutions to directly participate in activities outside their traditional roles.

The reduction of barriers to foreign bank participation in Canada has been a gradual process. The provision for Schedule II banks in 1980 was a significant reduction in foreign bank restrictions. This allowed foreign banks to avoid the requirement to be “widely-held”. As Schedule II banks, foreign banks were, and still are, required to set up as a subsidiary of the parent. This required a head office within Canada and capitalization of \$10 million. Initially there were ceilings on total assets of foreign banks within Canada, but they were never binding and have been removed through NAFTA and WTO agreements. Currently there are not any additional restrictions on the activities of

Schedule II foreign banks other than those common to the Schedule I domestic banks. Initially there were limits on the number of branches Schedule II banks were allowed to operate. At the time of the big bank merger proposals in 1998 the entry conditions for foreign banks were less severe than in the recent past, but foreign banks were still unable to rely on their parent banks' capital base.

In 1999, after the merger proposals, there were further revisions of the *Bank Act* that allowed for Schedule III banks. Foreign banks operating under this designation can establish branches in Canada without having to set up a subsidiary. There are two types of Schedule III banks: "full-service" branches and "lending" branches. Both are limited in the commercial activities they can perform and are required to make a significant deposit with a Canadian financial institution¹. "Lending" branches are not allowed to accept deposits and "full-service" branches can only accept deposits greater than \$150,000. Overall, the Schedule III banks allow foreign banks greater ownership flexibility but restrict the commercial powers of foreign banks in Canada.

There were also some additional amendments made in 1997, but they were mostly cosmetic or concerned consumer privacy. The current Canadian regulatory environment can be described as a system with few restrictions on commercial activities and considerably less limitations on ownership. The changes promoted competition amongst existing banks and near banks and from potential entrants to the industry. At the time of the large merger proposals the extent of potential competition from foreign banks was limited compared to now. However, the deregulation gave Canada a set of regulations that should help to make the Canadian financial industry more contestable both when

¹ The requirement for "lending" branches is a \$100,000 deposit and a \$5,000,000 deposit for "full-service" branches.

compared to other countries and to the situation in Canada in years past. Freedman (1997) goes so far as to compare the system to that of the purely universal banks of Germany. The major remaining difference is the restriction in Canada on downstream linkages where financial firms own significant parts of non-financial firms.

2.3 Evolution of the Financial Sector

Along with the changes that resulted from deregulation it is useful to consider the market forces that helped to motivate the actions of financial firms and regulators. In addition to the effect of deregulation, general trends in the way businesses obtained external financing can also be partially attributed to changes in technology and preferences. For example, improvements in information technology and the introduction and expansion of the Internet increased the ability of financial institutions to offer more complex services. Preferences were affected by uncertainty about inflation during the 1970s that helped to increase the demand for shorter term borrowing and savings instruments. Some of the changes in industry structure and types of commercial activities can be characterised as coming from either the globalization or the securitization movements. To completely understand the impact of deregulation on competition, it is useful to outline these market trends that also influenced the financial sector.

Globalization refers to the process where savers and borrowers are able to go to world markets to find the services they demand. Factors leading to an increase in global financing include new technology and reductions in international trade barriers. For businesses looking to obtain direct external financing, world capital markets are attractive because they may provide cheaper financing. This has been the case for Canada in recent times. Calmes (2004) reports that during the 1960s, 1970s, and early 1980s the

proportion of Canadian businesses obtaining direct financing within Canada stayed relatively constant. Of all Canadian businesses obtaining external financing during that period, about 80 percent obtained it within Canada. This dropped to about 65 percent in the later 1980s and the 1990s. Outside of direct financing, the potential for borrowers and savers to obtain other services abroad was also on the rise. In discussing why Canada saw such extensive deregulation Daniel, Freedman and Goodlet (1992) suggest that a reciprocity type argument should be considered. Along with the globalization movement, Canada is likely to see barriers in other countries simultaneously fall. It should expect benefits to accrue to Canadians participating in foreign markets as well as foreigners participating in ours.

Securitization refers to the movement towards direct financing and away from indirect intermediation which most financial firms have traditionally been engaged in. Although this phenomenon was influenced by the fact that businesses no longer relied on domestic securities dealers, in light of globalization, part of the trend can be credited to the desire to move away from long term financial instruments. Calmes (2004) examines the trend by looking at the ratio of indirect to direct financing along with the rate of inflation. Starting in the late 1960s there was a 2:1 ratio of indirect to direct financing by Canadian businesses. This fell steadily until the early 1980s reaching below a 1:1 ratio. The 1970s were mired by inflation which removed confidence and created uncertainty in borrowers and savers about the future. This helped to push financing towards a more direct approach because it is less susceptible to inflation. The ratio then moved back above 1:1 by the late 1990s when high inflation was no longer a problem. The decrease in indirect financing was a result of loans losing ground to stocks, bonds, and money

market mutual fund hybrids. This put pressure on the banks to adapt if they wanted to continue to be as successful as they traditionally had in the financial sector.

The banks have always been involved in commercial lending to generate assets while accepting personal, business and government deposits as liabilities. They began to deal in personal loans and mortgages in the 1950s and further expanded into areas of the trust companies and securities dealers as deregulation unfolded. In aggregate, their share of loans to Canadian businesses outside of the financial sector rose from approximately 65 to 80 percent in the early 1980s. This was followed by a reduction until it reached about 65 percent again in 1992 before picking back up to above 70 percent at the end of the 1990s (Calmes, 2004). The banks managed to hold their position relative to other institutions, but they had lost, or feared losing some of their share of the market for financing.

The banks have managed to move into non-traditional areas by acquiring pre-existing brokerages, trust companies and life insurance firms; but they also have established their own in-house services to avoid serious loss of business to securitization and commercial activities outside of traditional banking. Freedman (1997) points out that the banks have increased their presence in the securities markets. An indication of this was the banks' increased participation in the market for government securities. For example, prior to 1987 the Schedule I banks won about 15 percent of treasury bill auctions and after 1987 the share rose to over 60 percent (Freedman, 1997). He notes that this does not present any antitrust issues because there is sufficient competition among the banks and remaining independent securities firms as well as entry by foreign firms.

Before the changes in regulation, the banks' loans were made up of few mortgage and consumer loans compared to the other institutions. A large part of the mortgages in Canada are now offered by the banks. The banks' share of mortgages grew from 10 percent in 1970 to 55 percent in 1996 (Freedman, 1997, p. 22). This is not surprising because national banks have an advantage over mortgage companies in the absence of restrictive regulations. The advantage comes from the banks' size and national coverage, making them less susceptible to regional risk. Consumer loans have also steadily moved towards banks. This is evident from the increased share the banks have of consumer loans, increasing from approximately a 50 percent in 1970 to approximately 70 percent by 1996.

By examining deregulation and market trends it is apparent that the structure of the financial sector is not straightforward. It is clear that banks have a significant part in all areas of financial services. This has been aided by the removal of restrictions on ownership and commercial activity of banks set out by the *Bank Act*. Although these restrictions were also designed to promote stability, revisions have provided an environment where financial firms are able to compete freely across the traditional boundaries. While some of the changes in market shares are undoubtedly a result of deregulation, it has also been market conditions that permitted and often motivated the changes.

2.4 Current Industry Structure

Despite deregulation in the financial sector, the identity of the major banks operating in Canada is the same as before 1967. The largest five banks are still the Royal Bank, the Toronto Dominion Bank, the Bank of Nova Scotia, the Canadian Imperial

Bank of Commerce and the Bank of Montreal. The Office of the Superintendent of Financial Institutions reports that at the end of September 2004, there were 68 banks under its supervision in Canada. This figure includes the Schedule I and II Canadian banks as well as foreign bank subsidiaries and foreign banks operating only as branches in Canada (OSFI, 2004). The break-down is contained in Table 2. These figures suggest that the number of financial institutions has increased substantially in recent years. This is somewhat misleading because a large part of the recent entrants are foreign bank branches whose operations are quite limited compared to the existing banks. There are also a large number of trust and loan companies, as well as the credit unions and caisses populaires.

Table 2: Number of Financial Institutions by Category, 2004

Banks	68
Domestic Banks	19
Foreign Banks	27
Foreign Bank Branches - Full Service	17
Foreign Bank Branches - Lending	5
Trust Companies	46
Loan Companies	23
Credit Unions and Caisses Populaires	1,236

Source: Office of the Superintendent of Financial Institutions (2004) and Credit Union Central Canada (2004)

Table 3 shows that there is an extensive bank branch network. At the end of 2003, the chartered banks had a total of 9,015 branches across the country, which yields a branch density of one branch per 3,517 persons (Bank of International Settlements, 2004). A large part of the network is comprised of branches owned by the 5 largest banks. Indeed, together they account for more than half of all branches. It is through this extensive branch network that the large banks operate on a national scale.

Table 3 also shows that the trust companies and credit unions and caisses populaires have also developed branch networks. The credit unions and caisses populaires have traditionally not engaged in branching, but they are beginning to do so through consolidation. This is evident in the fact that the number of institutions has fallen over the past 3 years while the number of branches has remained relatively constant. At the end of 2000 there were 1,825 credit unions and caisses populaires with a total of 3,645 branches (BIS, 2001). By the end of 2003 the number of credit unions and caisses populaires had fallen to 1,236 with a total of 3,567 branches (BIS, 2004).

Table 3: Bank, Trust, Credit Union and Caisses Populaire Branching, 2003

	Branches	Branch Density (persons per branch)
Chartered Banks	9,015	3,517
Royal Bank	1,300	
Bank of Montreal	1,142	
Canadian Imperial Bank of Commerce	1,106	
Toronto Dominion Bank	1,065	
Bank of Nova Scotia	960	
Other Banks	3,442	
Credit Unions and Caisses Populaires	3,567	8,890
Trust and Loans Companies	1,694	18,719

Source: Bank for International Settlements (2004) and 2003 annual reports of the 5 largest banks

While there are more banks operating in Canada than in the past, the banking industry and financial sector can both be characterised as being concentrated based on the share of total assets by institution type. These figures are listed in Table 4. Most of the assets of the banks, which collectively hold most of the financial industry assets, are held by the five largest banks. Table 4 shows the shares with and without life insurance companies included in the total. The common services offered by banks and life

insurance companies overlap to a lesser extent than do the services of the banks, trust companies, loan companies, credit unions and caisse populaires. It is therefore useful to examine the industry defined with and without life insurance companies. In the case where life insurance companies are excluded, the 5 largest banks hold 71.6 percent of total assets, which is a significant level of concentration. It is also important to note that the foreign banks have a small share of total assets even though there are a large number of them participating in Canada.

Table 4: Assets of Financial Institutions by Category, September 2004

	Percentage of Total (including Life Insurance Companies)	Percentage of Total (excluding Life Insurance Companies)
All Banks	72.7	82.6
Five Largest Banks	63.0	71.6
Life Insurance Companies	12.0	
Loan Companies	6.2	7.0
Credit Unions and Caisse Populaires	6.5	7.4
Foreign Bank Subsidiaries	3.8	4.4
Trust Companies	2.6	3.0
Foreign Bank Branches	1.4	1.5

Source: Office of the Superintendent of Financial Institutions (2004) and Credit Union Central of Canada (2004)

Intermediation is the process of taking deposits and granting loans. In order to characterise an institution as an intermediary, it should be the case that deposits and loans make up most of the liabilities and assets, respectively. Table 5 shows what percentages of each institutional group's assets are loans, and what percentage of liabilities are deposits. It appears that loan companies, as well as credit unions and caisse populaires, are specialized in intermediation relative to the other institutions. This is evident in the

fact that they have greater loan to asset ratios and greater deposit to liability ratios than the other institution types.

Table 5: Major Commercial Activity by Institution Type, September 2004

Million CDN \$	Total All Banks	Five Largest Banks	Foreign Bank Branches	Foreign Bank Subsidiaries	Total Trust Companies	Total Loan Companies	Credit Unions and Caisses Populaires
Assets	1,802.5	1,562.9	33.5	95.0	65.2	153.2	161.0
Loans	994.1	854.0	14.4	42.0	28.5	116.3	129.0
Ratio	0.55	0.55	0.43	0.44	0.44	0.76	0.80
Liabilities	1,802.5	1,562.9	33.5	95.0	65.2	153.2	161.0
Deposits	1,210.6	1,050.5	18.1	66.9	53.7	129.2	138.6
Ratio	0.67	0.67	0.54	0.70	0.82	0.84	0.86

Source: Office of the Superintendent of Financial Institutions (2004) and Credit Union Central of Canada (2004)

Disaggregating the loan and deposit categories helps to further describe the financial sector. Table 6 lists the value of loans and deposits broken down into subcategories by institutional type as well as each type's share of the group total. There exists a degree of specialization across the various institution types. The banks' loan portfolios are weighted away from mortgage loans compared to the other financial institutions. So although the banks have moved into mortgage loans over the last few decades, they do not dominate like they do in non-mortgage loans. The specialization is not as clear for deposits, but it appears that the near banks have a greater share of longer term deposits. Overall, the banks, and particularly the 5 largest banks, have a significant share of each type of deposit.

Table 6: Composition of Loans and Deposits by Categories, September 2004

Million CDN \$	Total All Banks	Five Largest Banks	Foreign Bank Branches	Total Foreign Bank Subsidiaries	Total Trust Companies	Total Loan Companies	Credit Unions and Caisses Populaires*
Loans							
Non-Mortgage Loans							
Value	596.8	507.3	14.1	33.5	6.5	4.1	59.2
% of total	89.5	76.1	2.1	5.0	1.0	0.6	8.9
Mortgage Loans							
Value	397.3	346.7	0.3	8.4	22.0	112.2	69.8
% of total	66.1	57.7	0.1	1.4	3.7	18.7	11.6
Deposits							
Demand							
Value	196.4	164.1	2.5	16.5	8.0	11.8	
% of total	82.3	68.8	1.1	6.9	3.4	4.9	
Notice							
Value	259.8	164.1	0.2	9.9	5.6	28.1	
% of total	80.4	50.8	0.1	3.1	1.7	8.7	
Fixed-term							
Value	754.4	651.8	15.4	40.6	40.1	89.3	
% of total	77.8	67.2	1.6	4.2	4.1	9.2	

Source: Office of the Superintendent of Financial Institutions (2004)

* Data unavailable for Credit Unions and Caisses Populaires at this level of aggregation for 2004. Mortgage and non-mortgage values for 2004 are estimated under the assumption that the mortgage loans / total loans ratio is 0.54, which is the value from 2001. The 2004 estimated value of mortgage loans is therefore 129.0 * 0.541.

* Source: Credit Union Central of Canada (2004) and Department of Finance (2003)

From the various shares of assets and activities it is apparent that there is a large degree of concentration in the banking industry and financial sector. The number of branches, and branch density, is greatest for the banks. In general, domestic banks are the dominant institution type. This group is made up almost entirely by the five largest banks. However, there are more banks for the five largest to compete with than before, mostly due to foreign banks. The emergence of the foreign subsidiary banks and, more recently, the foreign bank branches have removed only a small proportion of asset share from the five largest banks. Given the short period of existence of foreign banks in Canada, there is potential for concentration in the financial sector to fall. The role of the

near banks is small compared to the banks but not insignificant. They represent considerable proportion of the major commercial activities that banks engage in.

In discussing the evolution of the financial sector this section has outlined the general response of financial firms to the deregulation and the effects of this response on industry structure. The banks have begun to participate in areas of finance they were previously restricted from. The near banks have also broadened their scope of commercial activities, but still remain specialized when compared to the banks. Despite fewer restrictions regarding foreign and domestic ownership, the deregulation had little impact on the concentration of assets in the financial sector.

3 COMPETITION IN BANKING

3.1 Competition and Welfare

Having described the structure of the banking sector the next task is to analyse competition in banking. Since the *Competition Act* and the *Merger Enforcement Guidelines as Applied to Banks* are designed to ensure a competitive economy, this section will discuss the issues relevant to competition in banking. To completely understand the appropriateness of the *Merger Enforcement Guidelines as Applied to Banks*, it is useful to review the theory pertaining to competition in banking in Canada. The first step will be to establish how competition in general, and in particular competition in banking, has traditionally been believed to impact economic welfare. This is followed by a discussion of the trade-off between competition and stability, with particular attention to the protective regulation Canada had and is moving away from. The theoretical discussion leads into a discussion of the economics implied by the *Competition Act* and the MEGB. Section 3 finishes with a discussion of contestability that will help establish an appropriate level of competition and motivate estimation procedures performed in Section 4. The analysis of this section draws from Northcott's (2004) survey of the literature on competition in banking.

Normative policy analysis should have some type of goal or objective. To define what ought to be, economists can turn to efficiency for their answer. The goal can therefore be a policy decision that helps to achieve the most efficient outcome. For example, the protection afforded the banks and near banks by regulation in the past was

designed to make the economy more efficient by avoiding asymmetric information and externality market failures. If efficiency is maximized then the combined welfare of those involved, banks and those that use banks, is also maximized. Protective regulation like that in Canadian banking also has the potential to create inefficiency. Sheltering a market from competition can have adverse effects on the allocative, productive and dynamic efficiency that free markets are generally assumed to achieve. The rate at which innovation or technological progress occurs describes dynamic efficiency. Although there is a literature on the relationship between competition and dynamic efficiency, the bank competition literature has not developed a consensus on the relationship, which will also be the case in this paper. Efficiency in allocation and production are the common issues of debate in merger analysis.

One of the classical economic assumptions required for markets to allocate resources efficiently is that there are many independent producers in the market. This ensures that firms do not have the ability to influence equilibrium prices through changing their output decision. In the case where firms' decisions affect equilibrium prices, they are said to have market power. The basic argument for merger policy is that consolidation has the potential to enhance market power. Market power increases either unilaterally, where the merged firm controls a significant part of the market, or through interdependence, where all the producers are better able to coordinate output to influence prices as a result of the merger. It is argued that this standard industrial organization analysis is relevant for banking. The idea is that if banks have market power they are able to sustain higher loan rates, lower deposit rates or a combination of both. Whatever

the case, the quantity of credit decreases and the interest rate margin increases with market power.

Northcott (2004) discusses the economic modeling in the literature with respect to the relationship between market structure and the performance dimension of efficiency in allocation. In modeling a market where banks differentiate themselves spatially, Besanko and Thakor (1992) find that interest rate margins fall as the number of banks increases. Using a general equilibrium approach capital accumulation models predict that competition has positive effects on the quantity of credit extended by the system. For example, Guzman (2000) compares a monopoly banking system to a perfectly competitive one and finds that the perfectly competitive system accumulates capital faster. Northcott (2004) reports on other work as well. The results vary depending on the model, but in general if banks are competitive price-takers then efficiency in allocation is achieved.

Productive efficiency refers to whether the firm is achieving lowest per unit resource costs. This in turn depends on whether the firm has achieved efficient scale and whether it has avoided X-inefficiency. In the absence of scale economies, firms in a perfectly competitive market maximize efficiency in production because they are forced to produce at the minimum efficient scale. If economies of scale are significant relative to industry demand, then perfectly competitive firms do not achieve productive efficiency because they are too small and cannot realize the cost reductions from expanding. The efficiency defence in merger policy is based upon productive efficiency. That is, potentially anti-competitive mergers that would result in allocative inefficiency may be allowed if they are necessary for the merging firms to achieve optimal scale.

Accompanying the theory on the relationship between competition and efficiency is a large empirical literature on the relationship. Northcott (2004) reports that the earliest work found positive relationships between profits and various proxies for market power. She notes that this analysis is flawed because it fails to separate the efficiency loss caused by reduced competition from the gains in productive efficiency caused by increased bank size. Some of the more recent work has attempted to build on this by focusing on efficiency in allocation. To do this it relates competition to interest rates and interest rate margins. The results tend to show no relationship between concentration and interest rates after controlling for other factors like barriers to entry. The empirical work on productive efficiency does not add much to the theoretical debate. Studies focused on productive efficiencies and scale economies provide two common themes. There is empirical evidence that scale economies exist and that their level depends on various factors.

3.2 Competition and Stability

Having discussed competition and how it affects efficiency, this section will focus on the other half of the traditional competition-stability trade-off. The trade-off comes from the idea that decreasing competition helps to stabilize the banking system which suffers from asymmetric information problems that create instability and pecuniary externalities that exacerbate the problem. In describing the attitudes towards competition in banking, Poadoa-Schioppa writes:

according to many people, the instability that, at least at the level of the individual firm, is inevitably brought about by a competitive system is really not congenial to banking. (Poadoa-Schioppa, 2001, p. 13)

Poadoa-Schioppa goes on to describe the story of how this previously predominant view has lost ground since the 1970s around the globe, among both policy makers and academics. Though the trade-off has generally been thought to exist between competition and stability, one of the reasons there has been a change in views is that the trade-off is not considered to be as strong anymore. This is made evident by the fact that there are theories which predict that competition is beneficial for stability and others that suggest the opposite.

One of the arguments in favour of the idea that a lack of competition improves stability comes from the charter value theory literature. Given one of the reasons the banking industry is inherently unstable is from information asymmetries that cause banks to take on more risk than is optimal, mechanisms that promote less risky decisions should therefore improve stability. Charter value theory supports a positive relationship between market power and a reduction in risk levels that banks choose. Charter value is derived from future profits and thus measures the benefit to avoiding bankruptcy. The higher the charter value, the more attractive prudent investment decisions become, reducing the asymmetric information effect. Northcott (2004) summarizes the work of various authors on the topic, reporting that the general result, whatever modeling specification is used, is that competition reduces charter value. In an environment where competition is low, and will continue to be so, charter values are high and asymmetric information induced risk is mitigated.

In addition to information problems between banks and their depositors is a similar problem between banks and their borrowers. Borrowers have better information about themselves and the risk inherent in their projects than the lenders do. Banks can

use relationship lending and screening to reduce the problem. The usefulness of each can be shown to depend on the level of competition.

Relationship lending is the process where banks develop relationships with individual firms or a specific industry. Petersen and Rajan (1995) find that when there is less threat of borrowers switching, banks are more willing to extend loans to younger and riskier firms. This reduces the moral hazard and adverse selection problems that result from charging higher interest rates. If competition is intense, banks are less willing to engage in relationship lending because they are less likely to share in the success of a young business which occurs in the future.

Where full information between borrowers and lenders is not available, banks can also use screening to reduce the market failure. Cetorelli and Peretto (2000) use a capital accumulation model to show that the incentive to screen decreases as the number of banks increases. This result comes from the fact that there is a free-rider problem because banks can observe the results of others' screening. Shaffer (1998) describes the situation where free-riding is not a problem because banks are not able to observe screening results of other banks. This analysis finds that the lower quality borrowers are more likely to receive a loan as the number of banks increases. Whether concentration encourages screening is therefore not clear.

Part of the pecuniary externality that banks impose on the economy by failing comes from contagion. If a bank fails or becomes illiquid, the problem can spread to the rest of the system through direct and indirect linkages. Northcott (2004) suggests that the literature has not developed the theory linking competition to contagion, but that industry structure is believed to impact contagion. Systems with larger banks absorb credit or

liquidity shocks better. Systems with stronger links between banks spread the shocks more evenly among the system and reduce the risk of failure by an individual or group of banks. Whether the factors that influence contagion are affected by competition is not clear, but more concentrated systems are less likely to suffer from contagion.

The trade-off between competition and stability may not be as simple as previously thought. Policy makers may not have to give up one in order to achieve the other. Overall, it is evident that they are related and should be considered together. So when examining the effect of bank mergers on competition, stability cannot be ignored.

3.3 Large Bank Mergers

In general, mergers have the potential to affect economic welfare by increasing market power firms may have, helping firms realize scale economies, or both. Mergers decrease the number of firms participating in the market and create a firm larger than either of the merging parties. With fewer firms and thus higher concentration, it may be possible for firms to collectively increase price above cost. Also, if the merged firm is sufficiently large it may be able to unilaterally increase price above cost without fear of losing its share of the market. The change in firm size may also affect production costs. By integrating the production of two firms, scale economies might be gained or lost. This depends on the size of the merging firms relative to minimum efficient scale and whether the merger creates X-inefficiency. For any potential merger, a policy maker must at least consider these potential effects. In Canada, anti-trust law has attempted to incorporate these ideas into the legislation.

The proposed mergers in 1998 caused a great deal of tension in public policy debate for various reasons. Much of this was a result of the scale of impact the large

mergers would have on the entire country. The most important issue was whether the large banks should be allowed to merge. Additionally, there was uncertainty about how the existing legislation would treat the mergers.

As is the case for any industry, bank mergers fall under the jurisdiction of the *Competition Act*, which states:

Where, on application by the Commissioner, the Tribunal finds that a merger or proposed merger prevents or lessens, or is likely to prevent or lessen, competition substantially the Tribunal may make an order directed against any party to the proposed merger. (*Competition Act*, R.S.C. 1985, c. 34, s. 92.1)

To help determine what constitutes a lessening of competition Section 93 lists various factors that are to be considered. The list includes considerations about remaining competition, both foreign and domestic, in addition to the possible effects of the merger on entry barriers. The list is not intended to be exhaustive as it calls for consideration of any other factor deemed relevant, but not listed. The *Act* also sets out two exceptions to Section 92 that are relevant for bank mergers. The efficiency defence, available for any type of merger, allows a merger to proceed even if it reduces competition so long as it creates sufficient offsetting efficiency gains. Section 94 sets out an exception that is unique to banking. It states that any order made under the *Competition Act* regarding bank mergers may be overturned by the Minister of Finance as set out by the *Bank Act*.

Despite the extensive coverage bank mergers receive in Canadian legislation, there was still uncertainty about how the law would judge large mergers such like those proposed in 1998. A lot of this was a result of the difficulties in applying the traditional anti-trust approach. To conduct an anti-trust merger analysis, product and geographic markets need to be defined. The banks engage in a large range of services across the country making anti-trust markets difficult and cumbersome to define. In addition, there

are difficulties in measuring or describing prices for the services banks offer as they tend to be bundled or paid for in an untraditional manner. For example, a bank may offer transaction services to its customers for the ability to loan the customers' account balance. The Competition Bureau responded to the difficulties in applying the traditional anti-trust approach by creating the *Merger Enforcement Guidelines as Applied to Banks* (MEGB) in 1998 during the wave of proposals.

The guidelines for banks are quite similar to the *Merger Enforcement Guidelines* in that they both are designed to clarify the merger review process. They both set out how markets will be defined and how concentration ratios will be calculated. For banks, if the merged firm accounts for less than 35 percent of the market then the merger will not be challenged based on unilateral effects. When the post-merger 4 firm market share is less than 65 percent and the merged firm has a market share less than 10 percent the merger will not be challenged based on interdependence concerns. Any markets that fail these initial screens will be examined using the factors set out in Section 93 of the *Competition Act*.

Whether the MEGB are adequate depends on how closely the banking industry is described by the structure-conduct-performance paradigm (SCP). Based on industrial organization, this theory relates industry structure to performance through conduct and behaviour. In its simplest form the SCP theory predicts that as structure becomes more monopolistic, for example, highly concentrated, then conduct is less competitive. As conduct becomes less competitive, performance falls. The linkage was initially believed to flow from structure through conduct to performance but it has been recognized that the relationship can much more complex. This is evident in the legislation as the guidelines

note that decisions will not be based solely on concentration. The process set out by the guidelines uses the simple SCP predictions only in applying the concentration screens prior to analysis. Merger reviews then turn to analysis of factors other than concentration. One of those other factors is barriers to entry. The contestability literature emphasizes the relationship between barriers to entry and competition, and suggests that the condition of entry should be the focus of competition policy in banking.

3.4 Contestability

The theory of contestability can be considered an extension of the theory of SCP. Like SCP theory, contestability theory suggests that conduct in an industry is determined by industry structure. However, contestability theory makes no predictions based on the number of firms in the industry or their relative size. Instead it predicts efficiency can occur without satisfying all the assumptions of the theoretical perfectly competitive market. All that is required for optimal performance is low entry and exit barriers. From the theory of contestability the following policy implication can be drawn:

Thus traditional *per se* indicators of market performance such as concentration, price discrimination, conglomerate mergers, or vertical and horizontal integration do *not automatically* call for government intervention in contestable markets. (Baumol, Panzar and Willing, 1982, p. 465)

Baumol et al. also suggest that when markets are not contestable it is possible that policy makers need to intervene. Before doing so, identification of factors that influence contestability is required as well the estimation of the degree of contestability.

Before constructing an estimate of competition, it is useful to discuss the factors that influence contestability. Given that barriers to entry and exit determine contestability, the relevant characteristics are those that affect the condition of entry. Just

like in industries outside of banking, economies of scale present a natural barrier for banks as well. As discussed above, the exact size of scale economies is uncertain, but the consensus is that they do exist. Also, as banking technology continues to improve the size of any scale barriers may change. Absent any other entry barriers, it would not be surprising to find high or low levels of contestability given the ambiguity regarding scale economies. Finally, banking does exhibit non-traditional barriers to entry as a result of asymmetric information and branching. As will be discussed, the magnitude of these barriers depend in part upon technology.

While the impact of competition on asymmetric information problems was discussed above, the impact of asymmetric information on competition, and also contestability, is important as well. Asymmetric information can create a barrier to entry through relationship lending. As mentioned above, asymmetric information between banks and borrowers can be alleviated through the use of relationship lending. Unfortunately, relationship lending is based on businesses receiving services from a single bank, so the greater the asymmetric information problem is, the less likely banks will behave competitively. If a borrower cannot easily demonstrate its worthiness then there is a benefit to staying with its current bank, which implies a cost to switching banks. This gives incumbent banks an advantage, thus creating the barrier to entry. Dell'Ariscia (2000) presents a model designed to analyse market conduct and structure in the presence of asymmetric information. The model demonstrates that when information about a borrower is proprietary then the bank and borrower benefit from staying together. These findings confirm the idea that a barrier is created by relationship lending.

Improvements in information processing have reduced the asymmetric information barrier. For example, the use of credit scoring techniques and credit bureaus helps lenders determine the quality of a borrower therefore reducing information asymmetry. Furthermore, as the opportunities and portfolios of borrowers become less opaque, there is less benefit from relationship lending. This reduces the advantage incumbent banks might have through the established relationships with the borrowers they already serve.

Another potential barrier to entry in banking comes from branching. An extensive branch network can be considered a type of product differentiation. Customers value the convenience a national network provides and believe there is additional safety due to the size of the network. A potential entrant must either incur the sunk costs of establishing a similar network or reduce prices in order to compete with incumbents. This suggests that branching makes banking less contestable.

However, branching potentially increases contestability through the reduction of other barriers. Allen and Gale (2000) present a model that compares competition under unitary and branch banking systems. They find that competition may be greater in the branch system. The result comes from a “lock-in” effect created by asymmetric information about borrowers. The model predicts that banks in a unitary system will exploit the “lock-in” effect more because they only face competition from banks in close proximity. However, this analysis fails to recognize that branching may increase the incentive to exploit the asymmetric information “lock-in” effect because customers wish to avoid switching costs when they enter new product or geographic markets.

It has long been recognized that regulation can create substantial barriers to entry. As discussed above, some of the tight regulations in banking were designed specifically to shelter the industry from competition. These regulations can be of any type, so long as they impose sunk costs on entrants. In the presence of tight regulation the industry becomes less contestable because the discipline on incumbents from potential entrance that would normally exist is reduced or removed by regulatory hurdles.

Canada had significant regulatory barriers in banking over the last couple of decades, but they have been removed to a large extent. Restrictions on commercial activity and ownership restrictions present in the 1960s and 1970s have been reduced through revisions made to the *Bank Act*. Foreign ownership restrictions have progressed through three stages, each reducing barriers to entry. Initially, foreigners faced severe entry hurdles due to foreign ownership restriction and the widely-held ownership restriction. The entry conditions fell when foreign banks were allowed to operate in Canada through subsidiaries. This trend was continued as foreign banks were later allowed to open branches in Canada without a parent subsidiary. Based on foreign bank restrictions alone, it is likely that contestability increased over the last four decades. The industry is also likely to be more contestable as a result of fewer restrictions on commercial activities. Canada has a greater number of financial institutions that are able to participate in all types of financial activities than in the past. In general, although regulation accounted for a large barrier to entry in the past, its present severity is low.

This section has shown that in order to characterise any banking industry as competitive or not, there are a large number of factors to consider. The same is true of merger reviews, like those in 1998. Whether the proposed mergers would have been

harmful to the economy depends in part on the level of competition in the banking industry at the time. The Canadian industry has characteristics that lend support to both a competitive, and a non-competitive conclusion. Additionally, the trade-off between competition and stability is not clear. This paper will move on to estimate the level of competition to help answer these questions.

4 ESTIMATION AND RESULTS

4.1 Purpose of Estimation

For analysing the extent to which policy makers should be concerned about bank mergers in Canada, it will be useful to examine how a measure of competition has changed over the past four decades as the industry has evolved. The competition and contestability literatures suggest that the level of competition in an industry can vary according to the various factors discussed above. Additionally, Northcott (2004) points out that the level of competition tends to vary over time and across countries. This paper will therefore estimate the level of competition for the Canadian banking industry from 1965 to 2001. The literature has also argued that if an industry is contestable, then competitive behaviour can occur regardless of other structural characteristics. Some have argued that the deregulation left the Canadian banking industry more contestable than in the past, and that large mergers would therefore not be harmful. The estimation results of this paper will test whether that argument can be made.

In previous work the factors which influence contestability and competitive behaviour have been identified as regulation, foreign firm presence and characteristics unique to banking, such as branching (Claessens & Levean 2003). These factors present natural structural breaks to check for changes in the measure of competition due to the start of the deregulation in the early 1980s, as well as improvements in information technology and the emergence of foreign banks in the early 1990s. Ideally the empirical task should be to construct a measure of competition in each year since it would be useful

to examine a timeline of competition. However, the nature of the data available and empirical analysis here only allows for a single measure over a period of time, instead of year by year. Using dummy variables, structural breaks can be introduced into the sample so that estimates can be constructed for sub periods.

4.2 Estimating Competition

The empirical work employs two structural methods for estimating the extent of competitive behaviour. The method derived in Bresnahan (1982) and Lau (1982), henceforth the BL approach, will be used in this paper and is discussed below. The other method derived in Panzar and Rosse (1987), henceforth the PR approach, will not be used in this paper. However, a discussion of this approach is included so that a more complete picture about contestability in banking can be presented. Both approaches yield a test statistic with a value in the interval $[0, 1]$, where the end points on the interval represent the extreme cases while values between 0 and 1 represent imperfect competition. Within this region, firms have some market power, but less than a monopolist or perfectly colluding oligopoly. When referring to these statistics this paper will use the terms perfect competition, imperfect competition and pure monopoly. Although these terms generally refer to industry structure, here they are used solely to describe the degree of competitive behaviour.

The PR approach uses firm level data to measure the responsiveness of revenues to changes in input prices. If firms are behaving competitively then changes in input prices have the same effect on marginal revenue as they do on marginal cost. If firms have market power, then increases in input prices cause revenue to increase by an amount less than the change in costs. Using this idea, the joint elasticity of revenue with respect

to all input prices, called an H-statistic, gives a measure of competition. An H-statistic of 1 represents perfect competition, 0 represents pure monopoly and values between 1 and 0 represent imperfect competition.

Northcott (2004) reports the results for studies estimating competition in Canada and other countries and suggests that imperfect competition is the prevailing level of competition most of the time. Claessens and Levean (2003) is the most recent and comprehensive work making use of the PR approach. Their intent was to determine what factors affect competition in banking and they estimated the degree of competition for 50 countries, including Canada, for the period 1994 to 2001. The first step was to estimate H-statistics for each country, in each year. As was the case for most countries in the sample, Canada had an H-statistic that was statistically different from 1 and 0; implying that neither perfect competition nor pure monopoly was the prevailing behaviour. The next step was to estimate the effect of various factors believed to influence contestability on the H-statistics. They found that competition was greater when foreign banks were present, there were fewer entry restrictions, and there were fewer restrictions on commercial activity restrictions. They also present evidence contrary to the traditional prediction that concentration has a negative impact on competition. They present mixed results on this relationship that depend on the estimation specification. In some cases they report that competition increases as concentration increases, after accounting for other significant factors.

There are two studies that investigated the effect of deregulation on competition in Canadian banking. Nathan and Neave (1989) employed a PR approach using Canadian data for the years 1982 to 1984. They were concerned with determining

whether the *Bank Act* revision of 1980 had an impact on competition by looking at the time period immediately following implementation of the changes. They report H-statistics that reject a pure monopoly hypothesis in all three years and perfect competition in 1983 and 1984. These results suggest that competition fell in the three years after the 1980 *Bank Act* revisions because the industry may have been characterised as perfectly competitive in 1982 only. Shaffer (1993) also examines the effect of the 1980 revisions but used a BL approach instead. Using a structural dummy variable, estimates of the level of competition before and after 1980 were obtained. For both periods the level of competition is not significantly different from perfect competition. The post revision estimate is statistically smaller than the pre-revision estimate, but not different in economic terms since the hypothesis of perfectly competitive behaviour cannot be rejected in either case.

4.3 Econometric Procedure

The estimation procedure in this paper uses the BL approach to estimate the level of competition in Canadian banking from 1965 to 2001. The procedure is identical to the one used by Shaffer (1993) except that the time period is longer and two structural breaks are included. The essence of the BL approach is to capture the extent to which banks price above marginal cost. Under the assumption that firms are profit maximizing they set price so that marginal cost is equal to perceived marginal revenue. If the industry is perfectly competitive then perceived marginal revenue is equilibrium price and if the industry is monopolistic then the perceived marginal revenue is industry marginal revenue. Competition is therefore estimated by measuring the deviation of price from marginal cost.

The procedure is formally derived by starting from the industry marginal revenue function.

$$MR = P + h(Q, X, \alpha) \quad (1)$$

Where P is industry price, h is the semi-elasticity of demand, Q is the aggregate output of the industry, X is a vector of exogenous variables relevant to demand and α is a vector of demand parameters. The perceived marginal revenue, no matter what level of competition exists, is as follows:

$$PMR = P + \lambda h(Q, X, \alpha) \quad (2)$$

The value of λ is determined by competition. Setting perceived marginal revenue equal to marginal cost and rearranging to solve for price yields equation 3.

$$P = -\lambda h(\bullet) + MC \quad (3)$$

The parameter λ can be estimated and measures the level of competition. In the case of perfect competition λ is 0, and if the industry is monopolistic λ takes the value 1. Values between 0 and 1 represent imperfect competition and measure the deviation of aggregate output from perfectly competitive levels. (Shaffer, 1993, pp. 51-2)

Estimation of equation 3 requires specification of demand and supply equations, and from these the semi-elasticity and marginal cost are derived. As in Shaffer (1993) the demand is specified as

$$Q = a_0 + a_1P + a_2Y + a_3Z + a_4PY + a_5PZ + a_6YZ + e \quad (4)$$

Q is the value of assets as is common in intermediation models. Here P, the price of banking output, is the interest rate earned on assets and is equal to interest income divided by total assets. National income is represented by Y, and Z is the price of a

substitute for banking services, defined as the interest rate on a 3-month treasury bill.

The definition of the demand variables as such is supported by the literature on intermediation modeling. The inclusion of the multiplicative terms is necessary because of the system identification problem discussed by Bresnahan (1982). From the demand equation the semi-elasticity is found by taking the partial derivative of Q from equation 4 with respect to P.

Various studies on intermediation make use of the following trans-log cost function.

$$\ln C = \beta_0 + \beta_1 \ln Q + \beta_2 (\ln Q)^2 + \beta_3 \ln W_1 + \beta_4 \ln W_2 + \beta_5 (\ln W_1)^2 / 2 + \beta_6 (\ln W_2)^2 / 2 + \beta_7 \ln W_1 \ln W_2 + \beta_8 \ln Q \ln W_1 + \beta_9 \ln Q \ln W_2 \quad (5)$$

This functional form is commonly assumed in estimation using a BL approach (Shaffer, 1993, p. 52). Its popularity comes from its generality, and in addition, it conveniently yields the following marginal cost function.

$$MC = (C/Q)(b_1 + b_2 \ln Q + b_3 \ln W_1 + b_4 \ln W_2) \quad (6)$$

C is total costs and W_1 and W_2 are the prices of the two inputs: labour and deposits. The price of labour is defined as total personnel expenses divided by the number of employees while the price of deposits is equal to interest expenses divided by total deposits.

The supply relation is derived by combining equation 6 and the partial derivative of Q with respect to P from equation 4, and is specified as follows:

$$P = -\lambda_1 Q / (\partial Q / \partial P) + -\lambda_2 DQ / (\partial Q / \partial P) + (C/Q)(b_1 + b_2 \ln Q + b_3 \ln W_1 + b_4 \ln W_2) + e \quad (7)$$

where $\partial Q / \partial P = a_1 + a_4 Y + a_5 Z$

Where $D = (D_1, D_2)$ is a dummy variable used to examine whether there are differences in the estimate of λ across various time periods within the sample. D_1 is 1 for the years 1981 to 1989 and 0 otherwise. D_2 is 1 for the years 1990 to 2001 and 0 otherwise. These structural break dummy variables allow for different estimates of λ in each of the three periods: λ_1 for 1965 to 1980, λ_2 for 1981-1989, and λ_3 for 1990 to 2001. The use of 1981 as a structural break is motivated by previous work, such as Shaffer (1993) which found that the 1981 structural break was statistically significant. Also, Nathan and Neave (1989) found evidence of a change in competition shortly after the 1980 revision. Finally, the 1987 and 1992 revisions of the *Bank Act* motivate the 1990 structural break. The robustness of 1981 and 1990 as breaks was tested for and the results are discussed below. In both cases, varying the year of the boundaries does not change these results appreciably.

As mentioned above, the data set from Shaffer (1993) will be extended to the year 2001. The industry is defined as commercial banks, which includes all Schedule 1 and 2 banks' operations in Canada. The non-interest rate variables are all in logarithmic form and have been corrected for inflation. The Appendix provides a table describing the data sources.

4.4 Expectations From Previous Studies

Since intermediation is a normal good, the coefficient on price of bank assets should be negative and the coefficient on national income and the government bill rate should be positive. The structural model specifies that λ should be contained in the interval $[0, 1]$ and whether it is expected to be closer to 0 or 1 depends on the market characteristics. Previous work provides a set of expectations about the results regarding

the estimate of competition. Shaffer (1993) had estimates for λ before and after 1980 that were not statistically different from 0 using a couple of model specifications; implying perfect competition. This is similar to the results of Nathan and Neave (1989) who reported a mix of perfect competition and imperfect competition. Where these previous works differ is on the effect of the 1980 revision of the *Bank Act*. Shaffer (1993) reports that λ falls after the revisions indicating that competition increased while Nathan and Neave (1989) had estimates of less competition in the later years of the sample. This does not imply that either estimation is incorrect since the time periods are of different length. It does suggest that there may be support for either competition increasing or decreasing after the *Bank Act* revisions.

Aside from previous empirical work, there are various factors of contestability described above that can be used to form hypotheses prior to estimation. Although the objective of Claessens and Laeven (2003) was quite different, their work helps with the expectations about the results here. They found strong evidence that less regulatory restrictions regarding commercial activity and the presence of foreign banks both improve competition. Given that the revisions have moved Canada towards an environment with fewer restrictions and that foreign bank presence has increased over the period, the test statistic λ should fall in the later part of the sample. The expectation would therefore be that $\lambda_1 > \lambda_2 > \lambda_3$. Claessens and Laevens (2003) also attempted to establish a relationship between competition and concentration. Their weak results combined with a rather stable Canadian banking concentration provide no further influence for expectations about competitive behaviour.

4.5 Results

The system was estimated using full information maximum likelihood. This method maximizes the joint likelihood of the residuals from both equations simultaneously, where it is assumed that the residuals are from a joint normal distribution.² The estimation results of the system, including the demand function (equation 4) and the supply relation (equation 7), are presented in Table 7. The system was estimated both with and without the structural breaks. This provides a benchmark for comparing the model with the structural breaks. The linear coefficients for the demand equation (a_1 , a_2 , and a_4) in both estimations appear to be well behaved as they each have the correct sign and most are statistically significant. Although there are no a priori expectations about the signs of the non-linear terms, their statistical significance is important as required for the identification problem mentioned above. This appears to be satisfied since all except a_6 are statistically non-zero in both models.

None of the coefficients from the supply relation equation are significant at a 10% level in the model without structural breaks. A Wald test of the null hypothesis that $b_1 = b_2 = b_3 = b_4 = 0$ yields a test statistic of 143.26. Given the test statistic is assumed to come from a chi-squared distribution with 3 degrees of freedom, the null hypothesis is rejected, indicating the variables are at least jointly significant. Table 8 shows the pairwise correlation of the variables from the supply relation equation. Based on the observation of a strong correlation between output and wages; the joint significance of

² To test this assumption a Jarque-Bera (JB) statistic was constructed for the residuals from each equations. The JB statistic is a function of the skewness and kurtosis of a sample. Under a null hypothesis of univariate normality, the test statistic has a Chi-squared distribution with 2 degrees of freedom. With a 5% confidence level this yields a critical value of 5.99. The test statistic for the residuals of the demand equation is 2.039 and for the supply relation function is 45.921, suggesting that the normality hypothesis be rejected for the supply relation function, but not the demand equation.

the four coefficients; and the individual insignificance of each coefficient there may be a multi-collinearity problem. This problem is not as severe in the model with structural breaks as b_1 and b_3 are significantly different from zero.

Table 7: Competition Estimates for Canadian Banking, 1965 - 2001

Coefficient	Expected Sign	Without Structural Break			With Structural Break		
		Estimate	Standard Error	P-value	Estimate	Standard Error	P-value
Demand							
a_0		-5295.80	2163.16	0.02	-5289.47	2487.96	0.04
a_1	negative	-29020.5	6086.5	0.00	-28986.0	2660.7	0.00
a_2	positive	2.61946	0.31105	0.00	2.71217	0.30869	0.00
a_3		5665.87	1381.46	0.00	5637.35	1697.13	0.00
a_4	positive	19.1573	376.174	0.96	25.0096	529.394	0.96
a_5		-5.72872	2.52114	0.03	-9.02719	4.51755	0.05
a_6		-0.08898	0.05228	0.09	-0.06894	0.07443	0.36
R squared		0.979586			0.978014		
Supply Relation							
b_1		8.64924	8.72243	0.33	-7.20588	3.36075	0.04
b_2		-0.20033	0.47267	0.67	0.27317	0.18703	0.15
b_3		0.84067	0.61536	0.18	-0.72181	0.21622	0.00
b_4		-0.27326	0.27748	0.33	-0.09945	0.15651	0.53
λ_1		0.00392	0.01967	0.84	-0.01808	0.02938	0.54
λ_2					0.02711	0.04377	0.54
λ_3					0.39547	0.18161	0.03
R-Squared		0.411649			0.934391		

P-value calculated using t-statistic

Table 8: Correlation Matrix, Regressors for Supply Relation

	Quantity	Wages	Price of Deposits
Quantity (Q)	1.00		
Wages (W_1)	0.88	1.00	
Price of Deposits (W_2)	0.50	0.14	1.00

The competition measure for the model without structural breaks is 0.00392. With a standard error of 0.01967 it is not statistically different from 0. The result that λ is close to 0 is not surprising given the results from the slightly shorter period of analysis of Shaffer (1993). From this it can be expected that the estimation with structural breaks is likely to have at least some periods with estimates near the perfect competition result.

The estimation of the model using structural breaks suggests that competition fell in the most recent period. The estimates of λ_1 and λ_2 , -0.01808 and 0.02711 respectively, are small and not significantly different from zero. This indicates that the perfect competition hypothesis cannot be rejected. The negative value for λ_1 is not a concern as Shaffer (1993) has shown that it is possible to have such values, which are consistent with perfectly competitive behaviour. The estimate for λ_3 is 0.39547 with standard error 0.18161, which is statistically greater than 0. Therefore, the hypothesis of perfect competition is rejected at a 5% confidence level. The banking industry can therefore be described as perfectly competitive until the early 1990's when it became imperfectly competitive.

Although the perfect competition hypothesis is rejected in the last period, the severity in reduced competition is not extreme. By construction, the parameter λ measures the percentage deviation from the perfectly competitive outcome. In this case the industry is only exercising 39% of the market power it could if it were a pure monopoly. Additionally, the null hypothesis of monopoly for the last period is rejected at a 1% level. From this it can be argued that it is the precision of the estimate that yields the imperfect competition result and not an extreme exercise of market power.

4.6 Robustness of Results

The appropriateness of using 1981 and 1990 as the first years in the second two periods was checked by varying the length of these periods. Some results regarding the competition measures under various structural breaks are displayed in Table 9. It shows that there are some minor differences in the estimates of the λ_i when the structural breaks are changed. However the statistical and economic significance of the results do not change. In all cases, λ_1 and λ_2 are very close to zero while λ_3 is statistically different from 0 at reasonable confidence levels, but closer to perfect competition than monopoly. Not listed in Table 9 are the results for the rest of the model under each structural break specification. These results do not vary much when changing the break between period 1 and 2. However, the selection of the break point between period 2 and 3 appears to be important since the parameters in demand equation and supply relation behave best when 1990 is used.

Table 9: Robustness of Structural Breaks, Competition Estimates

First Year Period 2	Last Year Period 2	λ_1		λ_2		λ_3	
		Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
1981	1988	0.000	0.067	0.026	0.078	0.374	0.269
1981	1989	-0.019	0.030	0.028	0.047	0.393	0.186
1981	1990	0.000	0.038	-0.007	0.041	0.167	0.115
1981	1991	-0.003	0.053	0.021	0.048	0.210	0.115
1981	1992	-0.007	0.042	0.029	0.041	0.178	0.097
1979	1989	-0.017	0.095	0.017	0.096	0.310	0.15
1980	1989	-0.016	0.045	0.016	0.046	0.310	0.13
1981	1989	-0.002	0.023	0.000	0.023	0.132	0.09
1982	1989	-0.008	0.035	0.008	0.035	0.000	0.04

5 CONCLUSIONS

The merger proposals in 1998 spurred debate about the relationship between banking regulation and competition. There are still questions about whether the proposed mergers would have been harmful to the economy. Part of the uncertainty is due to disagreement about how competitive the industry was, and how competitive it would have been if the mergers had been approved. To contribute to the discussion this paper set out to evaluate and estimate the level of competition in the Canadian banking over the period of deregulation in the financial sector.

Section 2 discussed the evolution of the industry structure over the last four decades of the twentieth century, which helped characterise the situation in the 1990s. By discussing the commercial activity and asset shares of banks and their competitors, the extent of concentration was established. The Canadian financial sector has been characterised by a high level of concentration of assets and extensive branching by the banks, and more specifically, the five largest banks. The other purpose of Section 2 was to proceed through the deregulation and describe the reduction in the regulatory barriers that occurred during the period.

The next section discussed the theory relevant to competition and mergers in Canadian banking. It discussed the theory supporting the competition-stability trade-off and also presented the arguments that contradict the predicted trade-off. Additionally, this section discussed how the level of competition is believed to vary according to industry structure. It was argued that condition of entry is most important for

competition in banking. The condition of entry determinants relevant to the analysis of the time period discussed included regulation, branching, and methods banks use to deal with asymmetric information problems like screening and relationship lending.

Section 4 discussed the results of an estimation procedure designed to measure the level of competition. The results indicate there is reason to believe the level of competition fell after 1990. The results suggest that the level of competition for the first two periods (1965-1980 and 1981-1989) was perfectly competitive while the last period (1990-2001) was characterised by imperfect competition. Although the drop in the estimated level of competition is statistically and economically significant, it is not severe since the results do not support a monopoly or perfectly collusion.

These results suggest that Canadian banking may have experienced a drop in competition after the deregulation, contrary to the arguments of those that support large bank mergers. The results do not imply that the deregulation was unnecessary or that it did not enhance competition, since there are other factors that influence competition in banking. It might be other industry characteristics such as branching or asymmetric information problems that are driving the decrease in competition. The estimation results also suggest that the restrictions foreign banks face are still significant. The time period of the estimation does not allow for much adjustment to the 1999 revisions allowing foreign bank branches. However, the insignificant share of assets by foreign bank branches in 2004 shows the response has been small.

The estimation results support the decision of the Competition Bureau and Minister of Finance to hold back the large mergers proposed in 1998. From the empirical results in this paper it can be concluded that entry conditions were less than optimal from

a competition standpoint. Based on the level of competition, the concerns that the Competition Bureau and Finance Minister had regarding these large mergers and their potential anticompetitive effects were warranted. Without further changes in regulation, especially regarding foreign participation, large domestic bank mergers are not likely possible. In the event the mergers had proceeded, unless entry barriers were reduced, there likely could have been a further lessening of competition.

6 APPENDIX

Table 10: Data Sources

Data	Variable	Source	Description
Assets	Q	OECD (2003)	
Interest Income	P*Q	OECD (2003)	
Interest Expenses	W ₂ *D	OECD (2003)	
Total Expenses	C	OECD (2003)	
Personnel Costs	W ₁ *N	OECD (2003)	
Deposits	D	OECD (2003)	
Number of Employees	N	Statistics Canada (2004)	CANSIM I series L57077
National Income	Y	Statistics Canada (2004)	CANSIM II series V498906
Banking substitute	Z	Bank of Canada (2004)	3-month T-Bill rate

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