

THE INTEROWNERSHIP INDEX

By

Alexandre Findlay Deslongchamps

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Supervisor: Devashis Mitra, Ph.D. Faculty of Business Administration/
Finance

Examining Board: Martin Wielemaker, Ph.D. Faculty of Business Administration/
Entrepreneurship & Business Administration/ Chair &
Internal Reader

Constantine Passaris, Ph.D. Faculty of Arts/Economics/
External Reader

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ABSTRACT

This thesis is an investigation into the relationship that exists between horizontal interlocking cross-ownership and market competition in the Canadian banking market. A literature review examines the effects of cross-ownership and its relation to market concentration. It is determined that traditional market concentration measures, notably the Herfindahl-Hirschman index (HHI), fail to account for cross-ownership between market players. By adding a cross-ownership variable to the HHI, a new proposed index is derived that proportionally augments the index value in relationship to the level of cross-ownership in the market. This index is tentatively called an *interownership index* (IOI). The Canadian banking market is examined to validate the proposed index, and to demonstrate empirically the effects of cross-ownership discussed in the literature review. Share ownership of all five major Canadian banks from the 2013 fiscal year is examined. The results show considerable interlocking cross-ownership amongst direct competitors, resulting in an IOI value 34.18% higher than the HHI when cross-ownership is factored in. The IOI's behaviour is consistent with the hypothesis. To empirically demonstrate the effects of cross-ownership, examinations of pricing variance and product competition are compared to the US banking market, in which no quantifiable cross-ownership exists. Significant differences are observed in pricing and competitive strategy between comparable markets with and without cross-ownership. It is ultimately concluded that the behaviour observed in the Canadian banking market is consistent with previous research that demonstrates that cross-ownership results in anticompetitive behaviour. The IOI is proposed as an alternative to market concentration measurement for antitrust authorities.

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List of Abbreviations

| | |
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| TD | Toronto Dominion Bank (Also includes TD Asset Management Inc.) |
| RBC | Royal Bank of Canada |
| BMO | Bank of Montreal (Includes both BMO Asset Management Inc. and BMO Capital Markets Corp.) |
| BNS | Bank of Nova Scotia |
| CIBC | Canadian Imperial Bank of Commerce (Includes CIBC World Markets Inc. and CIBC Asset Management Inc.) |
| NDC | Non Direct Competitor – Refers to all shareholders that are not direct competitors of the share’s issuer. |

Defining Interownership

Derived from the terms “Interlocking” and “Ownership”, Interownership refers to a firm’s ownership position in a direct competitor. This ownership relationship is most often reciprocal. The degree to which this reciprocal relationship exists is referred to as the *level of interownership*. A market in which competitors maintain significant ownership positions in each other would therefore have a **high** level of interownership. (See Table 1 & Table 2).

Table 1. Market with three major players with low interownership.

| Shareholder | Firm A | Firm B | Firm C | NDC* |
|-------------|--------|--------|--------|------|
| Firm A | 0% | 4% | 2% | 94% |
| Firm B | 0% | 0% | 3% | 97% |
| Firm C | 1% | 0% | 0% | 99% |

*NDC: Non Direct Competitor

Table 2. Market with three major players with high interownership.

| Shareholder | Firm A | Firm B | Firm C | NDC |
|-------------|--------|--------|--------|-----|
| Firm A | 0% | 30% | 18% | 52% |
| Firm B | 27% | 0% | 15% | 58% |
| Firm C | 44% | 20% | 0% | 36% |

1. Introduction

The Canadian Banking system is considered the soundest in the world. The Big Five banks, consisting of the Royal Bank of Canada, Toronto-Dominion Bank, Scotiabank, Bank of Montreal, and CIBC, have been touted by economists for their continued cooperation in the banking sector. This stability, brought by highly profitable, stable, and solvent banks, allowed the nation to experience a light recession with muted consequences in 2009 while comparable nations suffered far more harmful economic crises. While the Big Four of the United States required bailouts, Canada's banks managed to remain profitable throughout the full length of the downturn.

From a financial perspective, the most prominent manner in which the Big Five cooperate is through the horizontal interlocking cross-ownership, or *interownership*, of their stocks. As of December 2013, the five largest shareholders of RBC stock are RBC, TD, Scotiabank, BMO, and CIBC. The five largest shareholders of TD stock are also RBC, TD, Scotiabank, BMO, and CIBC. This is the case for every one of the Big Five banks. The Canadian banking system is characterized by an oligarchic nexus of interownership, the consequences of which are unclear, as antitrust authorities do not currently factor horizontal cross-ownership into market concentration and competitive assessments.

Existing research in this field has demonstrated that a tradeoff exists between institutional stability and anti-competition. When cross-ownership is high, the resulting monopolistic activity of this nature increases the profitability of banks (Bolk & Tieman, 2004), thus benefiting shareholders, and may also shield the institutions from economic volatility (Boyd, De Nicoló, & Smith, 2004 ; Morgan, 2003). However, a lack of competition has negative consequences, particularly for product pricing. A lack of competition ultimately harms consumers (Clement & Vosko, 2003), and hinders economic prosperity (Berger & Hanna, 1994).

Through a thorough literature review and empirical examination of cross-ownership in the Canadian banking market, this thesis will 1) examine how interlocking cross-ownership affects the behaviour of market players, and 2) develop a market concentration index that can account for its effects.

Although the ramifications of cross-ownership are fairly well researched, this thesis addresses three points of novelty:

First, **research into cross-ownership in the Canadian context is lacking**. Apart from brief attention to cross-media ownership in the early 2000s, there exists no research that addresses cross-ownership in any Canadian domestic market.

Second, **existing research into cross-ownership is broad**. Cross-ownership can be vertical, horizontal, partial, within a market or across markets. Despite these substantial differences, cross-ownership is rarely subcategorized in the academic literature. This paper aims to hone in on one specific form of cross-ownership,

interownership, where direct competitors take interlocking ownership positions in each other.

Third, **cross-ownership is not factored into current market concentration measurements and assessments used by Canadian antitrust authorities.** The Herfindahl-Hirschman Index, CR4, and other popular measures of market concentration used by Canadian and American antitrust authorities, do not account for cross-ownership. As a result, market competition assessments in Canada and abroad have not taken into consideration the impact of cross-ownership and may have underestimated the anti-competitive environment of markets, allowing for the approval of harmful mergers and acquisitions. Many other alternative measures of market concentration, notably the Rosenbluth index, Linda index, and the comprehensive concentration index (CCI), are all equally blind to cross-ownership.

The contents of this thesis are as follows: First, background information on the Big Five Canadian banks and their relationship with antitrust authorities is given to help contextualize this work. Chapter Two provides a literature review on cross-ownership and its relationship to market concentration and market player behaviour, and also explains the functioning of the Herfindahl-Hirschman Index, and demonstrating its strengths and weaknesses as an estimator of market concentration. Chapter Four ties the theory on cross-ownership and the Herfindahl-Hirschman Index via the development of a proposed market concentration index, the IOI which will hypothetically account for cross-ownership. Chapter Four tests the validity of the IOI index on the Canadian banking

market by comparing the HHI value to the IOI value. The level of anti-competition estimated by the index is then compared to the observable real level of anti-competition. In order to assess the accuracy of the IOI's estimation of concentration, various indicators of anti-competition are examined within the Canadian banking market and are subsequently benchmarked to the comparable American banking market where cross-ownership is not present. Chapter Five provides a discussion of the paper's contributions, pointing out strengths and weaknesses, and proposing how the IOI can be used, and how interownership can be addressed. Chapter Six provides a summary of this work and concluding remarks.

1.2 Background Information – The Big Five

The Big Five are no strangers to cooperation. In 1998, The Bank of Montreal proposed to merge with Royal Bank, while CIBC proposed to merge with the Toronto-Dominion Bank. These proposed mergers were rejected when the Competition Bureau concluded that “the loss of such a major competitor is further concern in light of the already high levels of concentration that exist in most local markets”¹. Although the Competition Bureau, through their market concentration evaluation, saw danger in this potential merger, it was a rare occasion in which a request by a bank to merge or acquire was rejected.

From the 1990s to present, Royal Bank merged with Royal Trust, acquired the U.S. based Security First Network Bank, and the Canadian subsidiary of Ally Bank. RBC also merged its credit/debit card acquiring business with BMO's to form Moneris Solutions. Scotiabank acquired the Montreal Trust, the National Trust, E*TRADE Canada, DundeeWealth, and ING Direct Canada (later renamed "Tangerine").

TD Bank merged with Canada Trust and acquired Waterhouse Investor Services Inc., Newcrest Capital, as well as U.S. firms Banknorth Group, Banknorth NA, Riverside National Bank of Fort Pierce, South Financial Group Inc. and Chrysler Financial.

These mergers and acquisitions resulted in assets doubling, and in some cases, tripling in the span of a few years. Simultaneously, each bank grew their ownership shares in the other four, further concentrating the market.

Despite the substantial ownership concentration, media coverage and public perception have been rather positive in recent years. Canada was among a very small minority of developed nations that did not need to bail out its banks in the aftermath of the 2008 economic crisis (although they did receive "liquidity support")². Furthermore, the banks' highly stable stocks have proven to be a lucrative blue-chip investment for millions of investors. It is perhaps for these reasons that, while banks in other nations are sometimes seen as nefarious and untrustworthy, Canadian banks provoke little irk within the government and populace alike. Although institutional stability is certainly positive for some stakeholders, it is important to determine what is given up in exchange for this

stability. Increased profitability can be achieved through cost efficiency and increased market share, attained through an effective competitive strategy – methods that are generally perceived as positive and healthy for the market, and typically benefit consumers. Increased profitability can, however, also be achieved through price-fixing and non-competition, which are generally perceived as harmful to the market, and costly to consumers. Anti-competition comes at a substantial socioeconomic cost, as market players deviate from competition towards a less desirable monopoly solution. However, since the stability of banks plays a critical role in the overall economic stability of the State, a utilitarian may argue that some levels of anti-competition can be excused for the greater good – the good, in this case, being national economic stability. However, from a strictly regulatory standpoint, any form of collusive behaviour should require intervention. In assessing the impact of cross-ownership on Canadian banks, it is important to identify what tradeoffs are being made for the romanticized ideal of *institutional stability*.

In order to assure that the profit-making game is played fairly, governing bodies monitor the level of competition in domestic markets. When significant mergers and acquisitions are proposed, the State evaluates the impact of the proposed action on market competition, using a set of mathematical measures. If the proposed action is above acceptable thresholds, the State will prohibit the proposed action in order to avoid the formation of an anti-competitive market.

Antitrust authorities including the Federal Trade Commission, The United States Department of Justice,³ and the Canadian Competition Bureau use the Herfindahl-Hirshman Index as a key measure of market competition, and is often viewed as the first line of defence. As a result, a significant portion of the assessment of markets is dependent on the accuracy and reliability of the HHI.

2. Literature Review

Cross-ownership, a broad term characterizing a firm's position in other firms, is an area that is fairly well researched. Cross-ownership can be vertical, in which a firm has one or more reciprocal ownership interests in firms higher or lower in the supply chain, or it can be horizontal, in which firms have reciprocal ownership interests in other companies in the same field, often direct competitors (Serbera, 2011). This concept can also transcend multiple markets, and is not necessarily limited to private corporations. State-owned businesses have also been known to have cross-ownership interests in private firms (Ritika & Rupayan, 2012).

Interownership is a subcategory of cross-ownership, which exclusively involves horizontal cross-ownership among competitors. This has, in two previous works, been referred to as *horizontal shareholding interlocks* (see Flath, 1992; Merlone, 2001). In order to simplify the terminology, I have adopted the term *interownership*, deriving from *interlocking* and *ownership*.

This literature review explores four key themes that provide the theoretical framework for this paper. First, literature on the relationship between cross-ownership and market competition is analyzed and second, the relationship between cross-ownership and collusion is explored. Third, I review the empirical cases of interlocking cross-ownership

in Canada and abroad. Finally, I review the Herfindahl-Hirschman index, and look at its utility, its behaviour, and its strengths and weaknesses.

2.1 Cross-Ownership and market competition

The impact of cross-ownership on market competition is well understood and typically falls in line with current theory on market concentration. Parker & Röller (1997), through the examination of the American mobile telephone market, concluded that high levels of cross-ownership are an important factor in explaining noncompetitive prices in markets. The noncompetitive prices examined by Parker & Röller can entail either explicit price fixing or tacit product pricing understandings. Fanti (2013) also concluded that cross-ownership results in noncompetitive prices. He asserts that in a competitive market with profit maximizing players, an increase in product differentiation enables firms to distinguish themselves from competitors and increase profits. However, when cross-ownership is sufficiently high, a reduction of the degree of product differentiation works to increase profits of firms (Fanti, 2013). Ritika & Rupayan (2012) also examined the relationship between cross-ownership and product market competition, and concluded the following:

[...] higher cross-ownership makes participating firms less aggressive in the product market and, thus, softens the product market competition, which results in high profit of the rival firm and the share of the rival's profit that accrues to the participating firm overcompensates for reduction in its own profit for being less aggressive.

Cross-ownership changes competitive interests, moving the market equilibrium towards the monopoly solution (Maxwell, O'Brien, & Parsons, 1999 ; O'Brien & Salop, 2000). Ritika & Rupayan (2012) stated that in the Cournot duopoly framework with profit maximizing firms, a firm has a unilateral incentive to have as high stake as possible in its rival firm. In a Cournot oligopoly framework, a firm still has a very strong incentive to have as high stake as possible in its rival firms. However, for each additional market player, this incentive weakens significantly because collaboration becomes more difficult.

The conclusions of Parker & Röller (1997), Ritika & Rupayan (2012), Fanti (2013) Maxwell, O'Brien, & Parsons (1999) and O'Brien & Salop (2000) all determine that cross-ownership, particularly when this cross-ownership occurs between competitors, modifies the competitive interests, and thus the behaviour of market players. These conclusions all point to a clear negative assessment of cross-ownership and its impact on markets. However, not all assessments of cross-ownership and market player behaviour are strictly negative. Allen & Phillips (2000) state that cross-ownership affects firms in a positive manner, as it can result in strategic benefits in product market relationships. The merger of BMO and RBC's credit and debit acquiring business (Moneris Solutions) is possibly an example of a positive strategic benefit. By merging their operations, substantial cost-efficiencies were achieved and Moneris Solutions was able to benefit from the strategic insights of both banks. Today, Moneris Solutions has become a North American leader in POS systems, processing more than 3 billion transactions per year.

Although strategic benefits are certainly positive externalities, Reitman (1994) notes that the cooperation resulting from cross-ownership is far more substantial than simple synergetic alliances and ventures:

“Firms can form partial ownership arrangements by purchasing claims to competitor’s profits in order to commit to less aggressive competition. These arrangements can increase profits for all firms in the industry even in the absence of synergies [...] Partial ownership arrangements may form without the motivation of exploiting synergies, possibly resulting in larger profits without any counterbalancing increase in efficiency.”

As Reitman (1994) states, the positive synergies and strategic benefits from cross-ownership demonstrated by Allen&Phillips (2000) are a possibility, but are not a definitive outcome, and not necessarily the norm either. Cross-ownership can encourage positive synergies, but market players can easily forego these synergies and commit to less aggressive competition and increase profits.

2.2 Cross-Ownership and the collusive optima

Collusion is easier when firms face a smaller number of competitors or when the industry is more concentrated. This has shaped antitrust laws in the United States, Canada, and elsewhere. Since horizontal mergers reduce the number of independent firms and increase concentration, they lead to an industry structure more conducive to collusive behaviour. Cross-ownership can effectively reduce the number of competitors in an industry. For example, when two firms in a Cournot duopoly framework own half of each other, the

number of market players is effectively cut in half, from 2 to 1. This concept is consistent with the findings of Ritika & Rupayan (2012) who stated that a firm has a unilateral incentive to have as high a stake as possible in its rival firm. When both firms take the highest stake possible in each other without a legal change in ownership (50%), the level of competition is brought to zero.

From a purely financial perspective, the value of any financial security is the present value of expected future cash flows that the security holder is entitled to. The increase in share value represents the increase in firm value – most commonly exemplified by an increase in profitability. Thus, the performance of shares is directly tied to the success of the firm, and when a competing firm takes a long share position, it will gain financially from its position only if the rival is successful. This conflicts with the business' goals. Assuming a stable and clearly defined market, a firm can only gain market share at the expense of competitors. Thus, it is normally in a business' interest to see its competitors fail, and **lose** market share. By taking an ownership position in a competitor, it is implicitly hoping that the firm will **gain** market share. The action is inherently anti-competitive.

It has been argued that knowledge has become the only meaningful resource today (Druker, 1993; Quinn, 1992; Toffler 1990). Bruzzone (1999) argues that cross-ownership has implications in terms of access to strategic information. He states that cross-ownership can favour exchanges of practical information, which can be used for collusive

purposes. Malueg (1993, p. 34) concluded similar results, stating that “In many cases, increases in cross ownership lead to a less competitive static equilibrium as well as an increased likelihood of collusion”. Ghosh and Hodaka (2012) also conclude similar results. Exchanges in ownership and exchanges in knowledge often come hand in hand. It is for this reason that strategic alliances often involve some level of cross-ownership.

Although the aforementioned research has shown that cross-ownership concentrates markets, weakens price competition, and encourages knowledge sharing, all through collusion, it is important to note that most academics point to **tacit**, rather than **explicit** collusion. Researchers argue that the lack of competition and increase in monopolistic behaviour that arises when cross-ownership levels are high is not necessarily the result of explicit agreements to collude. Cross-ownership naturally facilitates **tacit** collusion among firms (Gilo, 2000; Gilo, & Spiegel, 2006; Gilo, Spiegel, & Temeurshoev, 2008). Tacit collusion does not involve price-fixing cartels or cliché back-alley deals. Rather, the collusion is the result of market players acting in the best interest of the corporation, which, due to conflicting ownership stakes, involves noncompetitive pricing, horizontal strategic alliances, and other monopolistic behaviours. In the case of tacit collusion, directors of banks are not engaging in illegal activity. Tacit collusion is the result of banks legally taking advantage of strategic opportunities with the goal of increasing profitability and maximizing shareholder value. If these strategic opportunities result in collusive behaviour, it is at the State’s discretion to intervene, by increasing the frequency of market intervention and/or increasing the level of market regulation.

When there exist few major market players, firms have the incentive to strive for a collusive optimum. Side payments are a collusive technology in which a firm is given an incentive to avoid competing in exchange for payment (Schmalensee, 1987). Interownership arguably creates a vehicle for side payments. Abstaining from price competition allows the firm to gain from a higher profit margin, and also gains from the high profit margins enjoyed by competitors, whose shares increase as a result. The greater the level of cross-ownership, the greater a firm's financial success is dependent on the success of its competitors. In order for directors to maximize shareholder value in a state of high cross-ownership, they must devise strategic plans that assure both the success of their own firm, as well as the success of the direct competitors. Such strategic plans can manifest themselves in the form of price fixing.

2.3 Evidence: Cross-ownership in Canada and abroad

In the Canadian context, cross-ownership has not been discussed in the banking system. No written works, academic or non-academic have raised this issue. Cross-ownership has been observed in other countries, notably the Chinese airline industry.⁴ In the past decade, there has been increasingly heavy cross-ownership among four major carriers that dominate the market⁵. This cross-ownership is also coupled with heavy code-sharing, a practice in which two airlines share the same flight. Cross-ownership in itself creates an incentive to not compete, and keep prices artificially high. With code-sharing, there is pressure to collaborate with a competitor to offer seats at identical prices and charge

identical fees (since consumers would expect a single rate for a single flight, regardless of how many airlines code-share it). Thus, the situation is not conducive to competition, and has raised considerable antitrust concerns for the Chinese government. A situation similar to this can be observed among some Canadian banks. Using the example of BMO and RBC's credit/debit acquiring business that was previously used as a positive outcome of cross-ownership, this strategic venture can also be analyzed in a more negative manner, by comparing it to code-sharing. Much like using the same airplane to serve their customers, BMO and RBC use the same credit/debit acquiring and processing business. As a result, both businesses have a strong incentive to shape their credit/debit offerings in a similar manner, and employ similar pricing models.

Although cross-ownership in the Canadian banking industry has yet to be addressed, cross-ownership has been observed in the media industry and was in the public spotlight in the late 2000s (CBC, 2006). The extremely high level of vertical cross-ownership in the media industry eventually led to the CRTC implementing a new media ownership policy, preventing companies from owning more than two of the same media in a given market (CRTC, 2008). Although much praise was given to the governing body for addressing cross-ownership, many critics were left unenthused, as the regulations were not retroactively enforced. As a result, private corporations with monopolistic webs of ownership in dozens, if not hundreds of media outlets, were allowed to maintain status quo. Although the ramifications of cross-media ownership are certainly of social importance, they do not entail the same economic importance as the interownership that

this thesis aims to address. The media case in Canada presented no signs of national-scale horizontal cross-ownership (e.g. Bell owning a portion of Rogers, Rogers owning a portion Quebecor, etc). As a result, there was little concern for product non-competition, or price fixing. Furthermore, media is usually consumed for free (or almost free), so although the cultural and social impact may have been significant, there was no quantifiable economic impact for media consumers. Thus, not only has interownership in the Canadian banking system not been addressed, the broader idea of interownership in Canada appears equally unexplored.

Specific to the financial industry, cross-ownership has been observed within Czech Financial Intermediaries (Kenway & Klvacova, 1996), as well as the Italian banking system (Trivier, 2005). In both works, it is concluded that elevated levels of cross-ownership negatively affect competitive interests. It is also clear from these studies that financial firms are unique, in that their product and service offerings are complex and wide ranging. Because of this complexity, attempting to assess competition using inside-out methods that require data on input costs, marginal costs, and other microeconomic data is difficult. The complexity that is entailed in yielding an accurate value with the Lerner index, Panzar-Rosse Model, and other measures is perhaps one of the reasons that antitrust authorities in Canada and abroad have rarely intervened in mergers and acquisitions in financial industries.

The literature on cross-ownership concludes that it does increase market concentration and does modify the behaviour and competitive interests of market players. Although strategic synergies can be a positive externality of increased cross-ownership, it is not a guaranteed outcome. Since it is concluded that cross-ownership increases market concentration, the development of an index that takes into account this variable would be of benefit to antitrust authorities if it can provide a more accurate estimation of market concentration.

2.4 The Herfindahl-Hirschman Index

Observing raw market share data alone provides an inaccurate estimation of competition. This is because larger firms have a greater amount of resources at their disposal to thwart off smaller competitors (Barney, 1991). Conversely, an inordinate quantity and quality of resources are required for a smaller competitor to compete with larger firms (Hirschman, 1946). The HHI index represents these realities by squaring market shares (Demsetz, 1973). Using the value “1” to represent the market as a whole, all players in a given market are given a fraction of this value to represent their respective market shares (e.g. Firm A 0.33, Firm B 0.31, Firm C 0.16, Firm D 0.08, Firm E 0.05, Firm F 0.04, Firm G 0.01, Firm H 0.01, Firm I 0.01). By squaring the respective market shares, the large market players are given more weight, and small players are given much less (Herfindahl, 1950). In the following table (Table 3), the sum of squares effect is demonstrated. In scenarios A and B, there are three market players whose market share add up to 100%. Despite the parametric consistency of the two scenarios, the scenarios yield two

significantly different HHI index values (HHI A is 11 points higher than HHI B). This difference is the direct result of the sum of squares effect, which inherently adds more weight to firms with higher market share. The sum of squares effect enables one to draw conclusions that are much more consistent with real world market competition. It is for this reason that antitrust authorities use the HHI index over straight-line concentration ratios, which weigh small and large firms equally. Scenario A, which is in fact an estimation of soft drink market share in 2009⁶ shows a 52% market share by Coca Cola. Thus, although Coca Cola does not have a market monopoly, it certainly competes in an anticompetitive, monopolistic environment. Furthermore, the degree of anti-competitiveness is dramatically reduced when market share is more evenly distributed (scenario B) and a new market player is introduced (scenario C).

Table 3. The Sum of Squares Effect

| Scenario | Coca Cola | PepsiCo | Dr. Pepper | Firm D | HHI |
|------------|-----------|---------|------------|--------|------|
| Scenario A | 0.52 | 0.36 | 0.12 | | 0.41 |
| Scenario B | 0.33 | 0.33 | 0.33 | | 0.33 |
| Scenario C | 0.30 | 0.30 | 0.20 | 0.20 | 0.26 |

2.5 Challenges with the HHI

Because the HHI's logic is simple, it has become a standard anticompetitive measure used by government institutions, and other antitrust authorities. However, many academics argue that it omits too many relevant factors, and as a result, mergers and acquisitions thought to be acceptable have, throughout recent history, been approved when in fact the anticompetitive impact was harmful. Some researchers have identified shortcomings in the HHI index. For example, it has been stated that the index fails to take into account geographical boundaries and the degree of product homogeneity of a given market (Liejesen, 2004). Others argue that market share, in itself, is an inaccurate method of measuring market competition (Netherlands Bureau for Economic Policy Analysis, 2000). The Lerner index, which determines market power through price and marginal cost, is a well-known and well-regarded method of determining market competition (Elzinga & Mills, 2011). Unfortunately, the complexities and intangibilities of banking and many other industries make the determination of marginal cost nigh-impossible. The Panzar-Rosse revenue test (Rosse & Panzar, 1977; Panzar & Rosse 1982; Panzar & Rosse 1987) faces similar challenges, as it is reliant on the knowledge of input prices. The limitations of these alternatives are not bound simply to the banking industry. The challenge of determining market competition through these alternative measures becomes increasingly difficult as all businesses become more complex. Businesses merge, acquire, diversify, and enter new markets, and as such, determining accurate values for input prices, marginal cost and other finite internal values becomes highly challenging. Since

the Herfindahl-Hirschman Index does not rely on internal microeconomic measures, it has been able to maintain its simplicity despite a decades-long macro shift toward conglomeration in North American markets. The HHI continues to be a standard in antitrust regulation, allowing authorities to distinguish between unconcentrated markets, and markets of concern.

2.6 Reasons for the HHI

In order to assess the quantitative impact of share ownership, I have chosen to build on the existing principles of the HHI index. Although some academics have suggested alternatives to Herfindahl, citing marginally improved accuracy, the index's real-world applicable use is far more economically and politically significant than others. Thus, by building on an already established formula that is widely accepted, with its fundamentals thoroughly understood, the results of this research have a higher probability of acceptance.

Formulaic amendments to the HHI have been suggested in the past to address two concerns: 1) geographic significance and 2) product/service heterogeneity. First, the index fails to consider the impact of geography in market competition. Region-specific businesses, such as radio broadcasting companies, are constrained by their geographic regions and do not, therefore, compete with players in surrounding areas. Since location is irrelevant to the index, a competitive assessment purely based on market share would

fail to consider the lack, or excess, of competition given specific markets and regions. In these cases, the HHI index is prone to yielding fairly inaccurate results.

It appears, however, that this concern of geographic significance is largely irrelevant, given the nature and use of the index. The index is used for decision-making purposes on a grand scale – a scale large enough that it deserves the attention of a nation’s governing antitrust body. Therefore, the businesses that will be, and have been, assessed with the HHI index have passed the point of geographic pertinence – these companies are national, if not multinational. Regional discrepancies in market competition are not of practical significance, and thus, geography is irrelevant to the index. Smaller businesses that are constrained by regions are not large enough to pose competition concerns to a State authority, and therefore, the HHI index would not be used. In sum, the very purpose of the HHI index negates the concern of geographic significance. As a side note, it is also important to note the impact of e-commerce on traditional business. With goods and services increasingly being transacted online, geography is becoming less of a factor even for small and medium-sized businesses.

The second concern – that of product heterogeneity, is also of little practical significance. It has been argued that since businesses offer heterogenous products, they are not in direct competition, and therefore, the market’s level of competition cannot easily be measured. Although heterogeneity may be of concern for more distinct, creative-based industries, it is not relevant for the large-scale corporations that are of concern to

competition bureaus and other organizations. Canada's largest industries – banking, oil, lumber, metals, goods manufacturing, telecommunications, etc. all generally offer homogenous products and services. It is these industries that are the focus of antitrust legislation, and thus the focus of the HHI index. It is important to note the distinction between product heterogeneity, and product differentiation. The aforementioned industries all have market players that invest heavily in product differentiation – positioning and branding products in order to distinguish themselves from competing products. Although the goods offered are marketed differently, the core products remain the same, and thus, remain homogenous.

In sum, it is reasonable to assume that these two issues are not of practical significance to the HHI index, given its application. Interownership, however, is a factor that is highly significant and highly relevant to the index's application. It is a phenomenon that is almost exclusively examined in concentrated markets with massive players for whom geography and product heterogeneity is irrelevant. The HHI index, by nature, assumes that each market player is a separate entity with no interests held in competitors. As industries have grown, and market players have converged, clear ownership ties have arisen between competitors in large, politically significant markets. It is therefore, important to determine if these ownership ties affect market concentration and market player behaviour. If the presence of interownership increases market concentration and creates incentives for businesses to adopt noncompetitive behaviours, then factoring this variable into the HHI index would increase the accuracy of the index and facilitate

decision-making for antitrust authorities. However, if interownership has no impact on market concentration, then factoring this variable into the HHI index would be of little practical significance. In the literature review, the examination of previous literature on market concentration will help determine what impact cross-ownership, and more specifically, interownership, has on market concentration, and market player behaviour.

3. Methodology

With the concepts of cross-ownership and the HHI index well understood, this chapter now explores the methodological process to harmonizing cross-ownership and the HHI through the creation of a new index. The new index is tested in theoretical scenarios to establish its behaviour. Finally, the parameters are set for an empirical examination of the Canadian banking market, as a means to test the validity of the index, and the consistency between the theory on cross-ownership, and its real-world effect on the Canadian banking market.

3.1 Herfindahl-Hirschman Formula

Since the Herfindahl-Hirschman Index is the standard in market concentration measurement, a simple amendment to correct for cross-ownership would be preferable to the development of an entirely different formula. In order to modify the formula, it must first be broken down and its behaviour analyzed.

$$HHI = \sum_{i=1}^N S_i^2 \quad [1.1]$$

The original Herfindahl formula contains two variables:

N = the number of market players,

S_i = Market player (i) share of the total market (s),

The formula squares each s_i value, and sums it with every other firm's s_i value in the given market. By summing squared values, larger values are given more importance, and smaller values, less. If, for example, a market contains three players, with market share of 30%, 20%, and 50%, respectively, the equation would be represented as:

$$HHI = S_1^2 + S_2^2 + S_3^2 \quad [1.2]$$

$$HHI = 0.30^2 + 0.20^2 + 0.50^2$$

$$HHI = 0.09 + 0.04 + 0.25$$

$$HHI = 0.38, 38\%, \text{ or } 3800$$

In this simple example, the market yields an HHI value of 0.38, or 38%. In order to distance the HHI from a mere fraction, values are often multiplied by 10000 for representation purposes. Thus, the HHI value in this case would be represented as 3800.

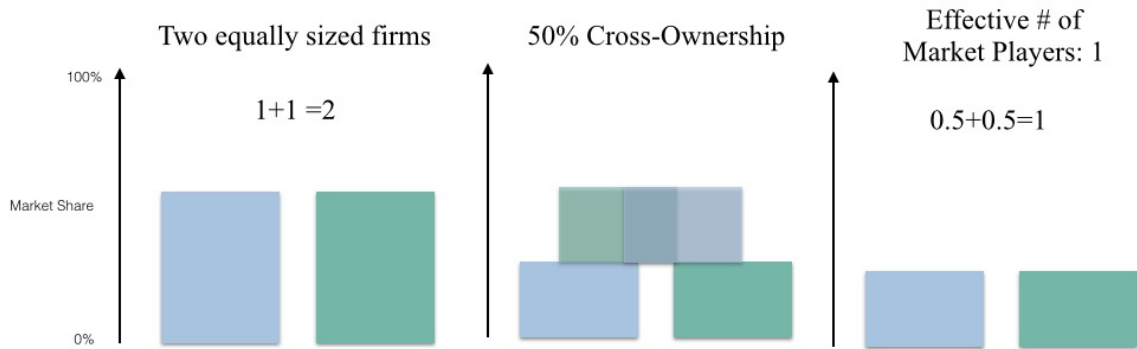
HHI values are classified as either unconcentrated, moderately concentrated, or highly concentrated. Unconcentrated markets are markets whose HHI value is below 1500 points, moderately concentrated markets are between 1500 and 2500 points, and highly concentrated markets have a value above 2500. To put this into perspective, if any firm has a 40% share in a given market, the HHI will be at least 1600 points, and if any firm has a 50% share in a given market, the HHI will be at least 2500 points. As a general rule, antitrust bodies in North America do not accept mergers or acquisitions that result in the

HHI value of an already moderate or highly concentrated market increasing by 200 points or more. Furthermore, any HHI value above 1500 is considered of concern, and any value of 2500 or more is generally deemed as “presumed to be likely to enhance market power”. Likewise, any market with an HHI value below 1500 is deemed to be of little concern and mergers and acquisitions are generally approved without resistance.

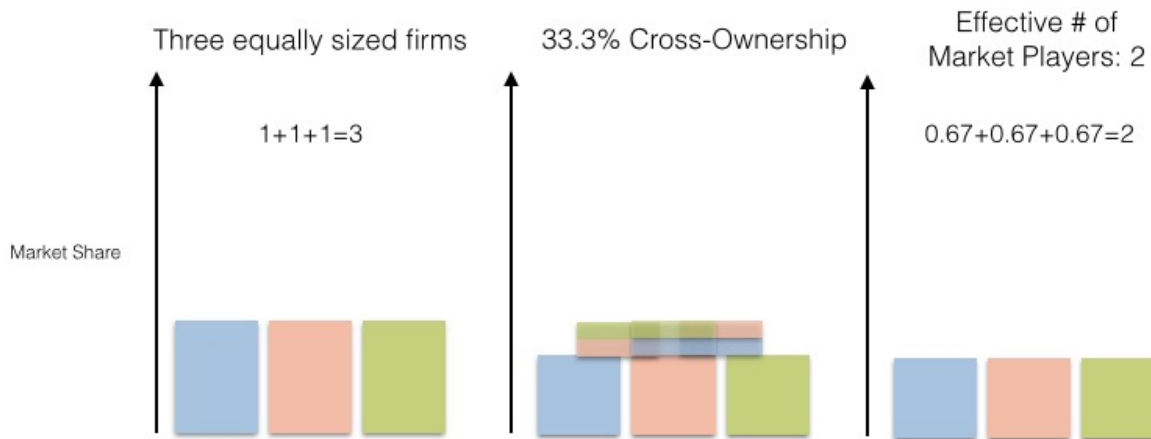
3.2 Formulaic Amendment (Interownership Index)

The HHI determines market competition among legally separate entities. As a result, two firms that compete in the same market but are wholly owned by the same parent company would still be considered as two competing firms. Restricting the definition of entity to that of a corporate person unintentionally ignores the realities of corporate ownership. In order to accurately measure market concentration, an entity should include “any corporate person or group of persons acting in concert”. This definition of entity is prominent in antitrust legalese, and is found most notably in the Canada Bank Act. By using this latter definition, two firms that are wholly owned by the same parent company should be considered one entity, not two. Similarly, when firms are partially owned by the same entity, that partial ownership should proportionally reduce the effective number of players in the market concentration calculation.

[1.3] *Illustration of effective number of market players with two equally sized firms engaging in 50% cross-ownership.*



[1.4] *Illustration of effective number of market players with three equally sized firms engaging in 33.3% cross-ownership.*



In the following table (Table 4), the difference in the real and effective number of market players is observed in different scenarios. Each situation dictates the number of equally-sized competing firms in a given market, and states the percentage of ownership that each firm has in its competitor. For example, a situation written as *3 Firms; C/O:33.3%* would

describe a market in which 3 equally sized competing firms own 33.3% of each of its competitors, meaning 66.6% of each firm’s shares are owned by competitors.

Table 4 Comparison of real and effective number of market players with 1, 2 and 3 firms with varying levels of cross-ownership.

| Situation (assuming equally-sized firms) | # of Market Players (using existing definition of entity) | Effective # of Market Players (using new definition of entity) |
|---|--|---|
| 1 Firm; C/O: 0% | 1 | 1 |
| 2 Firms; C/O:0% | 2 | 2 |
| 2 Firms; C/O:50% | 2 | 1 |
| 3 Firms; C/O:0% | 3 | 3 |
| 3 Firms; C/O:33.3% | 3 | 1 |
| 3 Firms; C/O:16.7% | 3 | 2 |

The higher the cross-ownership in a given market, the lower the effective number of market players. The challenge lies now in modifying the HHI in a manner that accounts for the impact of cross-ownership. By building off the original HHI, I have developed an equation that accounts for partial cross-ownership, thus aligning the market concentration index value with the effective number of entities in the market, using the definition of entity as “any corporate person or group of persons acting in concert”.

The proposed formulaic amendment introduces a new variable: C_j . Variable j represents a given competitor and C represents its ownership position in the given firm (firm i). Since the new index's purpose is to account for interownership, it can be called the interownership index, or IOI. In order to maintain consistency in its utility and application, the same three concentrated categories should be maintained (i.e. Unconcentrated < 1500, Moderately Concentrated 1500-2500, Highly Concentrated > 2500). Similarly, proposed mergers and acquisitions that increase the index value by more than 200 points should generally be rejected.

$$IOI = \sum_{i=1}^N \left[\frac{S_i^2}{1 - \sum C_j} \right] \quad [1.5]$$

The amended formula now contains three variables:

N = the number of market players,

S_i = Market player's (i) share of the total market (s),

C_j = Market competitor (j) ownership position in market player (i),

This value C_j is summed with all other competitors of firm i in the given market. This summed C_j is consequently subtracted from 1, (thus, $1 - \sum C_j$) and the s_i value from the

original HHI equation is divided by this $1-\sum c_j$ equation element. The final amended equation can be seen above (1.5).

Let's take the previous example of three market players with market share of 30%, 20%, and 50%, respectively, to demonstrate the calculation of the C_j value. Suppose that it is discovered that there exists some horizontal cross-ownership in this market. Firm A owns 15% of Firm B and 9% of Firm C. Firm B owns 5% of Firm A and 4% of Firm C. Firm C owns 14% of Firm A and 19 % of Firm B.

Placing this data in a matrix, we get:

Table 5. Ownership Matrix setup for IOI.

| | Firm A (C_j) | Firm B (C_j) | Firm C (C_j) | Total ($\sum C_j$) |
|--------|------------------|------------------|------------------|----------------------|
| Firm A | N/A | + 0.05 | + 0.14 | = 0.19 |
| Firm B | 0.15 | + N/A | + 0.19 | = 0.34 |
| Firm C | 0.09 | + 0.04 | + N/A | = 0.13 |

From this matrix, we can conclude that 19% of Firm A's shares are owned by competitors, 34% of Firm B's shares, and 13% of Firm C's. These values represent the $\sum C_j$ for Firm A, Firm B and Firm C, respectively. The calculation of the IOI for this example is demonstrated here:

$$IOI = S_1^2/1-\sum C_j + S_2^2/1-\sum C_j + S_3^2/1-\sum C_j \quad [1.6]$$

$$IOI = 0.30^2/(1-0.19) + .20^2/(1-0.34) + 0.50^2/(1-0.13)$$

$$IOI = .30^2/.81 + 0.2^2/0.66 + 0.5^2/0.87$$

$$IOI = 0.111111 + 0.060606 + 0.287356$$

$$IOI = 0.4591, 45.91\% \text{ or } 4591$$

In this case, cross-ownership results in an increase of 791 points over the traditional HHI value (from 3800 HHI to 4591 IOI). The IOI value is therefore 20.82% higher than the HHI value.

3.3 Equation Behaviour

The value of $\sum c_j$ gives the summed value of all the shares owned by direct competitors. By subtracting this value from 1, a remainder value is obtained. When the s_i value is divided by this remainder, it is augmented. The greater the level of interownership, the higher the s_i values are augmented. As a result, when these values are summed, the resulting HHI index value is augmented in relation to the level of interownership. Table 6 demonstrates how the HHI and IOI index behave in identical scenarios. Each scenario describes three factors: the number of firms, the market share of each firm (ex: two firms with 50% market share each would be represented as 50-50), and the level of interownership (i.e the percentage of each firm's shares that are owned by its direct competitors).

Table 6. Comparison of HHI index and IOI index in various interownership scenarios.

| | Scenario | HHI Index | IOI Index |
|----|--------------------------------|-----------|-----------|
| A) | 1 Firm: 100% | 1.000 | 1.000 |
| B) | 2 Firms: 50-50: 0% | 0.500 | 0.500 |
| C) | 2 Firms: 60-40: 10% | 0.520 | 0.577 |
| D) | 2 Firms: 50-50: 50% | 0.500 | 1.000 |
| E) | 3 Firms: 33-33-33: 0% | 0.333 | 0.333 |
| F) | 3 Firms: 40-35-25: 18% | 0.345 | 0.421 |
| G) | 3 Firms: 33-33-33: 67% | 0.333 | 1.000 |
| H) | 4 Firms: 25-25-25-25: 10% | 0.250 | 0.278 |
| I) | 5 Firms: 34-32-18-9-5: 8% | 0.261 | 0.297 |
| J) | 6 Firms: 17-17-17-17-16-16: 0% | 0.167 | 0.167 |
| K) | 6 Firms: 16-16-15-15-13-13: 8% | 0.108 | 0.141 |

The behaviour of the amended formula is wholly consistent with the behaviour of the original HHI index. When the amended formula is used to measure competition in a market in which there is no interownership, it yields the exact same value as the original HHI index. Because of this consistency, antitrust authorities can replace the HHI with the IOI, and yield the same results as the original HHI for markets with no interownership.

The following limit tests show how the HHI index and the IOI index react in tandem when logically identical data is given.

Scenario 1

There are two chartered banks in a given market. The first bank (Firm A) is the market leader, with 90% of the total market share. The second bank (Firm B) is the second and only other bank in the market, capturing the remaining 10% of the total market share. Both banks are separately owned and do not engage in cross ownership.

Firm A: 90% market share. Firm B: 10% market share.

Firm A: 100% owned by firm A. Firm B: 100% owned by firm B.

Results:

HHI Index: 0.82 IOI index: 0.82

Explanation: With the IOI index, when two firms are wholly privately owned, the resulting C_j value is 0, since each firm is not owned by any direct competitor. Thus the s_i values are divided by 1 minus 0, meaning the value is divide by 1, leaving the original s_i values unchanged. The market share can be split in any other manner by any number of firms and so long as each firm does not engage in interownership with any direct competitor, the HHI and IOI values will be identical. This can be seen in Table 13 in scenarios B, E and J.

Scenario 2

There are two chartered banks in a given market. The two banks each own 50% of the total market share. The first bank (Firm A) has decided to purchase 50% of the second bank's shares (Firm B), and the second bank (Firm B) has decided to purchase 50% of the first bank's (Firm A) shares.

Firm A: 50% market share. Firm B: 50% market share.

Firm A & B: Both 50% owned by firm A, 50% owned by firm B

Results:

HHI Index: 0.5 IOI index: 1

Explanation: In this situation, the IOI index value is 1, signalling an effective monopoly.

This is accurate, because both firms own the exact same share of each firm and combined have 100% market share. Because of this, there is not two controlling and competing interests, but one. This can be seen in Table 13 in scenario D and G.

This is also a clear example of the HHI index's failure. In the original HHI index, the value of 1 is supposed to signal a monopoly, and yet in this situation of an effective monopoly, it only yields a value of 0.5.

Limitations of the C_j value.

In any given scenario, the C_j value cannot exceed 0.5. This is because an ownership stake above 50% legally constitutes a change in ownership. For example, it is impossible for Firm A to own 60% of Firm B and Firm B to own 60% of Firm A. Because the share ownership is above 50%, one would have to effectively switch the ownership of both

firms. In essence, Firm A would de-facto become Firm B, and Firm B would de-facto become Firm A, and the cross ownership would be 40% (100%-60%) each, not 60%. With the de-facto changes in ownership, the cross-ownership at 40% can then be calculated without issue.

3.4 Index Application to the Canadian Banking market

3.4.1 Hypothesis

By factoring reciprocal ownership into the HHI calculation (the IOI index), the concentration value of the Canadian Banking Market should increase if cross-ownership is present. If little or no cross-ownership exists, the IOI value will be near-identical to the HHI value. Furthermore, the literature review concluded that interownership is inherently anti-competitive. Thus, should cross-ownership be absent, signs of a competitive market should be apparent. Similarly, if significant cross-ownership is present, noncompetitive pricing practices should be present among the market players that engage in cross-ownership.

3.4.2 Parameters

In order to study whether the Canadian banking system yields an anticompetitive HHI and/or IOI value, certain parameters must be established. First, the limits as to what is to be considered in the c_j value must be determined. Two terms used in the definition of the c_j value must be properly defined: **direct competitor** and **share ownership**. In this

research, all corporations defined as full-service Schedule I, Schedule II, and Schedule III commercial banks under the Bank Act (S.C. 1991, c.46) are considered market players. Thus, when a banking institution is identified, all other corporations that fall under the aforementioned definition are considered direct competitors. Not-for-profit credit unions and Caisses Populaires are omitted, as their ownership structure is member-based and does not allow for share ownership. For purposes of statistical significance, all direct competitors with less than **0.4%** of total market share (firm revenue as a percentage of total market revenue) are deemed statistically insignificant and are instead grouped in a category of “remaining banks” which collectively possess approximately 1.67% of total market share. The category of “remaining banks” represents the summed ownership of all market players possessing less than **0.4%** of market share.

For share ownership, all ownership of shares in a firm by a direct competitor, including all of its subsidiaries, is included. All data is taken from the Morningstar database. All three categories of share ownership as represented by Morningstar are counted:

- 1. Institutional Share Ownership:** The primary, and most statistically prominent medium of ownership, is institutional share ownership. This occurs when a market player (e.g. The Royal Bank of Canada Inc. and its wholly owned subsidiaries) possesses shares of a competitor.
- 2. Share Ownership Via Funds:** The second medium of ownership occurs through funds and other investment products. This occurs when a market player acquires shares of a competitor for use in a fund or other product offering. For example, The

Royal Bank of Canada Inc. offers to its investors, a Canadian Dividend GIF. This massive fund contains nearly 14 million Bank of Montreal shares, which represents a 2.16% ownership position in the company. Although the shares are used in investor products, the ownership status of the shares is identical to shares held in more traditional means.

- 3. Concentrated Shareholders:** Due to the nature of the ownership, some funds owned by institutions are considered concentrated shareholders. Investment products such as ETFs and 401K plans typically fall under this category.

The second and third categories of share ownership described above are less direct than straightforward institutional share ownership. However, it is important to consider these less direct forms of cross-ownership in order to have a complete scope of cross-ownership and its impact. Flath (1992) states that “the cartelizing effects of horizontal shareholding interlocks are compounded if firms are mindful not only of direct shareholding but also of indirect shareholding”.

3.4.3 Data

For consistency, the data used in this research is used from December 30, 2013. The share prices used in calculations are the end-of-day prices on December 30, 2013. Furthermore, since the investment portfolios are updated every quarter, and all five major banks use the same fiscal year, all banks have an investment portfolio dated December 30. Information

on the total number of shares is taken from each respective institution's annual report filing for the 2013 fiscal year.

4. Results

This chapter examines cross-ownership in the Canadian banking market from an empirical standpoint and determines the HHI and IOI value, given the parameters set out in the previous section. In order to assess if cross-ownership does, in fact, decrease competition, key product offerings are examined for evidence of noncompetitive pricing. The pricing strategy in the Canadian banking market is compared to the pricing strategy in the American banking market, where no cross-ownership exists. Finally, TD's competitive strategies in both North American markets are examined. TD's strategy in Canada, where it engages in heavy cross-ownership, is compared to its competitive strategy in the United States, where no cross-ownership exists.

4.1 Findings

Upon examining raw data on share ownership between the Big Five banks, certain trends become evident. First, holdings by direct competitors tend to be divided among subsidiaries and funds. For instance, although the Toronto-Dominion Bank appears to own 3.97% of RBC, its subsidiary, TD Asset Management Inc, as well as its funds more-than-double that ownership position to 8.3%. CIBC's holdings follow a similar trend, with ownership of direct competitors spread through its subsidiaries CIBC World Markets Inc., CIBC Global Asset Management Inc., and its various funds. Although the optics of having cross ownership spread across subsidiaries may seem nefarious, there does not appear to be any attempt to intentionally mask the level of cross-ownership of

each firm. Rather, each subsidiary manages different assets, and varying levels of cross-owned shares will naturally be held by subsidiaries.

In total, 31.25% of CIBC's shares are owned by direct competitors (Table 5), as well as 29.10% of TD's shares (Table 6), 28.31% of RBC's shares (Table 7), 28.01% of BNS's shares (Table 8) and over one-third (33.94%) of BMO's shares (Table 9). The single biggest ownership position by one bank is held by RBC, who owns 10.34% of BMO. In fact, all of RBC's ownership positions hover around the 10% range. The average position in the other four banks taken by RBC is 9.95%. These ownership positions total nearly \$20 billion as of December 30, 2013. RBC's mammoth positions make it the largest shareholder of CIBC, TD, and BNS stock. TD's positions make it the largest shareholder of BMO and RBC stock. The breakdown of ownership is detailed in the following tables (Tables 6, 7, 8, 9, and 10).

Table 7. Share Ownership in the Canadian Imperial Bank of Commerce by the Big Five Banks. Based on total share units of 399,250,000 and a share price of \$85.07 as was observed on December 30, 2013.

| Institutions | Shares Owned | % of Total | \$ Value |
|-----------------------|--------------|------------|------------------|
| Royal Bank of Canada | 40,056,964 | 10.0331 | 3,407,645,927.48 |
| Toronto-Dominion Bank | 37,849,532 | 9.4802 | 3,219,859,687.24 |
| Bank of Nova Scotia | 16,980,662 | 4.2531 | 1,444,544,916.34 |

| | | | |
|-------------------------|-------------|---------|-------------------|
| Bank of Montreal | 17,469,999 | 4.3757 | 1,486,172,814.93 |
| Can. Imp. Bank of Comm. | 12,420,072 | 3.1109 | 1,056,575,525.04 |
| Total | 124,777,229 | 31.2529 | 10,614,798,871.03 |

In Table 6, notice the split-point in ownership stakes between TD and RBC, and the remaining three. Share positions taken by these two banks in the others is approximately double that of the positions taken by other competitors. This is a trend that is relatively constant for every bank.

Table 8. Share Ownership in the Toronto-Dominion Bank by the Big Five Banks. Based on total share units of 919,400,000 and a share price of \$46.99 as was observed on December 30, 2013.

| Institutions | Shares Owned | % of Total | \$ Value |
|-------------------------|--------------|------------|-------------------|
| Royal Bank of Canada | 91,943,379 | 10.0004 | 4,320,419,379.21 |
| Toronto-Dominion Bank | 38,392,355 | 4.1758 | 1,804,056,761.45 |
| Bank of Nova Scotia | 28,538,499 | 3.1040 | 1,341,024,068.01 |
| Bank of Montreal | 44,252,765 | 4.8132 | 2,079,437,427.35 |
| Can. Imp. Bank of Comm. | 64,386,225 | 7.0031 | 3,025,508,712.75 |
| Total | 267,513,223 | 29.0965 | 12,570,446,348.77 |

In Table 7, notice that the TD's ownership position drops considerably compared to Table 6. All of the Big Five banks tend to hold on to considerably fewer of their own shares. On average, about eight times more capital is invested in competitor's shares than the bank's own shares.

Table 9. Share Ownership in the Royal Bank of Canada by the Big Five Banks. Based on total share units of 1,441,056,000 and a share price of \$71.41 as was observed on December 30, 2013.

| Institutions | Shares Owned | % of Total | \$ Value |
|-------------------------|--------------|------------|-------------------|
| Royal Bank of Canada | 79,926,660 | 5.5464 | 5,707,562,790.60 |
| Toronto-Dominion Bank | 119,679,610 | 8.3050 | 8,546,320,950.10 |
| Bank of Nova Scotia | 56,909,801 | 3.9492 | 4,063,928,889.41 |
| Bank of Montreal | 64,970,313 | 4.5085 | 4,639,530,051.33 |
| Can. Imp. Bank of Comm. | 86,574,017 | 6.0077 | 6,182,250,553.97 |
| Total | 408,060,401 | 28.3168 | 29,139,593,235.41 |

Table 10. Share Ownership in the Bank of Montreal by the Big Five Banks. Based on total share units of 648,476,000 and a share price of \$66.26 as was observed on December 30, 2013.

| Institutions | Shares Owned | % of Total | \$ Value |
|-------------------------|--------------|------------|------------------|
| Royal Bank of Canada | 67,045,150 | 10.3389 | 4,442,411,639.00 |
| Toronto-Dominion Bank | 69,707,422 | 10.7494 | 4,618,813,781.72 |
| Bank of Nova Scotia | 23,436,106 | 3.6140 | 1,552,876,383.56 |
| Bank of Montreal | 14,655,848 | 2.2600 | 971,096,488.48 |
| Can. Imp. Bank of Comm. | 45,266,200 | 6.9804 | 2,999,338,412.00 |

| | | | |
|-------|-------------|---------|-------------------|
| Total | 220,110,726 | 33.9428 | 14,584,536,704.76 |
|-------|-------------|---------|-------------------|

Table 11. Share Ownership in the Bank of Nova Scotia by the Big Five Banks. Based on total share units of 1,208,588,989 and a share price of \$66.27 as was observed on December 30, 2013.

| Institutions | Shares Owned | % of Total | \$ Value |
|-------------------------|--------------|------------|-------------------|
| Royal Bank of Canada | 113,716,955 | 9.4091 | 7,536,022,607.85 |
| Toronto-Dominion Bank | 109,043,065 | 9.0223 | 7,226,283,917.55 |
| Bank of Nova Scotia | 1,401,832 | 0.1160 | 92,899,406.64 |
| Bank of Montreal | 60,177,720 | 4.9792 | 3,987,977,504.40 |
| Can. Imp. Bank of Comm. | 54,212,757 | 4.4856 | 3,592,679,406.39 |
| Total | 338,552,329 | 28.0122 | 22,435,862,842.83 |

Before applying the HHI index or the proposed IOI index, it is evident that interownership in the Canadian banking market is significant. Over \$77 Billion in share interownership exists between the Big Five banks – considering the impact of cross-ownership on market concentration and market player behaviour that has been addressed

thus far, it is rather substantive that existing measures of market concentration do not take into consideration cross-ownership.

4.2 Applying the Herfindahl-Hirschman Index (HHI)

The only value in the original HHI index that requires calculation beforehand, is the s_i value. In order to calculate this value, the market share of each firm within the prescribed market barriers must be calculated. For this research, market share is derived from gross revenue as stated in each firm’s 2013 annual return. The market share of each of the statistically significant players can be found in Table 11 below.

Table 12. Estimation of market size and market share of players based on gross revenue. All revenue figures taken from annual report filings as of December 30, 2013.

| Firm | Revenue | Market Share % | s_i |
|----------|----------------|----------------|--------|
| RBC | 30,867,000,000 | 25.81 | 0.2581 |
| TD | 27,262,000,000 | 22.80 | 0.2280 |
| BNS | 21,655,000,000 | 18.11 | 0.1811 |
| BMO | 16,263,000,000 | 13.60 | 0.1360 |
| CIBC | 12,783,000,000 | 10.69 | 0.1069 |
| National | 5,163,000,000 | 4.32 | 0.0432 |
| HSBC | 2,161,000,000 | 1.81 | 0.0181 |

| | | | |
|------------|-----------------|--------|--------|
| Laurentian | 865,300,000 | 0.72 | 0.0072 |
| Western | 564,345,000 | 0.47 | 0.0047 |
| Other* | 2,000,000,000 | 1.67 | 0.0167 |
| Total | 119,583,645,000 | 100.00 | |

*Estimation of total revenue of remaining banks in the Canadian market. Market share outside of the 9 named banks drops significantly. Statistics Canada (2011) estimates the total revenue of the Canadian banking industry to be approximately \$120,000,000,000.

Figure 2. Calculation of HHI index value for the Canadian Banking market.

$$HHI=0.2581^2+0.2280^2+0.1811^2+0.1360^2+0.1069^2+0.0432^2+0.0181^2+0.0072^2+0.0047^2+0.0167^2$$

With reasonable assumptions, the traditional HHI index yields a value of 0.1837 for the Canadian Banking market. This falls under the “moderate concentration” status attributed to HHI values of $0.1500 \leq HHI \leq 0.2500$. Although the status of moderate concentration is in itself intriguing, the value of **0.1837** is on the lower end of this category and thus, realistically, would not be enough to justify any State intervention. Typically, in order for a government to intervene in a given market, the HHI index must be given the “highly concentrated” status ($HHI > 0.2500$) or at the very least, the value should be on the upper end of the moderate concentration bracket. Thus, despite the substantial ownership concentration and interownership revealed in the raw data, the traditional HHI index does not yield a high enough value and thus the current environment would be considered acceptable and additional mergers and acquisitions will likely be approved.

4.3 Applying the Interownership Index (IOI)

By taking the market share data used in the original HHI index calculation, and integrating the raw share ownership data, an IOI index value can be derived using the proposed formula. Table 12 below compiles the share ownership data for each of the Big Five banks. From this table, the Cj value can be derived. By subtracting the Cj value from 1, we get the modifier value that will boost each firm's market share by a proportional amount. Firm A (RBC), for instance, would have its market share, s_i , of 0.2581 squared, and then divided by 0.7723.

Figure 2. HHI v. IOI contribution for RBC

| | |
|---------------------|------------------------------------|
| HHI | IOI |
| $0.2581^2 = 0.0666$ | $\frac{0.2581^2}{0.7723} = 0.0863$ |

Table 13. Ownership Matrix setup for Interownership Index.

| | Own Firm | Competitors (Cj) | Others | 1-Cj |
|--------|----------|------------------|---------|---------|
| Firm A | 5.5464 | 22.7704 | 71.6832 | 77.2296 |
| Firm B | 4.1758 | 24.9207 | 70.9035 | 75.0793 |
| Firm C | 0.1160 | 27.8962 | 71.9878 | 72.1038 |
| Firm D | 2.2600 | 31.6827 | 66.0573 | 68.3173 |
| Firm E | 3.1109 | 28.1421 | 68.7470 | 71.8579 |

Figure 3. Calculation of the HHI index value for the Canadian banking market accounting for interownership in the Big Five banks (IOI Index).

$$HHI = \frac{0.2581^2}{0.7723} + \frac{0.2280^2}{0.7508} + \frac{0.1811^2}{0.7210} + \frac{0.1360^2}{0.6832} + \frac{0.1069^2}{0.7186} + 0.0432^2 + 0.0181^2 + 0.0072^2 + 0.0047^2 + 0.0167$$

With the same assumptions in place as the HHI calculation, this new calculation yields a value of **0.2463**. The index increase from **0.1837** to **0.2463** represents a **34.08%** increase, pushing the value much closer to the “highly concentrated” index classification. With a value of **0.2463**, further mergers or acquisitions would be subject to substantial scrutiny, and intervention by the State would be much more likely. When cross-ownership is factored into the market concentration calculation, The Canadian banking market environment is classified as highly anticompetitive, and possibly collusive. This result is consistent with the original hypothesis, as well as the limits testing and analysis of the equation’s behaviour. When, on average, approximately 1/3 of each firm is owned by direct competitors in a given market, the IOI value is about 1/3 higher than the traditional Herfindahl. This result is mathematically consistent.

With these results, past research on the impact of cross-ownership on market player behaviour would suggest that the Canadian banking market is highly anticompetitive. The negative effects of cross-ownership are fairly well researched, and on average, 30% of the market players’ shares are cross-owned by direct competitors. Furthermore, the more

conventional method of assessing anti-competition, the HHI index, yields a mid-high value of 0.1837, and the amended HHI formula (IOI index) yields a very high value of 0.2463. While the literature on cross-ownership suggests that such a level of market concentration is anti-competitive, it is important to conduct an empirical analysis of the Canadian banking market to determine if the market does, in fact, present symptoms of anticompetitive behaviour.

4.4 Symptoms of anti-competition: Profit Margins

Players in anticompetitive markets typically engage in noncompetitive pricing, resulting in abnormally high profitability. Industry profitability averages provide a reasonable indication of what a business *should* make in terms of profit. Grocery and supermarket industries typically operate on razor thin margins of about 2%-4%, whereas producers of luxury goods (Chanel, Rolex, Gucci) yield high margins of 20%-25%. Exxon Mobil, touted as the world's most profitable corporation, enjoyed a hefty profit margin of 7.74% in FY 2013.⁷ When the major players in an industry are able to collectively yield profitability margins significantly higher than the average, collusion, whether tacit or explicit, is suspect. Among the Big Five profitability margins are considerably elevated. All five had profitability margins above 25% in the 2013 fiscal year. These elevated profit margins stem from three revenue streams: interest revenue, investment management, and bank fees, all of which are explored in the following section. Table 13 provides pricing information on ten key product offerings of the Big Five banks.

Table 14. Comparison of product pricing offered by the Big Five banks for 10 homogenous products across 4 key product categories.

| Benchmarks | BMO | TD | RBC | CIBC | BNS | Avg | σ^2 | σ |
|-------------------------------|-------|-------|-------|-------|-------|-------|------------|----------|
| <i>Basic Interest Rates %</i> | | | | | | | | |
| Prime Rate | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.0000 | 0.0000 |
| High Interest Savings | 1.050 | 1.050 | 1.050 | 1.050 | 1.050 | 1.050 | 0.0000 | 0.0000 |
| <i>Mortgage Rates %</i> | | | | | | | | |
| C.T. Fixed Rate 5yr | 4.990 | 4.790 | 4.940 | 4.990 | 4.790 | 4.900 | 0.0105 | 0.0917 |
| Variable 5yr | 3.000 | 3.000 | 3.000 | 3.000 | 3.080 | 3.016 | 0.0013 | 0.0358 |
| <i>Credit Card Rates %</i> | | | | | | | | |
| Purchase Rate | 19.90 | 19.99 | 19.99 | 19.99 | 19.99 | 19.97 | 0.0016 | 0.0402 |
| Cash Advance Rate | 21.99 | 22.99 | 21.99 | 21.99 | 21.99 | 22.19 | 0.2000 | 0.4472 |
| <i>Banking Fees \$</i> | | | | | | | | |
| Overdraft protection | N/A* | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 0.0000 | 0.0000 |
| Stop Payment | 12.50 | 12.50 | 10.00 | 12.50 | 12.50 | 12.00 | 1.2500 | 1.1180 |
| NSF Cheque | 45.00 | 45.00 | 45.00 | 45.00 | 45.00 | 45.00 | 0.0000 | 0.0000 |
| Money Order | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 0.0000 | 0.0000 |

* The Bank of Montreal charges \$2.5 per month plus \$5 per occurrence. The overdraft pricing model is incompatible with those of the other four banks. It is therefore omitted from the mean, variance and standard deviation calculations.

The findings in Table 14 are rather significant. Of the 10 product prices and interest rates examined, half have a variance of zero. Of the remaining offerings, variance is minimal. Savings and mortgage rates between the banks are virtually indistinguishable. Assuming perfect competition, prices for homogenous products will sell for a common price in economic equilibria. However, in this case, the products are selling at the same price, but in an oligopolistic market. Near-identical pricing of homogenous products in absence of perfect competition suggests non-competition. To illustrate this point, let's look at the other rates offered in the market by smaller banks. As of December 2013, Accelerate Bank offers a high-interest savings rate of 1.95%, nearly double that of the 1.050% offered by all of the Big Five banks. True North Mortgage offers a 5-year closed-term fixed mortgage rate of 2.89%, two full percentage points below the Big-Five average. The same institution also offers a variable 5-year mortgage rate rate of 2.40%. Even National Bank, sometimes associated with the other large players as the "Big Six", offers a competitive mortgage rate. In December 2013, it offered a 5-year closed-term mortgage rate of 3.14%, about 1.5 percentage points lower than the lowest rate offered by a Big Five player. Despite economies of scale, and huge efficiencies stemming from IT investments and substantial outsourcing, the Big Five banks price their key products at a common rate, substantially higher than those offered by some smaller banks. This combination of market concentration, common pricing, and over-pricing is consistent with the previous research that has shown that cross-ownership has adverse effects on product market competition (Azar, Schmalz & Tecu, 2014; Jie & Huang 2014) and that

elevated cross-ownership yields a more collusive outcome (Farrel & Shapiro, 1990 ; Reynolds & Snapp 1986).

Price fixing is a two-ended concept in the banking industry, as players can fix both the lending rate (mortgage, loan, line of credit) as well as deposit rates (savings accounts, GICs, RESPs). It is, therefore, in the banks interest to maximize lending rates, and minimize deposit rates, especially when reserve ratios require very little in cash assets. When there exists five cross-owned entities that control over 90% of the market, common game theory suggests that attaining a collusive optimum is quite feasible. Recent instances such as the 2012 LIBOR scandal and the more recent 2014 HSBC–Deutschebank price fixing scandal, further suggest that price-fixing in the banking system is not only feasible, but real (Hall, 2013).

4.5 Comparison: US Market

Although the pricing behaviour within the Canadian market appears non-competitive, it is important to determine if this lack of variance is a natural aspect of full-service chartered banking or if the interownership results in prices being less competitive than in other banking markets. In order to determine this, data on pricing from the U.S. banking market is examined. The banking market in the United States provides a model that shares nearly all of the market trends and regulatory traits of the Canadian banking market, less the presence of interownership. Whilst the Canadian banking market counts five major players, the U.S. banking market has the “Big Four”. This Big Four consists of

Bank of America, Citigroup, JP Morgan Chase, and Wells Fargo, which collectively possesses 60% of the market (measured by total assets). Similar to the situation in Canada, the market also has a slew of small and regional banks, offering limited services as well as non-brick-and-mortar online banks, which specialize in certain product offerings.

Without any interownership, the U.S. banks have been competitive, and arguably too competitive. With a lack of regulation, banks competed aggressively, taking on more and more risk. When the 2008 collapse happened, the instability ultimately led to their demise, requiring a bailout to remain solvent. The situation in the U.S. demonstrates an example in which the presence of interownership may have played a positive role, by lessening competition and therefore increasing market stability. Interownership provides a tradeoff, in which competitive product and service offerings are sacrificed for increased economic stability. However, post-crisis, the banks play in a more cautious and regulated market.

The average variance in the product pricing of the Big Four is consistently higher than the variance of products offered by the Big Five. This variance in product pricing suggests that the banks are competitive, in that prices are not fixed and each bank tries to be price competitive in a different product category. For example, JP Morgan offers the lowest mortgage interest rate for both the 15 and 30 year fixed options, undercutting the competition by a considerable margin. Conversely, JP Morgan is the least competitive in

the credit card categories, offering the worst rate both for their standard credit card offering and their low-interest offering. CITI offers the worst mortgage rates of the Big Four, a poor savings deposit rate, and has mid-priced credit card rates, and yet is very price competitive in the CD product offering category. CITI's 1-year deposit rate is at least four times higher than the rates offered by the remaining three big banks. Bank of America leads the credit card category, offering the lowest rates for both their standard and low-interest credit card offerings. Finally, Wells Fargo appears to be mid-priced in most categories, and offers the best savings rate (although practically insignificant) at 0.03%. Each of the Big Four banks is the low-cost leader in a different category. This phenomenon demonstrates that each bank uses a different competitive strategy to capitalize on different product markets, thus exemplifying the behaviour of competitive market players.

Table 15. Comparison of product pricing offered by the Big Four banks in the United States.

| Benchmarks | BOA | CITI | JPM | WELLS | Avg | σ^2 | σ |
|----------------------------|-------|-------|-------|-------|-------|------------|----------|
| <i>Mortgage Rates %</i> | | | | | | | |
| 15 year fixed | 3.625 | 3.750 | 3.375 | 3.625 | 3.594 | 0.0247 | 0.1573 |
| 30 year fixed | 3.000 | 3.250 | 2.875 | 3.125 | 3.063 | 0.0260 | 0.1614 |
| <i>Credit Card Rates %</i> | | | | | | | |
| Lowest offering | 10.99 | 12.99 | 13.99 | 13.99 | 12.99 | 2.0000 | 1.4142 |

| | | | | | | | |
|----------------------|-------|-------|-------|-------|-------|--------|--------|
| Standard Rate | 20.99 | 22.99 | 22.99 | 21.99 | 22.24 | 1.3333 | 1.1547 |
| <i>Deposit Rates</i> | | | | | | | |
| Savings Account | 0.01 | 0.01 | 0.01 | 0.03 | 0.015 | 1.0000 | 1.0000 |
| <i>CD</i> | | | | | | | |
| 1 year | 0.05 | 0.20 | 0.02 | 0.05 | 0.080 | 66.000 | 8.1240 |
| 2 year | 0.10 | 0.25 | 0.25 | 0.21 | 0.203 | 50.250 | 7.0887 |
| 5 year | 0.15 | 0.50 | 0.55 | 0.50 | 0.425 | 341.66 | 18.482 |

In Canada, this phenomenon of banks being low-cost leaders in different categories is not observed. There is no low-cost leader for mortgages, and the difference between the highest and lowest offered rate of the Big Five for a 5-year fixed-term mortgage is only 0.25%. For 5-year variable mortgages, the rates are flat across the board. For high-interest savings, the exact same rate (1.05%) is offered by all five banks. Credit card purchase and cash advance rates are also flatter than the offerings by the Big Four in the American market.

Furthermore, while all the mortgage rates offered by the Big Four in the United States are lower than the average, and are effectively the lowest available rates in the American market, the rates offered by the Big Five in Canada are far from the lowest rates in the Canadian market. For instance, in December 2013, True North Mortgage offered a 2.74% rate for a 5-year fixed-term mortgage.

Overall, the rates offered by the Big Four are highly competitive, given the offerings of smaller banks. Freddie Mac determined in late November 2014 that the average 30-year fixed mortgage rate was 3.97 percent, and the average 15-year fixed mortgage rate was 3.17 percent. As is examined in Table 14, the rates offered by the Big Four were all lower than the average for both the 15 year and 30 year rates. JP Morgan’s offering was 15% lower than the average.

ATM Fees

Looking at ATM fees, the United States market also has more variance than the Canadian market.

Table 16. ATM fees among the Big Five.

| <i>Withdrawal Rates</i> | BMO | TD | RBC | CIBC | BNS | Avg | σ^2 | σ |
|-------------------------|------|------|------|------|------|------|------------|----------|
| Own ABM | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Canada (Interac) | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 0.00 | 0.00 |
| USA (PLUS) | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 |
| International (PLUS) | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 0.00 | 0.00 |
| Cash Adv (Canada) | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 | 0.00 | 0.00 |
| Cash Adv (Other) | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 0.00 | 0.00 |

Table 17. ATM fees among the Big Four.

| <i>Withdrawal Rates</i> | BOA | CITI | JPM | WELLS | Avg | σ^2 | σ |
|-------------------------|------|------|------|-------|------|------------|----------|
| Own ATM | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.000 |
| Other ATM (USA) | 2.00 | 2.00 | 2.00 | 2.50 | 2.13 | 0.063 | 0.250 |
| Foreign Flat fee \$ | 5.00 | 3.00 | 5.00 | 5.00 | 4.50 | 1.000 | 1.000 |
| Foreign Trans. % | 0.00 | 3.00 | 3.00 | 0.00 | 5.00 | 3.000 | 1.732 |

In Canada, the Big Five carry the same fees for the same six ATM services with zero variance. In the United States, fees are elevated, however there is a higher price variance among the Big Four. In addition, several competitive strategies for ATM fees can be observed among the Big Four as well as other market players, allowing customers a variety of options, including the option of escaping fees altogether. For instance, Bank of American has a substantive network of partner banks that let their customers waive the \$5.00 transaction fee as well as any operator access fee. Bank of American clients who withdraw funds from any of Barclays, BNL D'Italia, BNP Paribas, China Construction Bank, Deutsche Bank, Santander, Scotiabank, UkrSibbank or Westpac Bank have all fees waived. Chase also allows certain customers to waive fees not only abroad, but within the

United States as well. Chase waives ATM fees for students enrolled in a post-secondary education and also waives the fees for their Citigold account holders. Furthermore, financial innovators such as Capital One and Ally bank do not charge customers for using a foreign ATM and will reimburse any fees incurred.

It is also important to note that the Big Four offer more ATMs per capita than the Big Five. With 1 Big Four ATM per 4000 citizens compared to 1 Big Five ATM per 6,250 citizens, home branches in the United States are more accessible and therefore, customers can avoid ATM fees more frequently, making the annualized cost of ATM banking lower in the United States than in Canada.

The competitive landscape for ATM fees follows the same trends observed in other product offerings. Price variance is higher in the United States, and competitive strategies can be observed that benefit consumers and demonstrate a highly competitive market.

4.6 TD Bank: Behaviour in Canada and the United States

When the Canadian Big Five are compared to the American Big Four, we see that the Big Five are much less competitive from a pricing standpoint than the Big Four. We also see that, while the Big Four offer rates that are considerably better than the market average, the Big Five offer rates that are considerably worse than what is offered by the remaining market players. Despite the vast similarities in market concentration, regulation, and

environment, the Big Five, which engage heavily in interlocking cross-ownership, are far less competitive than the Big Four, which do not appear to engage in any shareholding interlocks.

To further examine how cross-ownership may affect the behaviour of market players, the behaviour of TD bank is examined. TD bank places itself in an interesting situation as it competes both in the Canadian and US markets. Therefore, it enables one to examine how the exact same corporation competes in two different, yet near-identical markets, one with high cross-ownership, and one with none. Furthermore, TD's place in the Canadian and United States market are relatively comparable. In terms of market reach, TD in fact has more branches in the United States than it does in Canada (1329 in the US, 1179 in Canada).

Evidently, TD bank in Canada is non-competitive in its product pricing, offering near-similar, if not the exact same product pricing, on savings, mortgages, banking fees and credit card rates when compared to the other Big Five players. However, by examining TD in the United States, the pricing strategy appears to be completely different. If high cross-ownership creates an incentive for players to be non-competitive, in the total absence of cross-ownership, one would expect TD to be highly price competitive, and this appears to be precisely the case.

When TD’s product pricing in the US is compared to the pricing of the Big Four, TD offers, on average, rates that are more competitive than those offered by the Big Four. TD undercuts the competition in the low-interest credit card market, offering a card at 9.24%, compared to the lowest “Big Four” rate offered by Bank of America at 10.99%. For savings account interest rates, TD offers a rate of 0.25%, the next leading rate is offered by Wells Fargo, with a measly 0.03%. Finally, TD’s CD rates are considerably better than those offered by the other Big Four.

Table 18. Comparison of TD Bank pricing strategy in the United States and pricing strategy of the Big Four banks.

| Benchmarks | BOA | CITI | JPM | WELLS | TD | TD Pricing |
|----------------------------|-------|-------|-------|-------|-------|-----------------|
| <i>Mortgage Rates %</i> | | | | | | |
| 30 year fixed | 3.625 | 3.750 | 3.375 | 3.625 | 3.875 | Non-competitive |
| 15 year fixed | 3.000 | 3.250 | 2.875 | 3.125 | 3.250 | On-par |
| <i>Credit Card Rates %</i> | | | | | | |
| Lowest offering | 10.99 | 12.99 | 13.99 | 13.99 | 9.24 | Competitive |
| <i>Deposit Rates %</i> | | | | | | |
| Savings Account | 0.01 | 0.01 | 0.01 | 0.03 | 0.25 | Competitive |
| <i>CD %</i> | | | | | | |
| 1 year | 0.05 | 0.20 | 0.02 | 0.05 | 0.35 | Competitive |

| | | | | | | |
|--------|------|------|------|------|------|-------------|
| 2 year | 0.10 | 0.25 | 0.25 | 0.21 | 0.30 | Competitive |
| 5 year | 0.15 | 0.50 | 0.55 | 0.50 | 0.85 | Competitive |

Table 19. Comparison of TD Bank pricing strategy in Canada and pricing strategy of the Big Five banks.

| Benchmarks | BMO | RBC | CIBC | BNS | TD | TD Pricing |
|-------------------------------|-------|-------|-------|-------|-------|-----------------|
| <i>Basic Interest Rates %</i> | | | | | | |
| Prime Rate | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | On Par |
| High Interest Savings | 1.050 | 1.050 | 1.050 | 1.050 | 1.050 | On Par |
| <i>Mortgage Rates %</i> | | | | | | |
| C.T. Fixed Rate 5yr | 4.990 | 4.940 | 4.990 | 4.790 | 4.790 | On Par |
| Variable 5yr | 3.000 | 3.000 | 3.000 | 3.080 | 3.000 | On Par |
| <i>Credit Card Rates %</i> | | | | | | |
| Purchase Rate | 19.90 | 19.99 | 19.99 | 19.99 | 19.99 | On Par |
| Cash Advance Rate | 21.99 | 21.99 | 21.99 | 21.99 | 22.99 | Non-competitive |
| <i>Banking Fees \$</i> | | | | | | |
| Overdraft protection | N/A | 4.000 | 4.000 | 4.000 | 4.000 | On Par |
| Stop Payment | 12.50 | 10.00 | 12.50 | 12.50 | 12.50 | On Par |
| NSF Cheque | 45.00 | 45.00 | 45.00 | 45.00 | 45.00 | On Par |

| | | | | | | |
|-------------|------|------|------|------|------|--------|
| Money Order | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | On Par |
|-------------|------|------|------|------|------|--------|

TD bank in Canada has the means and opportunity to undercut the competition in the Canadian market, but they choose not to, because there is little incentive to do so. With 30% of the company's shares cross-owned, gains in market share acquired through a successful competitive strategy would be wiped out by the loss incurred in the value of shares held in its competitors. In the United States market that is absent of interownership, TD has every natural economic incentive to be as competitive as possible in the market. Market share gains are pure gains, and the resulting losses incurred by competitors have no negative effect on TD's gains.

5. Discussion, Limitations, and Future Research

The results of the empirical study of the Canadian banking market and the IOI index proposal raise several important follow-up questions. The subjects of the utility of the IOI, consumer behaviour, cross-directorship, regulatory implications, and weaknesses of this study and the IOI index are discussed in this section.

5.1 Discussion: Use of the Interownership Index

Through the application of the proposed index to the Canadian banking market, it is evident that the IOI index provides a more accurate estimation of market concentration than the HHI. By strategically amending HHI, the IOI maintains the sum of squares effect and respects the principles of the Cournot oligopoly model. Furthermore, the IOI yields identical results to the HHI in markets where there is no interownership. Because results are undifferentiated when no interownership exists, the IOI is able to replace the HHI in a rather fluent manner. The IOI may also be useful to antitrust authorities in a complementary role to the HHI. If researchers use the IOI in tandem with the HHI in scenarios where interownership is suspect, we may be able to develop a more comprehensive understanding of how interownership affects competition. With more substantial data on the HHI and IOI values of markets across several years, substantive empirical analyses can be conducted to measure the correlation between interownership and product pricing, among others. The mathematical simplicity and accuracy of the IOI make it a highly useful tool, since antitrust bodies and independent researchers alike must

convey information and logic to the public in a manner that can be fairly easily understood and grasped.

5.2 Discussion: Consumer Behaviour

The Cournot model is a useful tool to understand the behaviour of market players in an oligopolistic market, however it does not explain why consumers choose to stay with the Big Five despite the lower-priced alternatives in the Canadian market. The Big Five may behave in an oligopolistic fashion, but there are several other smaller chartered banks in the market, so with smaller banks offering substantially more competitive rates on the same products, why don't Canadians flock to the lower rates, and instate a lower price equilibrium? Some possible explanations are proposed:

First, the way banking culture in North America has developed, switching costs are very high. Much like a religion, children are “born into” certain banks and therefore individuals are banking customers before they can consciously evaluate the alternatives. In many cases, parents have a preferred bank, and establish an account for their children through a joint account. These accounts enable parents to set money aside for educational purposes, deposit funds for the child for events such as birthdays, and also enable parents to teach their children about banking and the importance of saving money. Through this process, children grow into their banking institution, slowly acquiring more products and services as they age and their banking needs become more complex. Banks are very aware of this development process, and have designed products to suit their customer's

needs at all stages of life. RBC, for example, offers a “Leo’s Young Savers Account” branded to children under 19 years of age. The product is marketed to parents as “a great way for children and youth to get started with saving and everyday banking”⁸. All Big Five banks follow this basic customer acquisition and retention strategy.

For the millions of Canadian children that are “born into” banks, there is no conscious decision-making process, and no evaluation of alternatives. As young customers age, an increasing array of products and services are offered by their “born-into” bank, and the customer becomes more attached to their institution. Each additional product that a customer consumes increases switching costs. It may be relatively simple to change banks when an individual has a couple of standard deposit accounts, but when one’s credit card, mortgage, line of credit, GICs, TFSAs, Mutual Funds, RESPs, and RRSPs are all with the same institution, switching entails a significant amount of time, patience, and loss of capital. Furthermore, as smaller banks cannot offer the same range and depth of product offerings, an individual who switches banks may be obligated to become a customer of two or three financial institutions in order to have access to all of the product services that customer had at their previous Big Five bank.

Banking also has a rather substantial network effect. The more people who bank, the greater the amount of capital, and the more the bank can engage in lending operations. Greater numbers also allow banks to offer a greater diversity of mutual funds and other investment products. From the customer’s perspective, banking is much easier when

friends and family are with the same bank, and similarly, it is easier for businesses to transact with businesses from the same bank. Transactions between accounts within the same bank are often faster, cheaper, and easier.

Branch banking also plays a critical role in the stronghold of the Big Five. It is associated with security, and economic stability (Carlson & Mitchener 2006). As banking has become more complex, and more personalized, in-person banking remains highly important. Branches have become home bases for customers, and access to branches is critical. For customers with investment banking needs, banking with an institution that does not have a branch in town is simply not possible.

Table 20: Branch banks and ATMs among key Canadian banks.

| | Branches | ATMs |
|-----------------|----------|-------|
| RBC | 1,372 | 4,973 |
| TD | 1,179 | 2,845 |
| BNS | 1,038 | 3,800 |
| CIBC | 1,100 | 4,000 |
| BMO | 933 | 2,900 |
| National Bank | 453 | 937 |
| HSBC | 140 | N/A |
| Laurentian Bank | 153 | 422 |

| | | |
|----------------|----|-----|
| Western Bank | 40 | N/A |
| Churchill Inv. | 12 | N/A |

The banks that fall out of the Big Five circle struggle to have even 10-15% of the Branch and ATM reach enjoyed by the Big Five. The only bank that comes near is the National Bank, but few of their branches are located outside of Quebec. For the average customer, non-branch banking is not an option, and therefore, banking with any other institution other than the Big Five (or Big Six in Quebec) is not an option.

In sum, the high switching costs associated with changing banks, coupled with the sheer inaccessibility of full-service banking with a “non-Big Five” bank may have forced consumers to stay with their banks and accept the rates and fees they offer.

Another theory as to why Canadians do not flock to lower rates at other banks is more complex. The answer is that many of them do, in fact, flock to other banks. Financial innovators in the Canadian market such as ING Direct and AllyBank were able to attract millions of Canadians to their business with their highly competitive rates, and unmatched customer service. In a 1998 public letter, the Competition Bureau stated that for ING Direct customers “the average rate of interest paid over the past year is more than 10 times that offered by the major banks on a deposit of \$4,500”⁹. However, this halted in 2012 for ING Direct when it was acquired by Scotiabank (and renamed

“Tangerine”). AllyBank’s reign ended in 2013, when it was bought by the Royal Bank of Canada. After the acquisitions, the competitive rates quickly became less competitive, and were muddled in with the uniform rates offered by the Big Five. A substantial portion of Canadians are price sensitive, and willing to accept the switching costs to migrate some accounts to alternative banks. The problem is that the big banks quickly see these threats, and extinguish them through acquisitions.

5.3 Discussion: Cross-directorship

As was stated in the introduction of this work, horizontal cross-ownership facilitates tacit collusion, not explicit collusion. As a measure of assessing the possibility of explicit collusion, a study of the makeup of the board of directors of the Big Five was conducted, gathering board member information from 2000 to 2013. An analysis of the board of directors makeup of the Big Five finds no substantial evidence of intermingling – at no point during this period did a board member of a Big Five bank sit on the board of another Big Five Bank (Tables 16-20). Board members have, however, worked for a competing bank in management roles. Geoff Beattie, who is an active board member of RBC as of 2013, was the Vice-President of CIBC Wood Gundy Inc. from 1987-1990. Ties like these are of little concern, since a substantial amount of time has transpired between taking the two roles.

One interesting note from the study is the elevated frequency of board members with “Honourable” and “Right Honourable” titles. Influential political figures sit on these

boards and may facilitate the achievement of politically relevant strategic goals. For example, a respected politician board member could be more effective in lobbying for the approval of a proposed merger or acquisition if political allies sit on the other side of the table. After all, all but two proposed mergers and acquisitions made by Big Five banks in recent history have been approved by the governing body. However, in order to confirm such a suspicion, more research is needed.

5.4 Discussion: Threats of International Players

The argument of institutional stability that was brought up in the literature review is only valid in a closed economy model. If there are no sizeable new entrants, the Big Five can continue to engage in anticompetitive activities that keep profitability and solvency high, and the institutions will, in fact, continue to strengthen. However, the threat of new entrants is a very real and considerable threat, and if a sizeable new entrant is successful in competing in the market, the cross-ownership will have the opposite negative effect on economic stability. With 30% of each institution cross-owned, 30% of each institution's value is tied to the success *or failure* of competitors. Should a sizeable new entrant successfully compete and become a market leader, any loss in market share by a Big Five player would negatively impact the balance sheet of the other four, which in turn would compound the negative financial impact in a domino-like effect. The only way to eliminate an outside competitor without directly competing is through acquisition, and the past two decades of banking history are a testament to this.

5.5 Discussion: Proposed Regulatory Remedies

The IOI provides a better estimation of the level of concentration and anti competition in a given market, and the study conducted on the Canadian banking market suggests that the market is more anticompetitive than was estimated with the HHI. Since interownership has anticompetitive effects, what regulatory or legislative changes could reduce these effects? Some propositions are discussed.

5.5.1 Bank Act Ownership Restriction

The Bank Act, a piece of federal legislation that governs the operations of Canadian banks, states that no more than 10% of the ownership of a Schedule I bank be held by any one person or group of individuals acting in concert.¹⁰ Arguably, this law is already being violated, since the Big Five have a collective average of 30% ownership in each other, which encourages price-fixing and other collusive behaviour. There is a case to be argued that this high level of interownership between the Big Five could fit the legal definition of *individuals acting in concert*. Although a litigation case arguing this could prove to remedy the situation, it may be more reasonable to revise c.46 of the Bank Act and reduce the current restriction on ownership of 10% to 5%.

The 10% limit may very well have been reasonable during the time it was imposed. However, as market concentration has grown stronger, and firms have gotten bigger, the significance of a 10% ownership position is nominally far more impactful and prominent than it once was. For example, RBC's total assets grew 550% from 1991 to 2013, while

the nation's GDP grew an average of 2% per year. I would argue that lowering the ownership ceiling to account for the substantial change in financial and political significance of bank ownership that has arisen since the creation of this law in 1991 could prove to greatly remedy the situation with few negative consequences. The 10% ceiling could, for example, be lowered to 5%. In doing so, the ceiling on firm ownership by direct competitors is substantially lowered. Table 21 demonstrates how the ceiling affects the limits on interownership. Interownership scenarios are examined for markets with 3, 4, 5, and 6 equal payers in four different ownership ceiling scenarios of 10%, 7.5%, 5%, and 1% ownership.

Table 21. Matrix of maximum possible interownership allowed in a market with 3, 4, 5, and 6 equal players, with a 10%, 7.5%, 5%, and 1% ownership ceiling.

| | 10% | 7.5% | 5% | 1% |
|-----------|------------|-------|------------|----|
| 3 Players | 20% | 15% | 10% | 2% |
| 4 Players | 30% | 22.5% | 15% | 3% |
| 5 Players | 40% | 28% | 20% | 4% |
| 6 Players | 50% | 37.5% | 25% | 5% |

As Table 21 demonstrates, the current 10% restriction theoretically permits the Big Five banks to have up to 40% of their shares cross-owned. Evidently, differences in firm size

make it more difficult for the smaller players (BNS, CIBC, BMO) to take a 10% ownership stake in the larger players (RBC, TD). As a result, the average Big Five bank has 30.12% of its shares owned by direct competitors, rather than the full 40%. However, if the smaller banks become wealthier, they may have more capital to invest in competitors' shares. Thus, although the 30.12% statistic is considerable, current legislation allows cross-ownership to further increase.

As shown in Table 15, a limit of 5% ownership would cap maximum cross-ownership at 20%. Such a ceiling would be strict enough to avoid much of the anti-competitive influences of high cross-ownership, but yet is modest enough to not restrict access to capital. The principal argument against ownership restriction is that such ceilings restrict the free flow of capital (Garvey & Giammarino, 1998). Much like a price ceiling, an ownership ceiling prevents market firms from buying shares at an economic optimum. However, with the substantial increase in firm size, it can be argued that a 5% ownership position is as unrestrictive as the 10% ownership cap was in the 1990s when the law was introduced. Acquiring 5% of the shares of any of these five banks today represents an investment of over \$1 Billion. \$1 Billion is enough to ensure that everyday investors, investment fund management corporations and a slew of other entities that typically invest in bank shares are never limited in what they can acquire. The only entities that would have access to such capital and have an interest in acquiring a stake greater than 5% would be other multinational financial institutions – precisely the corporate entities that are of interest to antitrust authorities.

The 5% ceiling allows banks to continue to own shares of direct competitors for less nefarious purposes, such as product investment offerings, portfolio diversification, and creation of synergies (Macho, Stadler & Verdier 1991), while diminishing the economic incentives for noncompetitive behaviour.

Furthermore, the logic in implementing this ownership restriction is applicable to any other industry. As was discussed in the literature review, the anti-competitive effects of cross-ownership are applicable to any other industry, as was exemplified by the cross-ownership in the telecommunications industry in the United States, and the airline industry in China. Thus, while this research used the banking industry as a focal point for empirical observation, its conclusions and contributions are universal to all industries.

5.5.2 Branch Banking economic incentives

As has been discussed, the utility of full-service branch banking has resulted in a lower price elasticity for banking products. Despite the competitive rates offered by non-Big-Five players, the Big Five continue to retain and grow their customer base. Thus, if the utility of full-service branch banking prevents consumers from accessing lower-priced products offered by smaller banks, it may be useful to provide economic incentives for smaller banks to build branches and install ATMs in markets that they do not adequately service. For example, a tax break for building branches in new markets for institutions with a market capitalization under \$1 Billion could help stimulate competition. Even a

modest tax incentive could help smaller banks be more competitive and accessible to Canadian consumers and stimulate competition among the Big Five.

5.6 Limitations

5.6.1 Limitation: IOI index utility

The IOI index has no impact on the difference in the market concentration value prior and post-merger. This is because the IOI proportionally augments the pre and post merger values, meaning the difference between the two is the exact same as calculated with the HHI. As a result, for regulations stating that a merger that exceeds a certain numerical increase in market concentration is unacceptable, the IOI provides no increase in utility when compared to the HHI. The utility lies in the IOI being able to better estimate the **present** competitive environment. The higher the level of concentration, the less likely antitrust authorities will approve a merger or acquisition.

Furthermore, the IOI is only applicable to interownership, meaning horizontal ownership among direct competitors. The IOI cannot account or measure the impact of vertical cross-ownership, because with vertical cross-ownership, the controlling interests are not in the measured market and therefore have no conclusive effect on market concentration or market player behaviour.

5.6.2 Limitation: Accuracy of the IOI formula denominator

The IOI formula denominator, expressed as $1-\sum c_j$, does not reflect differences in how cross-ownership is distributed. Because the c_j values are summed, the formula does not take into account how the interownership is spread across in the market. For example, 3 firms holding 15% ownership stakes in a given firm will affect the index value in the same way as 15 firms with 3% ownership stakes in a given firm – in both cases the given firm’s squared market share will be divided by $1-0.45 = 0.55$. Arguably, a small number of large ownership stakes in a given firm is more anticompetitive than a large number of small ownership stakes, and the IOI does not account for this.

In order to remedy this inaccuracy, one could explore the possibility of squaring the c_j values before summing them, therefore giving more weight to larger instances of cross-ownership. Doing so would take the sum-of-squares effect that characterizes the original HHI index and apply it to the denominator of the IOI. Although this could improve the accuracy of the IOI, squaring these fractional values may be squaring away the utility of the index, since the resulting c_j value could be too small.

It is unclear how the formula would behave with these changes and more research is needed. It is also unclear how the formula’s relation to the original HHI would be affected.

5.6.3 Limitation: Parameters used in empirical study

The HHI and IOI are extremely simplistic. As a result, the parameters pertaining to market definition will vary from study to study. For example, while I chose to omit Caisses Populaires and not-for-profit credit unions due to their ownership structures, it is equally valid to include them in the market concentration calculation, which would have resulted in an HHI and IOI that were lower than those found in this paper. Similarly, one could estimate market size through total assets or net income rather than gross revenue, which may also yield a higher or lower HHI and IOI value. Although these considerations would modestly affect the numerical value yielded by market concentration measurements, it in no way impacts the validity, applicability or utility of the IOI. Regardless of the parameters chosen, the IOI will still proportionally increase the market concentration value in relation to the level of interownership, and its mathematical consistency with the HHI is left unchanged.

The comparison to the American banking market is also imperfect. While the American banking market was used in this study as a benchmark due to its comparable size, number of big players, comparable regulatory environment and, most importantly, absence of cross-ownership, it is not a clean benchmark free from external influences. As was mentioned, vertical cross-ownership exists in the American market, and it may or may not impact the competitive behaviour of the Big Four market players. Regardless, the American market is completely absent of horizontal cross-ownership, and thus for the purposes of comparison to the Canadian market where horizontal cross-ownership is

present, it is a valid benchmark, and likely the best benchmark in terms of size, number of major players, consumer and regulatory environment, and absence of horizontal cross-ownership.

5.7.1 Future Research: Vertical Cross-Ownership

As was discussed in the paper's literature review, cross-ownership can come in many forms. The conclusions of this paper are applicable only to situations of horizontal cross-ownership. Vertical cross-ownership is, however, also present in many markets, and its impact on markets may be quite the opposite. While cross-ownership in the Canadian banking market manifests itself in a very clear horizontal fashion, there exists substantial vertical cross-ownership in the American banking market. Ownership in the US banking market is characterized by unrelated investment firms holding substantial positions in all Big Four competitors in the market. Vanguard Group, Inc., State Street Corp, Black Rock fund advisors, and Fidelity Management and Research Company are among the top six largest investors for all four of the United States' largest banks: JP Morgan Chase & Co., Bank of America Corp., Citigroup Inc., and Wells Fargo & Co. Vanguard Group is the largest shareholder of three of the four banks.

With horizontal cross-ownership, market players are making the best decisions for the long-run health of the company, which can include some noncompetition to augment profits without increasing market share. However, with vertical cross-ownership, the shareholding decision-makers are unattached from the long-run health of the market players. As a result, the objective is to maximize capital gains, often at the expense of the

long-term health of the market players. These shareholding decision-makers can profit from gains, and take short positions to profit from losses. It is perhaps for this reason that, while noncompetition is observed in the Canadian market, heavy competition is observed in the American market. Evidently, heavy competition can be dangerous as was exemplified in the 2008 economic crisis.

An examination into the effects of vertical cross-ownership on market player behaviour would be an interesting research topic to pursue, as it is a phenomenon that is common in large industries and whose effects are unclear.

5.7.2 Future Research: Cross-ownership across business segments

The HHI measures market competition between whole firms, and as such, the IOI does so as well. Although the IOI is an effective tool to estimate the overall level of interownership and anticompetition between firms, it may be useful to use the IOI to compare and analyze business segments. Banks, like many other large-scale enterprises, engage in many different businesses. The Big Five compete across six business segments: Personal & Commercial Banking, Wealth Management, Insurance, Investor & Treasury Services, Capital Markets, and Corporate Support. By looking at segment-specific levels of interownership, one can include a more vast and complete array of competitors, which would lead to a more accurate market competition assessment. For example, by calculating the IOI for the insurance segment, non-bank insurance companies can be included in the market assessment calculations. Conducting these types of analyses may

reveal instances of interownership between banks and non-banks within the same market segment.

Cross-ownership analysis across business segments also allows one to determine which business segments are the most affected by cross-ownership, and which segments are the most anticompetitive.

5.8 Contributions

The contributions of this work can be summarized as follows: First, it satisfies the three areas of novelty set out in the introduction:

1. From what I have seen, this paper is the first to research cross-ownership of any kind in any Canadian market.
2. This research defines and explores a specific form of cross-ownership, interownership. By honing in on a specific, clearly defined form of cross-ownership, research results can be more specific and conclusive.
3. This research proposes the IOI index, which enables one to measure market concentration while accounting for interownership, all while maintaining the logic and simplicity of the original Herfindahl-Hirschman Index. This enables one to have a more accurate estimation of a competitive environment.

Finally, this research draws a clearly defined relationship between cross-ownership and market concentration. By adopting the definition of *entity* as “any person or group of

persons acting in concert” a direct and proportional relationship can be calculated between the level of interownership, and the number of effective market players. This direct and proportional relationship allows for the development of the interownership index and opens the door to further studies and contributions in this field.

6. Conclusion

The convergence of modern-day markets and the complexity of financial instruments have blurred the lines between competitor and partner, and the level of competition in an industry can no longer be accurately assessed through a simple measurement of market ownership, as is the case with the Herfindahl-Hirschman Index, the most prominent market concentration estimation tool in the antitrust field.

While numerous studies on horizontal cross-ownership have been conducted, observing a multitude of situations and studying its effects, the literature, as a whole, appears to come to the same conclusion: While horizontal cross-ownership among competitors can increase market stability, promote the creation of strategic alliances leading to market efficiencies, and increase the profitability of market players, significant levels of horizontal cross-ownership by nature are an increase in market concentration and lead to anti-competitive behaviour, most commonly exhibited through noncompetitive pricing, a form of tacit collusion. In extreme cases, interownership may lead to explicit collusion and price-fixing.

Going back to the definition of entity and the concept of an “effective number of market players”, if the Big Five were the only players in an oligopoly model, the effective number of market players would only be about 3.5 due to the level of interownership (5 market players less 30% interownership in each, equals $0.7+0.7+0.7+0.7+0.7= 3.5$). The

effective number of market players aids in understanding why players exhibit monopolistic tendencies and to what degree these tendencies are present. The Cournot duopoly and oligopoly models aid in understanding the substantial decrease in the ability to collude with each added market player. In a duopoly, each firm has a *unilateral* incentive to collude, and with each added player, this incentive drops dramatically. Therefore, while cooperation between five or six unattached competing interests is difficult and unlikely, when interownership reduces the effective number of market players to 2 or 3 (or 3.5), the incentive and ability to be noncompetitive dramatically increases.

Interownership among the Big Five Canadian banks is substantial. On average, 30% of each bank's shares are cross-owned by the other four. These horizontal shareholding interlocks are not unique to the banking industry, and can be present in any other market. Horizontal cross-ownership is not considered in merger and acquisition rulings, and most notably, the Herfindahl-Hirschman index fails to account for interownership. The IOI index has been introduced as a more accurate alternative. Through an evaluation of the underlying mathematical theory, I have concluded that the HHI can be substituted by the IOI, as the IOI is designed to yield identical results to the HHI when there is no interownership and will yield the same ratio in pre and post merger value as the HHI.

The interownership examined in the Canadian banking market does increase market concentration in terms of the effective number of market players. The interownership

increases the HHI value by 34% when it is factored in. The IOI value of 2463 puts the industry dangerously near the “highly concentrated” market category. The high value is consistent with anticompetitive trends that have been observed in the market in recent years. The examination of prices for key products and services offered by the Big Five show little-to-no variance, and overall profitability between the five average approximately 25%. This margin is substantially higher than the 2013 banking industry average of 18% (Statscan, 2014¹¹). This price non-competition is accentuated when compared to the competitive environment of the American banking market. The American Big Four displayed higher price variance, differentiated competitive strategies, competitive pricing and profitability margins closer to industry averages. TD, which competes in both the Canadian and American market, displayed highly competitive behaviours in the American market which has no interownership and noncompetitive pricing behaviours in the Canadian market where the institution engages in heavy interownership.

An assessment of branch banking shows a substantial gap between the Big Five and the other market competitors. The Big Five have more than ten times the amount of branches and ATMS when compared to the next five largest competitors. Finally, we also observed serial competitor acquisitions. When financial institutions enter the Canadian market and offer competitively priced products and services, the Big Five are quick to acquire them, thus eliminating any competitive threats. In the span of two years, two substantial

takeovers occurred that may have been prevented had interownership been factored in during the impact assessments conducted by the Canadian Competition bureau.

Although the Big Five banks continue to yield stellar returns to shareholders, and enjoy positive media attention, customers of all five banks appear to be subjected to high fees, yet are offered record-low rates for their deposits. In a market where price sensitivity and demand elasticity are extremely high, one would expect market players to be highly price competitive. However, product pricing, rates, and fees between Canadian banks have little-to-no variance, and remain artificially high. The high switching costs and lack of full-service banking offered by competitors largely prevent Canadian consumers from simply switching to a smaller, but more price competitive bank. With the IOI, antitrust authorities can better assess the impact of mergers and acquisitions and prevent situations like this, not only in the Canadian banking market, but in any domestic market of interest.

7. Appendix

Table 22. Board of Directors for Toronto-Dominion Bank 2000-2013

Highlighted: CEOs and Board Chairmans

BOD TD 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|----|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------------------|----------------------|----------------------|
| 1 | William E. Bennett | William E. Bennett | William E. Bennett | William E. Bennett | William E. Bennett | William E. Bennett | William E. Bennett | William E. Bennett | William E. Bennett | William E. Bennett | Hugh J. Bolton | A. Charles Baillie | A. Charles Baillie | A. Charles Baillie |
| 2 | Hugh J. Bolton | Hugh J. Bolton | Hugh J. Bolton | Hugh J. Bolton | Hugh J. Bolton | Hugh J. Bolton | Hugh J. Bolton | Hugh J. Bolton | Hugh J. Bolton | Hugh J. Bolton | W. Edmund Clark | W. Edmund Clark | W. Edmund Clark | W. Edmund Clark |
| 3 | John L. Bragg | John L. Bragg | John L. Bragg | John L. Bragg | John L. Bragg | John L. Bragg | John L. Bragg | John L. Bragg | John L. Bragg | John L. Bragg | Marshall A. Cohen | Eleanor R. Clitheroe | Eleanor R. Clitheroe | M. Norman Anderson |
| 4 | Amy W. Brinkley | Amy W. Brinkley | Amy W. Brinkley | Amy W. Brinkley | W. Edmund Clark | W. Edmund Clark | W. Edmund Clark | W. Edmund Clark | W. Edmund Clark | W. Edmund Clark | Wendy K. Dobson | Marshall A. Cohen | Marshall A. Cohen | G. Montegu Black |
| 5 | W. Edmund Clark | W. Edmund Clark | W. Edmund Clark | W. Edmund Clark | Wendy K. Dobson | Wendy K. Dobson | Wendy K. Dobson | Wendy K. Dobson | Marshall A. Cohen | Marshall A. Cohen | Darren Entwistle | Wendy K. Dobson | Wendy K. Dobson | Eleanor R. Clitheroe |
| 6 | Colleen A. Goggins | Colleen A. Goggins | Wendy K. Dobson | Wendy K. Dobson | Donna M. Hayes | Donna M. Hayes | Darren Entwistle | Darren Entwistle | Wendy K. Dobson | Wendy K. Dobson | Henry H. Ketcham | Darren Entwistle | Darren Entwistle | Marshall A. Cohen |
| 7 | David E. Kepler | Henry H. Ketcham | Henry H. Ketcham | Henry H. Ketcham | Henry H. Ketcham | Henry H. Ketcham | Donna M. Hayes | Donna M. Hayes | Darren Entwistle | Darren Entwistle | Pierre H. Lessard | Henry H. Ketcham | Henry H. Ketcham | Wendy K. Dobson |
| 8 | Henry H. Ketcham | Brian M. Levitt | Pierre H. Lessard | Pierre H. Lessard | Pierre H. Lessard | Pierre H. Lessard | Henry H. Ketcham | Henry H. Ketcham | Donna M. Hayes | Donna M. Hayes | Brian F. MacNeill | Pierre H. Lessard | Pierre H. Lessard | Henry H. Ketcham |
| 9 | Brian M. Levitt | Harold H. MacKay | Brian M. Levitt | Brian M. Levitt | Brian M. Levitt | Brian M. Levitt | Pierre H. Lessard | Pierre H. Lessard | Henry H. Ketcham | Henry H. Ketcham | Roger Phillips | Brian F. MacNeill | Brian F. MacNeill | Pierre H. Lessard |
| 10 | Harold H. MacKay | Karen E. Maidment | Harold H. MacKay | Harold H. MacKay | Harold H. MacKay | Harold H. MacKay | Harold H. MacKay | Harold H. MacKay | Pierre H. Lessard | Pierre H. Lessard | Wilbur J. Prezzano | Roger Phillips | Roger Phillips | Brian F. MacNeill |
| 11 | Karen E. Maidment | Irene R. Miller | Karen E. Maidment | Irene R. Miller | Irene R. Miller | Brian F. MacNeill | Brian F. MacNeill | Brian F. MacNeill | Harold H. MacKay | Harold H. MacKay | Edward S. Rogers | Edward S. Rogers | Edward S. Rogers | Roger Phillips |
| 12 | Irene R. Miller | Nadir H. Mohamed | Irene R. Miller | Nadir H. Mohamed | Nadir H. Mohamed | Irene R. Miller | Irene R. Miller | Irene R. Miller | Brian F. MacNeill | Brian F. MacNeill | Wilbur J. Prezzano | Helen K. Sinclair | Helen K. Sinclair | Edward S. Rogers |
| 13 | Nadir H. Mohamed | Wilbur J. Prezzano | Nadir H. Mohamed | Wilbur J. Prezzano | Roger Phillips | Nadir H. Mohamed | Roger Phillips | Roger Phillips | Roger Phillips | Roger Phillips | Helen K. Sinclair | Donald R. Sobey | Donald R. Sobey | Helen K. Sinclair |

BOD TD 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|----|--------------------|-------------------|--------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|---------------------|
| 14 | Wilbur J. Prezzano | Helen K. Sinclair | Wilbur J. Prezzano | Helen K. Sinclair | Wilbur J. Prezzano | Roger Phillips | Wilbur J. Prezzano | Wilbur J. Prezzano | Wilbur J. Prezzano | Wilbur J. Prezzano | Donald R. Sobey | Michael D. Sopko | Michael D. Sopko | Donald R. Sobey |
| 15 | Helen K. Sinclair | John M. Thompson | Helen K. Sinclair | Carole S. Taylor | William R. Ryan | Wilbur J. Prezzano | William R. Ryan | William R. Ryan | William R. Ryan | Helen K. Sinclair | Michael D. Sopko | John M. Thompson | John M. Thompson | Michael D. Sopko |
| 16 | | | Carole S. Taylor | John M. Thompson | Helen K. Sinclair | William R. Ryan | Helen K. Sinclair | Helen K. Sinclair | Helen K. Sinclair | Donald R. Sobey | John M. Thompson | Richard M. Thompson | Richard M. Thompson | John M. Thompson |
| 17 | | | John M. Thompson | | Carole S. Taylor | Helen K. Sinclair | John M. Thompson | John M. Thompson | John M. Thompson | Michael D. Sopko | Richard M. Thompson | | | Richard M. Thompson |
| 18 | | | | | John M. Thompson | John M. Thompson | | | | John M. Thompson | | | | George W. Watson |

Table 23: Board of Directors for Bank of Nova Scotia 2000-2013

BOD Scotiabank 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|---|---------------------|---------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------------|---------------------|---------------------|---------------------|
| 1 | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry | John T. Mayberry |
| 2 | Ronald A. Brenneman | N. Ashleigh Everett | Ronald A. Brenneman | Ronald A. Brenneman | Ronald A. Brenneman | Ronald A. Brenneman | Ronald A. Brenneman | Ronald A. Brenneman | Ronald A. Brenneman | Ronald A. Brenneman | Ronald A. Brenneman | Lloyd I. Barber | Lloyd I. Barber | Lloyd I. Barber |
| 3 | N. Ashleigh Everett | John C. Kerr | C.J. Chen | C.J. Chen | C.J. Chen | C.J. Chen | C.J. Chen | C.J. Chen | C.J. Chen | C.J. Chen | C.J. Chen | Bruce R. Birmingham | Bruce R. Birmingham | Bruce R. Birmingham |
| 4 | John C. Kerr | Thomas C. O'Neill | David A. Dodge | David A. Dodge | N. Ashleigh Everett | N. Ashleigh Everett | N. Ashleigh Everett | N. Ashleigh Everett | N. Ashleigh Everett | N. Ashleigh Everett | Sir Graham Day | Ronald A. Brenneman | Ronald A. Brenneman | Ronald A. Brenneman |
| 5 | Thomas C. O'Neill | Allan C. Shaw | N. Ashleigh Everett | N. Ashleigh Everett | John C. Kerr | John C. Kerr | John C. Kerr | John C. Kerr | John C. Kerr | John C. Kerr | N. Ashleigh Everett | C.J. Chen | C.J. Chen | C.J. Chen |
| 6 | C.J. Chen | Ronald A. Brenneman | John C. Kerr | John C. Kerr | The Honourable Michael J.L. Kirby | The Honourable Michael J.L. Kirby | The Honourable Michael J.L. Kirby | The Honourable Michael J.L. Kirby | The Honourable Michael J.L. Kirby | The Honourable Michael J.L. Kirby | Peter T. Godsoe | John C. Kerr | John C. Kerr | John C. Kerr |
| 7 | Charles H. Dallara | C.J. Chen | The Honourable Michael J.L. Kirby | The Honourable Michael J.L. Kirby | Thomas C. O'Neill | Laurent Lemaire | Laurent Lemaire | Laurent Lemaire | Laurent Lemaire | Laurent Lemaire | M. Keith Goodrich | Peter T. Godsoe | Peter T. Godsoe | Peter T. Godsoe |

BOD Scotiabank 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|----|------------------------|------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 8 | David A. Dodge | David A. Dodge | Thomas C. O'Neill | Thomas C. O'Neill | Elizabeth Parr-Johnston | Thomas C. O'Neill | Elizabeth Parr-Johnston | Elizabeth Parr-Johnston | Elizabeth Parr-Johnston | Elizabeth Parr-Johnston | Pierre J. Jeanniot | The Honourable Michael J.L. Kirby | The Honourable Michael J.L. Kirby | The Honourable Michael J.L. Kirby |
| 9 | Brian J. Porter | Indira V. Samarasekera | Alexis E. Rovzar de la Torre | Alexis E. Rovzar de la Torre | Alexis E. Rovzar de la Torre | Elizabeth Parr-Johnston | The Honourable Barbara J. McDougall | The Honourable Barbara J. McDougall | The Honourable Barbara J. McDougall | The Honourable Barbara J. McDougall | John C. Kerr | Laurent Lemaire | Laurent Lemaire | Laurent Lemaire |
| 10 | Aaron W. Regent | Susan L. Segal | Indira V. Samarasekera | Indira V. Samarasekera | Indira V. Samarasekera | Alexis E. Rovzar de la Torre | Alexis E. Rovzar de la Torre | Alexis E. Rovzar de la Torre | Allan C. Shaw | Allan C. Shaw | The Honourable Michael J.L. Kirby | The Honourable Barbara J. McDougall | The Honourable Barbara J. McDougall | The Honourable Barbara J. McDougall |
| 11 | Indira V. Samarasekera | Paul D. Sobey | Allan C. Shaw | Allan C. Shaw | Allan C. Shaw | Indira V. Samarasekera | Allan C. Shaw | Allan C. Shaw | Arthur R.A. Scace | Arthur R.A. Scace | Laurent Lemaire | E Kendall Cork | E Kendall Cork | E Kendall Cork |
| 12 | Susan L. Segal | Barbara S. Thomas | Paul D. Sobey | Paul D. Sobey | Paul D. Sobey | Allan C. Shaw | Arthur R.A. Scace | Arthur R.A. Scace | Gerald W. Schwartz | Gerald W. Schwartz | Elizabeth Parr-Johnston | N. Ashleigh Everett | N. Ashleigh Everett | N. Ashleigh Everett |
| 13 | Paul D. Sobey | Rick Waugh | Barbara S. Thomas | Barbara S. Thomas | Barbara S. Thomas | Arthur R.A. Scace | Paul D. Sobey | Gerald W. Schwartz | Paul D. Sobey | Paul D. Sobey | The Honourable Barbara J. McDougall | Sir Graham Day | Sir Graham Day | Sir Graham Day |
| 14 | Barbara S. Thomas | | Rick Waugh | Rick Waugh | Rick Waugh | Paul D. Sobey | Barbara S. Thomas | Paul D. Sobey | Barbara S. Thomas | Barbara S. Thomas | Allan C. Shaw | M. Keith Goodrich | M. Keith Goodrich | M. Keith Goodrich |
| 15 | Rick Waugh | | | | | Barbara S. Thomas | Rick Waugh | Barbara S. Thomas | Rick Waugh | Rick Waugh | Arthur R.A. Scace | Pierre J. Jeanniot | Pierre J. Jeanniot | Pierre J. Jeanniot |
| 16 | | | | | | Rick Waugh | | Rick Waugh | | | Gerald W. Schwartz | Elizabeth Parr-Johnston | Elizabeth Parr-Johnston | Elizabeth Parr-Johnston |
| 17 | | | | | | | | | | | Paul D. Sobey | Arthur R.A. Scace | Arthur R.A. Scace | Arthur R.A. Scace |
| 18 | | | | | | | | | | | Rick Waugh | Gerald W. Schwartz | Gerald W. Schwartz | Gerald W. Schwartz |
| 19 | | | | | | | | | | | | Allan C. Shaw | Allan C. Shaw | Allan C. Shaw |
| 20 | | | | | | | | | | | | Paul D. Sobey | Paul D. Sobey | Paul D. Sobey |
| 21 | | | | | | | | | | | | | | Malcolm R. Baxter |
| 22 | | | | | | | | | | | | | | The Honourable Henry N.R. Jackman |
| 23 | | | | | | | | | | | | | | Isadore Sharp |
| 24 | | | | | | | | | | | | | | Helen A. Parker |
| 25 | | | | | | | | | | | | | | Ian McDougall |

Table 24: Board of Directors for Royal Bank of Canada 2000-2013

BOD RBC 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|----|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1 | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | W. Geoffrey Beattie | John E. Cleghorn |
| 2 | David F. Denison | David F. Denison | John T. Ferguson | Douglas T. Elix | Douglas T. Elix | Douglas T. Elix | George A.C. Cohon | George A.C. Cohon | George A.C. Cohon | George A.C. Cohon | George A.C. Cohon | George A.C. Cohon | George A.C. Cohon | George A.C. Cohon |
| 3 | The Hon. Paule Gauthier | The Hon. Paule Gauthier | The Hon. Paule Gauthier | John T. Ferguson | John T. Ferguson | John T. Ferguson | Douglas T. Elix | Douglas T. Elix | Douglas T. Elix | Douglas T. Elix | Douglas T. Elix | Douglas T. Elix | Douglas T. Elix | G.N. (Mel) Cooper |
| 4 | Richard L. George | Richard L. George | Timothy J. Hearn | The Hon. Paule Gauthier | The Hon. Paule Gauthier | The Hon. Paule Gauthier | John T. Ferguson | John T. Ferguson | John T. Ferguson | John T. Ferguson | John T. Ferguson | John T. Ferguson | John T. Ferguson | Douglas T. Elix |
| 5 | Timothy J. Hearn | Timothy J. Hearn | Alice D. Laberge | Timothy J. Hearn | Timothy J. Hearn | Timothy J. Hearn | The Hon. Paule Gauthier | The Hon. Paule Gauthier | The Hon. Paule Gauthier | L. Yves Fortier | L. Yves Fortier | L. Yves Fortier | L. Yves Fortier | John T. Ferguson |
| 6 | Alice D. Laberge | Alice D. Laberge | Jacques Lamarre | Alice D. Laberge | Alice D. Laberge | Alice D. Laberge | Timothy J. Hearn | Timothy J. Hearn | Alice D. Laberge | The Hon. Paule Gauthier | The Hon. Paule Gauthier | The Hon. Paule Gauthier | The Hon. Paule Gauthier | L. Yves Fortier |
| 7 | Jacques Lamarre | Jacques Lamarre | Brandt C. Louie | Jacques Lamarre | Jacques Lamarre | Jacques Lamarre | Alice D. Laberge | Alice D. Laberge | Jacques Lamarre | Jacques Lamarre | Jacques Lamarre | Brandt C. Louie | Brandt C. Louie | The Hon. Paule Gauthier |
| 8 | Brandt C. Louie | Brandt C. Louie | Michael H. McCain | Brandt C. Louie | Brandt C. Louie | Brandt C. Louie | Jacques Lamarre | Jacques Lamarre | Brandt C. Louie | Brandt C. Louie | Brandt C. Louie | J. Edward Newall | J. Edward Newall | J. Edward Newall |
| 9 | Michael H. McCain | Michael H. McCain | Heather Munroe-Blum | Michael H. McCain | Michael H. McCain | Michael H. McCain | Brandt C. Louie | Brandt C. Louie | Michael H. McCain | J. Edward Newall | J. Edward Newall | Gordon M. Nixon | Gordon M. Nixon | David P. O'Brien |
| 10 | Heather Munroe-Blum | Heather Munroe-Blum | Gordon M. Nixon | Gordon M. Nixon | Gordon M. Nixon | Gordon M. Nixon | Michael H. McCain | Michael H. McCain | Gordon M. Nixon | Gordon M. Nixon | Gordon M. Nixon | David P. O'Brien | David P. O'Brien | Charlotte R. Otto |
| 11 | Gordon M. Nixon | Gordon M. Nixon | David P. O'Brien | David P. O'Brien | David P. O'Brien | David P. O'Brien | Gordon M. Nixon | Gordon M. Nixon | David P. O'Brien | David P. O'Brien | David P. O'Brien | Charlotte R. Otto | Charlotte R. Otto | Robert B. Petersen |

BOD RBC 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|----|-------------------------|-------------------------|-------------------------|--------------------|--------------------|--------------------|--------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|
| 12 | David P. O'Brien | David P. O'Brien | J. Pedro Reinhard | J. Pedro Reinhard | J. Pedro Reinhard | J. Pedro Reinhard | David P. O'Brien | David P. O'Brien | Robert B. Petersen | Charlotte R. Otto | Charlotte R. Otto | Robert B. Petersen | Robert B. Petersen | J. Pedro Reinhard |
| 13 | J. Pedro Reinhard | J. Pedro Reinhard | Edward Sonshine | Edward Sonshine | Edward Sonshine | Edward Sonshine | Robert B. Petersen | Robert B. Petersen | J. Pedro Reinhard | Robert B. Petersen | Robert B. Petersen | J. Pedro Reinhard | J. Pedro Reinhard | Hartley T. Richardson |
| 14 | Thomas A. Renyi | Edward Sonshine | Kathleen P. Taylor | Kathleen P. Taylor | Kathleen P. Taylor | Kathleen P. Taylor | J. Pedro Reinhard | J. Pedro Reinhard | Cecil W. Sewell, Jr. | J. Pedro Reinhard | J. Pedro Reinhard | Hartley T. Richardson | Hartley T. Richardson | Kenneth C. Rowe |
| 15 | Edward Sonshine | Kathleen P. Taylor | Bridget A. van Kraligen | Victor L. Young | Victor L. Young | Victor L. Young | Kathleen P. Taylor | Cecil W. Sewell, Jr. | Kathleen P. Taylor | Cecil W. Sewell, Jr. | Guy Saint-Pierre | Kenneth C. Rowe | Kenneth C. Rowe | Guy Saint-Pierre |
| 16 | Kathleen P. Taylor | Bridget A. van Kraligen | Victor L. Young | | | | Victor L. Young | Kathleen P. Taylor | Victor L. Young | Kathleen P. Taylor | Cecil W. Sewell, Jr. | Guy Saint-Pierre | Guy Saint-Pierre | Robert T. Stewart |
| 17 | Bridget A. van Kraligen | Victor L. Young | | | | | | Victor L. Young | | Victor L. Young | Kathleen P. Taylor | Cecil W. Sewell, Jr. | Cecil W. Sewell, Jr. | Allan R. Taylor |
| 18 | Victor L. Young | | | | | | | | | | Victor L. Young | Kathleen P. Taylor | Kathleen P. Taylor | Sheela D. Whittaker |
| 19 | | | | | | | | | | | | Victor L. Young | Victor L. Young | Victor L. Young |

Table 25: Board of Directors for Canadian Imperial Bank of Commerce 2000-2013

BOD CIBC 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|---|----------------------------|----------------------------|----------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| 1 | Charles Siros | Brent S. Belzberg | Brent S. Belzberg | Charles Siros | Charles Siros | Brent S. Belzberg | Brent S. Belzberg | Brent S. Belzberg | Brent S. Belzberg | Douglas G. Bassett O.C., O. Ont, | Douglas G. Bassett O.C., O. Ont, | Douglas G. Bassett O.C., O. Ont, | Douglas G. Bassett O.C., O. Ont, | Douglas G. Bassett O.C., O. Ont, |
| 2 | Brent S. Belzberg | Gary F. Colter | Gary F. Colter | Brent S. Belzberg | Brent S. Belzberg | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. |
| 3 | Gary F. Colter | Dominic D'Alessandro, O.C. | Dominic D'Alessandro, O.C. | Jalynn H. Bennett C.M. | Jalynn H. Bennett C.M. | Gary F. Colter | Gary F. Colter | Gary F. Colter | Gary F. Colter | Gary F. Colter | The Lord Black of Crossharbour | The Lord Black of Crossharbour | The Lord Black of Crossharbour | The Lord Black of Crossharbour |
| 4 | Dominic D'Alessandro, O.C. | Patrick D. Daniel | Patrick D. Daniel | Gary F. Colter | Gary F. Colter | William L. Duke | William L. Duke | William L. Duke | William L. Duke | Pat M. Delbridge | Gary F. Colter | Pat M. Delbridge | Pat M. Delbridge | Pat M. Delbridge |

BOD CIBC 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|----|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 5 | Patrick D. Daniel | Luc Desjardins | Luc Desjardins | Dominic D'Alessandro, O.C. | Patrick D. Daniel | Ivan E.H. Duvar | Ivan E.H. Duvar | Ivan E.H. Duvar | Ivan E.H. Duvar | William L. Duke | Pat M. Delbridge | William L. Duke | William L. Duke | William L. Duke |
| 6 | Luc Desjardins | Hon. Gordon D. Giffin | Hon. Gordon D. Giffin | Patrick D. Daniel | Luc Desjardins | William A Etherington | William A Etherington | William A Etherington | William A Etherington | Ivan E.H. Duvar | William L. Duke | Ivan E.H. Duvar | Ivan E.H. Duvar | Ivan E.H. Duvar |
| 7 | Hon. Gordon D. Giffin | Linda S. Hasenfratz | Linda S. Hasenfratz | Luc Desjardins | William L. Duke | Hon. Gordon D. Giffin | Margot A. Franssen O.C. | Margot A. Franssen O.C. | A.L. Flood C.M. | William A Etherington | Ivan E.H. Duvar | William A Etherington | William A Etherington | William A Etherington |
| 8 | Linda S. Hasenfratz | Nicholas D. LePan | Nicholas D. LePan | Hon. Gordon D. Giffin | Hon. Gordon D. Giffin | Linda S. Hasenfratz | Hon. Gordon D. Giffin | Hon. Gordon D. Giffin | Margot A. Franssen O.C. | A.L. Flood C.M. | William A Etherington | A.L. Flood C.M. | A.L. Flood C.M. | A.L. Flood C.M. |
| 9 | Kevin J. Kelly | Hon. John P. Manley P.C., O.C. | Hon. John P. Manley P.C., O.C. | Linda S. Hasenfratz | Linda S. Hasenfratz | John S. Lacey | Linda S. Hasenfratz | Hon. James A. Grant P.C., C.M., Q.C. | Hon. Gordon D. Giffin | Margot A. Franssen O.C. | R.D. Fullerton | Margot A. Franssen O.C. | Margot A. Franssen O.C. | Margot A. Franssen O.C. |
| 10 | Nicholas J. Kelly | Gerald McCaughey | Gerald McCaughey | Nicholas D. LePan | Nicholas D. LePan | Nicholas D. LePan | John S. Lacey | Linda S. Hasenfratz | Hon. James A. Grant P.C., C.M., Q.C. | Hon. Gordon D. Giffin | A.L. Flood C.M. | R.D. Fullerton | R.D. Fullerton | R.D. Fullerton |
| 11 | Nicholas D. LePan | Jane L. Peverett | Jane L. Peverett | Hon. John P. Manley P.C., O.C. | Hon. John P. Manley P.C., O.C. | Hon. John P. Manley P.C., O.C. | Hon. John P. Manley P.C., O.C. | Pat M. Hayles | Linda S. Hasenfratz | Hon. James A. Grant P.C., C.M., Q.C. | Margot A. Franssen O.C. | Hon. Gordon D. Giffin | Hon. Gordon D. Giffin | Hon. James A. Grant P.C., C.M., Q.C. |
| 12 | Hon. John P. Manley P.C., O.C. | Leslie Rahl | Leslie Rahl | Gerald McCaughey | Gerald McCaughey | Gerald McCaughey | Gerald McCaughey | John S. Lacey | Pat M. Hayles | Linda S. Hasenfratz | Hon. Gordon D. Giffin | Hon. James A. Grant P.C., C.M., Q.C. | Hon. James A. Grant P.C., C.M., Q.C. | Albert E.P. Hickman |
| 13 | Gerald McCaughey | Charles Sirosis | Charles Sirosis | Jane L. Peverett | Jane L. Peverett | Leslie Rahl | Leslie Rahl | Hon. John P. Manley P.C., O.C. | John S. Lacey | Albert E.P. Hickman | Hon. James A. Grant P.C., C.M., Q.C. | Albert E.P. Hickman | Albert E.P. Hickman | John S. Hunkin |
| 14 | Jane L. Peverett | Katharine B. Stevenson | Robert J. Stacey | Leslie Rahl | Leslie Rahl | Charles Sirosis | Charles Sirosis | Gerald McCaughey | Hon. John P. Manley P.C., O.C. | John S. Hunkin | Albert E.P. Hickman | John S. Hunkin | John S. Hunkin | Marie-Josée Kravis |
| 15 | Leslie Rahl | Ronald W. Tysoe | Katharine B. Stevens | Robert J. Stacey | Robert J. Stacey | Stephen G. Snyder | Stephen G. Snyder | Charles Sirosis | Gerald McCaughey | John S. Lacey | John S. Hunkin | W. Darcy Wckeough | Marie-Josée Kravis | W. Darcy Wckeough |
| 16 | Katharine B. Stevenson | | Ronald W. Tysoe | Ronald W. Tysoe | Ronald W. Tysoe | Robert J. Stacey | Cynthia M. Trudell | Stephen G. Snyder | Charles Sirosis | Charles Sirosis | Arnold Naimark | Arnold Naimark | W. Darcy Wckeough | Arnold Naimark |

BOD CIBC 2000-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|----|-----------------|------|------|------|------|-----------------|-----------------|--------------------|--------------------|----------------------|----------------------|----------------------|----------------------|------------------------|
| 17 | Ronald W. Tysoe | | | | | Ronald W. Tysoe | Ronald W. Tysoe | Cynthia M. Trudell | Stephen G. Snyder | Stephen G. Snyder | Michael E.J. Phelps | Michael E.J. Phelps | Arnold Naimark | Michael E.J. Phelps |
| 18 | | | | | | | | Ronald W. Tysoe | Cynthia M. Trudell | Roald W. Tysoe | Charles Sirosis | Charles Sirosis | Michael E.J. Phelps | Alfred Powis |
| 19 | | | | | | | | | Ronald W. Tysoe | W. Galen Weston O.C. | Stephen G. Snyder | Stephen G. Snyder | Charles Sirosis | Barbara J. Rae |
| 20 | | | | | | | | | | | W. Galen Weston O.C. | W. Galen Weston O.C. | Stephen G. Snyder | Charles Sirosis |
| 21 | | | | | | | | | | | | | W. Galen Weston O.C. | Stephen G. Snyder |
| 22 | | | | | | | | | | | | | | John S. Walton |
| 23 | | | | | | | | | | | | | | W. Galen Weston O.C. |
| 24 | | | | | | | | | | | | | | Peter N.T. Widdrington |

Table 26: Board of Directors for the Bank of Montreal 2000-2013

BOD BMO 1998-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|---|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| 1 | Robert M. Astley | Robert M. Astley | Robert M. Astley | Robert M. Astley | Robert M. Astley | Robert M. Astley | Robert M. Astley | Robert M. Astley | Robert M. Astley | Robert M. Astley | Stephn E. Bachand | Stephn E. Bachand | Stephn E. Bachand | Stephn E. Bachand |
| 2 | Janice M. Babiak | Janice M. Babiak | David R. Beatty | David R. Beatty | David R. Beatty | Stephn E. Bachand | Stephn E. Bachand | Stephn E. Bachand | Stephn E. Bachand | Stephn E. Bachand | David R. Beatty | David R. Beatty | David R. Beatty | David R. Beatty |
| 3 | Sophie Brochu | Sophie Brochu | Robert Chevrier | Robert Chevrier | Robert Chevrier | David R. Beatty | David R. Beatty | David R. Beatty | David R. Beatty | David R. Beatty | Robert Chevrier | Robert Chevrier | Robert Chevrier | Peter J.G. Bentley |
| 4 | George A. Cope | George A. Cope | George A. Cope | George A. Cope | George A. Cope | Robert Chevrier | Robert Chevrier | Robert Chevrier | Robert Chevrier | Robert Chevrier | Tony Compere | Tony Compere | Tony Compere | Robert Chevrier |
| 5 | William A. Downe | William A. Downe | William A. Downe | William A. Downe | William A. Downe | George A. Cope | George A. Cope | Tony Compere | Tony Compere | Tony Compere | Ronald H. Farmer | David A. Galloway | David A. Galloway | Tony Compere |

BOD BMO 1998-2013

| | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
|----|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| 6 | Christine A. Edwards | Christine A. Edwards | Christine A. Edwards | Christine A. Edwards | Ronald H. Farmer | William A. Downe | William A. Downe | George A. Cope | Ronald H. Farmer | Ronald H. Farmer | David A. Galloway | Eva Lee Kwok | Eva Lee Kwok | John F. Fraser |
| 7 | Ronald H. Farmer | Ronald H. Farmer | Ronald H. Farmer | Ronald H. Farmer | David A. Galloway | Ronald H. Farmer | Ronald H. Farmer | Ronald H. Farmer | David A. Galloway | David A. Galloway | Eva Lee Kwok | J. Blair MacAulay | J. Blair MacAulay | David A. Galloway |
| 8 | Eric R. La Flèche | Harol N. Kvisle | David A. Galloway | David A. Galloway | Harol N. Kvisle | David A. Galloway | David A. Galloway | David A. Galloway | Harol N. Kvisle | Eva Lee Kwok | J. Blair MacAulay | The Honorable Frank McKenna | The Honorable Frank McKenna | Eva Lee Kwok |
| 9 | Bruche H. Mitchell | Eric R. La Flèche | Harol N. Kvisle | Harol N. Kvisle | Bruche H. Mitchell | Harol N. Kvisle | Harol N. Kvisle | Harol N. Kvisle | Eva Lee Kwok | J. Blair MacAulay | The Honorable Frank McKenna | Bruce H. Mitchell | Bruce H. Mitchell | J. Blair MacAulay |
| 10 | Philip S. Orsino | Bruche H. Mitchell | Bruche H. Mitchell | Bruche H. Mitchell | Philip S. Orsino | Eva Lee Kwok | Eva Lee Kwok | Eva Lee Kwok | Bruce H. Mitchell | The Honorable Frank McKenna | Bruce H. Mitchell | Philip S. Orsino | Philip S. Orsino | The Honorable Frank McKenna |
| 11 | Dr. Martha C. Piper | Philip S. Orsino | Philip S. Orsino | Philip S. Orsino | Dr. Martha C. Piper | Bruce H. Mitchell | Bruce H. Mitchell | Bruce H. Mitchell | Philip S. Orsino | Bruce H. Mitchell | Philip S. Orsino | J. Robert S. Prichard | J. Robert S. Prichard | Robert H. McKencher |
| 12 | J. Robert S. Prichard | Dr. Martha C. Piper | Dr. Martha C. Piper | Dr. Martha C. Piper | J. Robert S. Prichard | Philip S. Orsino | Philip S. Orsino | Philip S. Orsino | J. Robert S. Prichard | Philip S. Orsino | J. Robert S. Prichard | Jeremy H. Reitman | Jeremy H. Reitman | Bruce H. Mitchell |
| 13 | Don M. Wilson III | J. Robert S. Prichard | J. Robert S. Prichard | J. Robert S. Prichard | Jeremy H. Reitman | Dr. Martha C. Piper | Dr. Martha C. Piper | Dr. Martha C. Piper | Jeremy H. Reitman | J. Robert S. Prichard | Jeremy H. Reitman | Joseph L. Rotman | Joseph L. Rotman | Philip S. Orsino |
| 14 | | Guylaine Saucier | Guylaine Saucier | Jeremy H. Reitman | Guylaine Saucier | J. Robert S. Prichard | J. Robert S. Prichard | J. Robert S. Prichard | Guylaine Saucier | Jeremy H. Reitman | Joseph L. Rotman | Guylaine Saucier | Guylaine Saucier | J. Robert S. Prichard |
| 15 | | Don M. Wilson III | Don M. Wilson III | Guylaine Saucier | Nancy C. Southern | Jeremy H. Reitman | Jeremy H. Reitman | Jeremy H. Reitman | Nancy C. Southern | Joseph L. Rotman | Guylaine Saucier | Nancy C. Southern | Nancy C. Southern | Jeremy H. Reitman |
| 16 | | | | Nancy C. Southern | Don M. Wilson III | Guylaine Saucier | Guylaine Saucier | Guylaine Saucier | | Guylaine Saucier | Nancy C. Southern | | | Joseph L. Rotman |
| 17 | | | | Don M. Wilson III | | Nancy C. Southern | Nancy C. Southern | Nancy C. Southern | | Nancy C. Southern | | | | Guylaine Saucier |
| 18 | | | | | | Don M. Wilson III | | | | | | | | Nancy C. Southern |

Table 27 Morningstar Shareholder Data: Canadian Imperial Bank of Commerce

| CIBC | | | |
|---|---------------------|--------------------------|--------------------|
| | Shares Owned | % of Total Shares | \$ Value |
| Total Shares | | | |
| Share Price (Dec 30 2013) | | | \$85.07 |
| | | | |
| INSTITUTIONS | | | |
| Royal Bank of Canada | 33,725,730 | 8.75 | \$2,869,047,851.1 |
| TD Asset Management Inc | 25,200,032 | 6.32 | \$2,143,766,722.24 |
| Bank of Nova Scotia | 16,885,613 | 4.24 | \$1,436,459,097.91 |
| BMO Asset Management Inc. | 15,438,988 | 4.16 | \$1,313,394,709.16 |
| CIBC Global Asset Management Inc. | 9,072,669 | 2.27 | \$771,811,951.83 |
| | | | |
| FUNDS | | | |
| RBC Canadian Dividend GIF | 6,331,234 | 1.59 | \$538,598,076.38 |
| TD Dividend Growth – T | 5,270,700 | 1.32 | \$448,378,449 |
| TD Monthly Income – S | 3,745,300 | 0.94 | \$318,612,671 |
| TD Dividend Income – S | 3,633,500 | 0.91 | \$309,101,845 |
| IMPERIAL CANADIAN DIVIDEND INCOME POOL | 3,347,403 | 0.85 | \$284,763,573.21 |
| | | | |
| CONCENTRATED SH – INSTITUTIONS | | | |
| Scotia Capital (USA) Inc. | 95,049 | 0.02 | \$8,085,818.43 |
| BMO S&P/TSX Equal Weight Banks Index ETF | 1,073,112 | 0.27 | \$91,289,637.84 |
| BMO Covered Call Canadian Banks ETF | 957,899 | 0.24 | \$81,488,467.93 |
| | | | |

| CIBC | | | |
|-------------|---------------------|--------------------------|-------------------|
| | Shares Owned | % of Total Shares | \$ Value |
| | 124,777,229 | 31.88 | 10,614,798,871.03 |

Table 28 Morningstar Shareholder Data: Toronto-Dominion Bank

| TD | | | |
|---|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| Total Shares | | | |
| Share Price (Dec 30 2013) | | | 46.99 |
| | | | |
| INSTITUTIONS | | | |
| Royal Bank of Canada | 80,609,042 | 8.77 | 3,787,818,884 |
| BMO Asset Management Inc. | 40,416,355 | 4.40 | 1,899,164,521 |
| CIBC World Markets Inc. | 40,232,931 | 4.38 | 1,890,545,428 |
| Bank of Nova Scotia | 27,786,080 | 3.02 | 1,305,667,899 |
| TD Asset Management Inc | 26,172,555 | 2.85 | 1,229,848,359 |
| CIBC Global Asset Management Inc. | 13,999,935 | 1.52 | 657,856,946 |
| FUNDS | | | |
| RBC Canadian Dividend GIF | 11,334,337 | 1.23 | 532,600,496 |
| TD Dividend Growth – T | 5,107,300 | 0.56 | 239,992,027 |
| IMPERIAL CANADIAN DIVIDEND INCOME POOL | 10,153,359 | 0.55 | 477,106,339 |
| TD Monthly Income – S | 3,577,700 | 0.39 | 168,116,123 |
| TD Dividend Income – S | 3,534,800 | 0.38 | 166,100,252 |
| | | | |
| | | | |
| CONCENTRATED SH – INSTITUTIONS | | | |

| TD | | | |
|---|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| BMO S&P/TSX Equal Weight Banks Index ETF | 2,027,083 | 0.11 | 95,252,630 |
| BMO Covered Call Canadian Banks ETF | 1,809,327 | 0.1 | 85,020,276 |
| TD Banknorth 401K Plan | 1,865,758 | 0.22 | 87,671,968 |
| Bank of Nova Scotia Trust Company | 752,419 | 0.08 | 35,356,169 |
| | | | |
| | 269,378,981 | 28.56 | 12,658,118,317 |

Table 29 Morningstar Shareholder Data: Royal Bank of Canada

| RBC | | | |
|--|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| Total Shares | | | |
| Share Price (Dec 30 2013) | | | 71.41 |
| | | | |
| INSTITUTIONS | | | |
| Royal Bank of Canada | 63,859,710 | 4.43 | 4,560,221,891 |
| BMO Asset Management Inc. | 62,300,789 | 4.32 | 4,448,899,342 |
| CIBC World Markets Inc. | 60,630,864 | 4.21 | 4,329,649,998 |
| TD Asset Management Inc | 44,470,404 | 3.09 | 3,175,631,550 |
| CIBC Global Asset Management Inc. | 19,084,622 | 1.32 | 1,362,832,857 |
| | | | |
| FUNDS | | | |
| RBC Canadian Dividend GIF | 16,066,950 | 1.11 | 1,147,340,900 |
| TD Dividend Growth – T | 7,253,600 | 0.50 | 517,979,576 |

| RBC | | | |
|---|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| IMPERIAL CANADIAN DIVIDEND INCOME POOL | 6,858,531 | 0.48 | 489,767,699 |
| TD Monthly Income – S | 5,514,700 | 0.38 | 393,804,727 |
| TD Dividend Income – S | 5,147,404 | 0.36 | 367,576,120 |
| | | | |
| | | | |
| CONCENTRATED SH – INSTITUTIONS | | | |
| BMO S&P/TSX Equal Weight Banks Index ETF | 1,410,448 | 0.1 | 100,720,092 |
| BMO Covered Call Canadian Banks ETF | 1,259,076 | 0.09 | 89,910,617 |
| Scotia Capital (USA) Inc. | 777,792 | 0.06 | 55,542,127 |
| Bank of Nova Scotia | 55,066,034 | 3.82 | 3,932,265,488 |
| Toronto-Dominion Bank | 57,293,502 | 3.97 | 4,091,328,978 |
| Bank of Nova Scotia Trust Company | 1,065,975 | 0.07 | 76,121,275 |
| | | | |
| | | | |
| | 408,060,401 | 28.31 | 29,139,593,235 |

Table 30 Morningstar Shareholder Data: Bank of Montreal

| BMO | | | |
|---------------------|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| Total Shares | | | |

| BMO | | | |
|---|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| Share Price (Dec 30 2013) | | | 66.26 |
| INSTITUTIONS | | | |
| Royal Bank of Canada | 53,146,278 | 8.28 | 3,521,472,380 |
| CIBC World Markets Inc. | 28,253,854 | 4.40 | 1,872,100,366 |
| Toronto-Dominion Bank | 27,884,174 | 4.34 | 1,847,605,369 |
| TD Asset Management Inc | 26,857,048 | 4.18 | 1,779,548,000 |
| Bank of Nova Scotia | 23,322,197 | 3.63 | 1,545,328,773 |
| BMO Asset Management Inc. | 11,189,597 | 1.74 | 741,422,697 |
| CIBC Global Asset Management Inc. | 10,493,741 | 1.63 | 695,315,279 |
| FUNDS | | | |
| RBC Canadian Dividend GIF | 13,898,872 | 2.16 | 920,939,259 |
| TD Dividend Growth – T | 5,786,300 | 0.9 | 383,400,238 |
| TD Monthly Income – S | 4,674,500 | 0.73 | 309,732,370 |
| TD Dividend Income – S | 4,505,400 | 0.7 | 298,527,804 |
| IMPERIAL CANADIAN DIVIDEND INCOME POOL | 3,846,794 | 0.6 | 254,888,570 |
| CIBC Monthly Income | 2,671,811 | 0.42 | 177,034,197 |
| CONCENTRATED SH – INSTITUTIONS | | | |
| BMO S&P/TSX Equal Weight Banks Index ETF | 1,396,554 | 0.22 | 92,535,668 |
| BMO Covered Call Canadian Banks ETF | 1,246,706 | 0.19 | 82,606,740 |
| Employees 401K Savings Plan of Bank of Montreal/Harris | 822,991 | 0.15 | 54,531,384 |

| BMO | | | |
|----------------------------------|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| Scotia Capital (USA) Inc. | 113,909 | 0.02 | 7,547,610 |
| | | | |
| | 220,110,726 | 34.29 | 14,584,536,705 |

Table 31 Morningstar Shareholder Data: Bank of Nova Scotia

| BNS | | | |
|----------------------------------|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| Total Shares | | | |
| Share Price (Dec 30 2013) | | | 66.27 |
| | | | |
| INSTITUTIONS | | | |
| Royal Bank of Canada | 93,547,355 | 7.77 | 6,199,383,216 |
| CIBC World Markets Inc. | 54,212,757 | 4.50 | 3,592,679,406 |
| BMO Asset Management Inc. | 52,367,261 | 4.35 | 3,470,378,386 |
| Toronto-Dominion Bank | 47,013,443 | 3.90 | 3,115,580,868 |
| TD Asset Management Inc | 44,240,622 | 3.67 | 2,931,826,020 |
| | | | |
| | | | |
| | | | |
| FUNDS | | | |
| RBC Canadian Dividend GIF | 15,948,543 | 1.32 | 1,056,909,945 |
| TD Dividend Growth – T | 7,365,300 | 0.61 | 488,098,431 |

| BNS | | | |
|---|---------------------|--------------------------|-----------------|
| | Shares Owned | % of Total Shares | \$ Value |
| TD Dividend Income – S | 5,222,600 | 0.43 | 346,101,702 |
| TD Monthly Income – S | 5,201,100 | 0.43 | 344,676,897 |
| RBC Monthly Income Sr D | 4,221,057 | 0.35 | 279,729,447 |
| BMO Dividend | 4,695,100 | 0.39 | 311,144,277 |
| | | | |
| CONCENTRATED SH – INSTITUTIONS | | | |
| BNS Split Corp II Unit | 637,104 | 0.05 | 42,220,882 |
| BMO S&P/TSX Equal Weight Banks Index ETF | 1,526,009 | 0.13 | 101,128,616 |
| CIBC Financial Companies | 227,010 | 0.02 | 15,043,953 |
| BMO Covered Call Canadian Banks ETF | 1,362,340 | 0.11 | 90,282,272 |
| Scotia Capital (USA) Inc. | 764,728 | 0.06 | 50,678,525 |
| | | | |
| | 338,552,329 | 28.09 | 22,435,862,843 |

Table 32 TD's Position in the Big Five

| TD – Position in Big Five | | | |
|----------------------------------|--------------------|-----------------------------|---------------------|
| Institution | # of Shares | % of Total Ownership | Dollar Value |
| | | | |
| | | | |
| CIBC | 37,849,532 | 9.4802 | 3,219,859,687.24 |

| TD – Position in Big Five | | | | |
|----------------------------------|--------------------|-----------------------------|-----------------------|--|
| Institution | # of Shares | % of Total Ownership | Dollar Value | |
| RBC | 119,679,610 | 8.3050 | 8,546,320,950.1 | |
| BMO | 69,707,422 | 8.3050 | 4,618,813,781.72 | |
| BNS | 109,043,065 | 9.0223 | 7,226,283,917.55 | |
| | | | | |
| Total | | | 23,611,278,336.6 1 | |

Table 33 RBC’s Position in the Big Five

| RBC – Position in Big Five | | | | |
|-----------------------------------|--------------------|-----------------------------|-----------------------|--|
| Institution | # of Shares | % of Total Ownership | Dollar Value | |
| | | | | |
| | | | | |
| CIBC | 40,056,964 | 10.0331 | 3,407,645,927.48 | |
| TD | 91,943,379 | 10.0004 | 4,320,419,379.21 | |
| BMO | 67,045,150 | 10.3389 | 4,442,411,639 | |
| BNS | 113,716,955 | 9.4091 | 7,536,022,607.85 | |
| | | | | |
| Total | | | 19,706,499,553.5 4 | |

Table 34 BMO's Position in the Big Five

| BMO – Position in Big Five | | | | |
|-----------------------------------|--------------------|-----------------------------|-----------------------|--|
| Institution | # of Shares | % of Total Ownership | Dollar Value | |
| | | | | |
| | | | | |
| CIBC | 17,469,999 | 4.3757 | 1,486,172,814.93 | |
| TD | 44,252,765 | 4.8132 | 2,079,437,427.35 | |
| RBC | 64,970,313 | 4.5085 | 4,639,530,051.33 | |
| BNS | 60,177,720 | 4.9792 | 3,987,977,504.4 | |
| | | | | |
| Total | | | 12,193,117,798.0 1 | |

Table 35 BNS's Position in the Big Five

| BNS – Position in Big Five | | | | |
|-----------------------------------|--------------------|-----------------------------|---------------------|--|
| Institution | # of Shares | % of Total Ownership | Dollar Value | |
| | | | | |
| | | | | |
| CIBC | 16,980,662 | 4.2531 | 1,444,544,916.34 | |
| TD | 28,538,499 | 3.1040 | 1,341,024,068.01 | |
| RBC | 56,909,801 | 3.9492 | 4,063,928,889.41 | |
| BMO | 23,436,106 | 3.6140 | 1,552,876,383.56 | |
| | | | | |
| Total | | | 8,402,374,257.32 | |

Table 36 CIBC’s Position in the Big Five

| CIBC – Position in Big Five | | | | |
|------------------------------------|--------------------|-----------------------------|---------------------|--|
| Institution | # of Shares | % of Total Ownership | Dollar Value | |
| | | | | |
| TD | 64,386,225 | 7.0031 | 3,025,508,712.75 | |
| RBC | 86,574,017 | 6.0077 | 6,182,250,553.97 | |
| BMO | 14,655,848 | 2.2600 | 971,096,488.48 | |
| BNS | 54,212,757 | 4.4856 | 3,592,679,406.39 | |
| | | | | |
| Total | | | 13,771,535,161.59 | |

Table 37 Comparison: HHI and IOI calculations for the Canadian Banking Market

HHI Calculation

| | Si | Si² | HHI | Si²/(1-cj) | IOI |
|---------------|-----------|-----------------------|---------------|------------------------------|---------------|
| Firm A | 25.81% | 6.67% | 18.37% | 8.64% | 24.63% |
| Firm B | 22.80% | 5.20% | | 6.92% | |
| Firm C | 18.11% | 3.28% | | 4.55% | |
| Firm D | 13.60% | 1.85% | | 2.71% | |
| Firm E | 10.69% | 1.14% | | 1.59% | |
| Firm F | 4.32% | 0.19% | | 0.1866% | |
| Firm G | 1.81% | 0.03% | | 0.0328% | |
| Firm H | 0.72% | 0.01% | | 0.0052% | |
| Firm I | 0.47% | 0.00% | | 0.0022% | |

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Curriculum Vitae

Candidate's full name: Alexandre Findlay Deslongchamps

Universities attended:

University of New Brunswick, Sept. 2014 – present, MBA candidate

University of New Brunswick, Sept. 2010 – May 2013, BBA, Honours Finance

Awards and Scholarships:

UNB Graduate Research Assistantship (2014)

Standard Recognition of Excellence Scholarship (2012)

Mr. & Mrs. Conrad J. Osman Scholarship (2012)

Dean's List (2011- present)

Martha Fraser McIntosh Scholarship (2011–present)

Loran Awards, Provincial Scholarship (2010)

William and Lois Paine Founder's Scholarship (2010)