Use of Exchange Traded Derivatives by Canadian Pension Funds and Investment Management Firms

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Abstract

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This study examines the use of exchange traded derivatives by pension funds and investment management firms to explore the factors limiting the growth of Canadian exchange traded derivatives. Using survey data on investment management firms we investigate various aspects of derivatives use by these firms. An interesting finding is that even though a majority of the firms are permitted to use derivatives, only a few actually use them. This result implies that conclusions drawn with data from sources like N-SAR forms, which include information on permission to use different types of derivatives but not the actual use of such instruments, may be unreliable. The statistical analyses performed using the Canadian Pension Fund Investment Manager Database and the Canadian Pension Fund Database demonstrate that derivatives are used by a few large institutional investors with internal expertise and that exchange traded derivatives are less popular among them. We conclude that improved product designs and liquidity in the market may help increase trading on the Montreal Exchange. In addition, we believe that educating investors as well as investment professionals on derivatives is necessary for the development of the Canadian exchange traded derivatives market.

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Appendix 1

1 Introduction

The exchange traded derivatives market has reported a rapid growth in the recent past. According to statistics released by the Bank for International Settlements (BIS), the growth in global trading volume of these contracts has exceeded more than 20 percent per annum. Further proof of this explosive growth is contained in the latest Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity of the BIS which reports a growth of over 181 percent from June 2001 to June 2004 based on notional value of contracts. In contrast, the growth of over the counter (OTC) derivatives contracts was 120 percent during the same period. Even with such a high rate of growth, the total notional amount of exchange traded derivatives amounts to less than a quarter of OTC contracts. The notional amount of exchange traded derivatives contracts stood at $49.5 trillion as at end of June 2004 while the notional amount of outstanding OTC derivatives contracts on the same date was $220 trillion.

A similar scenario can be observed in the Canadian derivatives markets, where even though trading of Canadian exchange traded derivatives has increased during the recent past it still lags behind Canadian OTC derivatives market activity. Some authors suggest that the dominance of the chartered banks in the OTC market and regulatory barriers are strangulating the growth of the exchange traded derivatives market. We attempt to ascertain some of the reasons for the sluggish growth of Canadian exchange traded derivatives by focusing on the derivatives use by Canadian pension funds and investment

management firms.

We conduct a survey of investment management firms listed in the Canadian Pension Fund (CPF) Manager Database during February and March 2007. In addition, the analysis is based on the spring 2006 version of the CPF Manager Database and the Canadian Pension Fund Database.

At present there are two derivatives exchanges in Canada, namely the Montreal Exchange (MX) and the Winnipeg Commodity Exchange (WCE). Different financial derivatives are listed on the MX while commodity derivatives are listed on the WCE. The MX is the oldest exchange in Canada and in 1999 under the restructuring of capital markets in Canada it became the sole Canadian financial derivatives exchange for the next 10 years. After the restructuring process, the trading of senior equities is handled by the Toronto Stock Exchange (TSE) and the junior equities by the Canadian Venture Exchange (CDNX), which was created through a merger of the Alberta and Vancouver stock exchanges. The CDNX which merged with the Winnipeg Stock Exchange in 2000, is currently known as the TSX Venture Exchange after being acquired by the TSE in 2001. Currently the TSX Venture Exchange and the TSE are a part of the TSX Group. In 2001 the MX became the first traditional North American exchange to complete the transition towards a fully automated trading system. Further, it is one of the few exchanges in the world that owns its clearing house and has control of its technology. The 10 year agreement between the MX and the TSX Group, not to compete in each others' market ends in March 2009, after which the MX may face new competition within Canada. At

present the MX offers options on equity, currencies and indexes as well as futures on interest rates and indexes. The flagship products of the MX include the Three Month Canadian Bankers Acceptance Futures (BAX), the Ten Year Government of Canada Bond Futures (CGB) and the S&P Canada 60 Index Futures (SXF).

Our survey of investment management firms suggests that lack of liquidity, large spreads and lack of products act as impediments to the use of exchange traded derivatives. We believe that the MX should focus on improving liquidity and product design in order to promote trading on the MX. Further, even though over 74 percent of investment management firms are permitted to use derivatives, only 25.3 percent of the respondents actually use them. This result implies that using data from sources like N-SAR forms, contained in the EDGAR database of the US Securities Exchange Commission, which includes information on the permissions to use different types of derivatives but not the actual use of such instruments may give inconsistent results.

An analysis of the spring 2006 edition of the CPF Manager Database and the Canadian Pension Fund Database indicates that only few large institutional investors in Canada use derivatives. This may be due to the lack of resources in small firms to initiate and maintain a derivatives program. In addition, it is also revealed that these institutional investors use derivatives mainly for hedging foreign exchange exposures. The analysis also indicates that pension funds do not use exchange traded derivatives extensively.

The remainder of this thesis is organized as follows: The related literature is presented in Section 2. In Section 3, we briefly describe the data used in this study. The

analyses based on the spring 2006 edition of the CPF Manager Database and the Canadian Pension Fund Database are organized in Section 4 and Section 5, respectively. Section 6 presents our conclusions.

2. Related Literature

Literature related to the development of the exchange traded derivative markets is sparse. Therefore, in the following sections we present the findings of a few papers that deal with exchange traded derivatives and then discuss other papers dealing with derivatives in general that are related to the current study. Two approaches, namely survey based and statistics based, are mainly used in the latter studies to examine the use of derivatives.

2.1 Exchange traded derivatives use

In 2005, the Futures and Options Association (FOA) along with PricewaterhouseCoopers (PWC) conducted a survey of broker dealers and their clients on the UK derivative markets and reported that respondents, both broker dealers as well as their clients, view "price transparency" and "central counterparty" as the main benefits of exchange traded derivatives. In addition, clients believe "standardization" to be a benefit of using an exchange. The survey reveals that the respondents would prefer to

have "more flexible OTC style products" trading on the exchanges. Another finding is that even though clients state that they prefer to use OTC products, the broker dealers think that their clients prefer to use exchange traded products.

Bodnar, Hayt, Marson and Smithson (1995) survey 530 non-financial US firms to examine the use of derivatives and find that 35 percent of their respondents use derivatives. Moreover, they find that 65 percent of large firms use derivatives while only 13 percent of small firms use derivatives. With regard to OTC and exchange traded derivatives usage, they find that large firms mostly use OTC derivatives while small firms use both OTC as well as exchange traded derivatives. Finally, they report that 32 percent of large firms use OTC foreign exchange options, while only 5 percent use exchange traded options. In contrast, only 8 percent of small firms use OTC options, while 13 percent use exchange traded options.

With regard to challenges faced by the derivatives markets in Canada, Ilkiw (1994) states that lack of liquidity in the Canadian derivatives market, especially in the exchange traded derivatives market, may dampen the use of Canadian derivatives. As a result, he predicts that Canadian pension plans which use derivatives may prefer to use more liquid US exchange traded derivatives or the more flexible OTC market.

Similar arguments are made by O'Connor (1993) who states that OTC derivatives are better able to meet the requirements of institutional investors when compared with exchange traded derivatives. He argues that due to illiquidity in the Canadian exchange traded derivatives market, it is placed at a disadvantage to the more liquid US derivative

markets. He further states that the "dominant position" of banks in the Canadian financial markets and "regulatory barriers" hamper the development of the Canadian exchange traded derivatives market.

2.2 Derivatives use by investment managers

There are only few papers that examine how professional investment managers use derivatives. Pinnuk (2004) finds that 60 percent of Australian equity fund managers hold exchange traded options. He also reports that options positions of those who trade in derivatives are not a significant part of their total investment portfolio and that large fund managers are more likely to trade in these instruments. He concludes that "very little is known about the actual use of derivatives by fund managers".

In their survey based study, Koski and Ponfitt (1999) examine US equity mutual funds to find how mutual fund managers use derivatives. They find that both funds that use and do not use derivatives have similar risk exposures and returns. Further, they report that only 21 percent of the mutual funds in their sample uses derivatives and nearly two thirds of funds using derivatives report that they use options and/or futures contracts.

Fong, Gallagher and Ng (2005) provide evidence on how derivatives are used by equity fund managers in Australia. They, too, find that there is no significant difference between users and non users of derivatives with respect to the performance and risk levels. They report that the exposure to derivatives is small when compared with the total

fund size and argue that this could be a cause for the observed insignificant impact of derivatives on fund returns.

A study by Block and Gallagher (1988) examine the use of stock index futures and options by portfolio managers of bank trust departments. They find that 11.3 percent of respondents in the whole sample use stock index futures and options. However, this rate is higher for those managing assets worth $1 billion or more.

Kiss and Valenti (1997) carry out a survey of US money manager firms to examine how these firms "use derivatives and computer risk management methods". Of the investment firms surveyed, 20 percent indicate that they use derivatives while the rest does not. The authors report that domestic equity managers and currency traders are more likely to be users of derivatives. In addition, the authors find the level of tax exempt assets under management to be a determinant of derivatives use. With regard to the objectives of using derivatives, 36 percent indicate that they use derivatives for hedging while 19 percent use them to enhance portfolio returns.

In their survey of US investment managers, Carter and Van Auken (1990) find that 24 percent of managers use options while only 19 percent use futures.

The reported rates of derivatives use by investment managers in these studies seem to be significantly lower when compared to studies involving non-financial firms. However, they are comparable to rates reported by prior research involving banks and insurance companies.

2.3 Derivatives use by Canadian firms

Jalilvand (1999), based on the results of the survey carried out by Jalilvand, Switzer and Tang (2000), find that economies of scale are a determinant of derivatives use among Canadian non-financial firms. The author also finds that the level of integration of corporate risk management policy with the firm's operational and financial policies is an important factor that determines the use of derivatives. Jalilvand, Switzer and Tang (2000) study the derivatives use by 154 non-financial firms in Canada. The authors report that 75 percent of the respondents use derivatives. A majority of non users of derivatives provide their limited risk exposure as a reason for not engaging in derivative transactions. Further, they report that 68 percent of the respondents use derivatives to manage foreign exchange exposures. The survey results show that most firms do not integrate the risk management policy with the firm's strategic plan.

2.4 Other studies on derivatives use

A study by Howton and Perfect (1998) find that forwards and futures are mainly used to hedge foreign exchange exposures while swaps are mainly used for interest rate contracts. The results of the survey of Swedish non-financial firms carried out by Alkebäck and Hagelin (1999) indicate that derivatives are mainly used for hedging purposes. El-Masry (2006) reports that public firms are more likely to be users of derivatives than private firms. Further, in line with previous studies, this study reports that derivatives are mainly used to hedge foreign exchange exposures and, to a lesser extent,

for managing the interest rate risk.

There are several studies which examine the derivatives use in non-financial firms across several countries. A recent study by Bartram (2006) examines options use by non-financial firms across different countries and finds that 15-25 percent of the respondents use options. Foreign exchange derivatives account for the largest proportion of derivative trades among the countries under study followed by interest rate derivatives. Bartram, Brown, and Fehle (2006) use a data base of 7,319 firms in 50 countries to examine the derivatives use in different countries. They find that risk management policies are determined together with other financial and operating decisions of a firm.

In general, the results of these studies indicate that non-financial firms regularly use derivatives, mainly foreign exchange and interest rate derivatives, and that they use derivatives as a risk management tool to reduce their exposures.

Studies which investigate the derivatives use in financial firms in general indicate that these firms use derivatives in a limited manner. Cummins, Phillips and Smith (1996) examine how US insurance companies use derivatives to manage their risks. They find that overall derivatives use by insurance companies is small. When the insurance companies are divided into quartiles based on size they find that less than 2 percent of the firms in the smallest quartile use derivatives. In the largest quartile between 20 to 38 percent of different types of insurance firms use derivatives. Carter and Sinkey (1998) examine interest rate derivatives use by US commercial banks and report that only 10 percent of banks use interest rate derivatives.

2.5 Determinants of corporate hedging

There are a large number of studies on corporate hedging determinants. We present a few common factors that were found in several such studies. Nance, Smith and Smithson (1993) argue that larger firms are more likely to hedge compared to smaller firms due to economies of scale associated with obtaining information and transactions costs. Many prior studies (Nance, Smith and Smithson (1993), Mian (1996), Geczy, Minton and Schrand (1997) and Sinkey and Carter (1994)) provide empirical evidence on the positive relationship between economies of scale and derivatives use. The extent of corporate hedging is also claimed to be influenced by the convexities in the corporate tax schedule of a firm (Mayers and Smith (1982) and Smith and Stulz (1985)). Nance, Smith and Smithson (1993) find that firms which face more convex tax schedules are more likely to use derivatives for hedging risk exposures. Myers (1977) argues that if gains from investments accrue more to bondholders than to shareholders, then the latter would have an incentive to underinvest. A firm can use derivatives to limit the occurrence of such states and reduce the "underinvestment problem". Therefore, prior research predicts that firms with high leverage and growth options, which may be faced with underinvestment problems, are more likely to use derivatives. Nance, Smith and Smithson (1993) and Geczy, Minton and Schrand (1997) find evidence to support this argument. Further, Colquitt and Hoyt (1997) and Hardwick and Adams (1999) find evidence of the positive relationship between derivatives use and leverage for insurance companies.

3. Data

We use the spring 2006 edition of the CPF Manager Database and the spring 2006 edition of the Canadian Pension Fund Database to examine derivatives use, and specifically exchange traded derivatives use, by Canadian institutional investors. The CPF Manager Database contains information on 198 investment management firms while the Canadian Pension Fund Database lists 998 pension funds.

In addition, we conduct a survey to investigate exchange traded and OTC derivatives use by Canadian pension funds and investment management firms. Questionnaires were sent to the directors of pension funds listed in the spring 2006 edition of the Canadian Pension Fund Database and investment manager firms listed in the spring 2006 version of the CPF Manager Database. The response rate was 13 percent for investment manager firms and 5 percent for pension funds.

To improve the response rate, we created a simplified version of the original questionnaire and conducted another survey during February and March 2007. An example of the questionnaire and details on the method followed to obtain responses is given in Appendix 1. This questionnaire was emailed to the contact person of each of the 198 investment management firms listed in the spring 2006 CPF Manager Database and was followed up by two reminders. In addition, we called investment management firms using the telephone numbers listed in the database to gather responses to the questionnaire. Each questionable response was followed up by another call to verify its

accuracy. As a result, the overall response rate improved to 39.9 percent. 41.8 percent of the responses were obtained through emails and 58.2 percent through telephone calls. The response rate exceeds the rates reported by prior studies such as 18.2 percent by Kiss and Valenti (1997) and 22 percent by Carter and Van Auken (1990).

4. Results and Analysis: CPF Investment Manager Database

4.1 Survey of investment management firms

The questionnaire was designed to identify the use of exchange traded and OTC derivative products by investment management firms in Canada. This section summarizes the responses received for the survey.

4.1.1 Policy restrictions on the use of exchange traded derivatives and OTC derivatives

Survey questions one and two ask the respondents to indicate whether the use of exchange traded derivatives and OTC derivatives are restricted by their company policy or by policies of their clients. The survey results are shown in Table 1. A majority of the respondents indicate that the firms do not have a policy limiting the use of exchange traded derivatives or OTC derivatives. In addition, only few respondents admit that exchange traded derivatives are limited to 10 to 40 percent and OTC derivatives are

limited to 20 to 40 percent of the overall portfolio or up to a certain percent of the risk exposure. Therefore, it appears that policy restrictions on derivatives use among investment management firms are not a common constraint.

4.1.2 Reasons for not using exchange traded derivatives and OTC derivatives

We examine the answers given by the respondents to questions three and four of our survey to find the reasons for not using derivatives. The responses are reported in Table 2. Even though 59 firms have no restrictions on trading in derivatives, only 20 firms or 33.9 percent are actually using exchange traded derivatives. This finding is comparable to what is reported by several prior studies such as Carter and Van Auken (1990) and Kiss and Valenti (1997).

We also find that a majority of the firms that are not restricted in using exchange traded derivatives did not use them to keep in line with their investment strategies. Although some respondents view exchange traded derivatives as being too risky, too costly or too complex, only one respondent indicates that lack of resources and sufficient training to manage the positions are the problem. This finding is in line with results reported in earlier research such as Jalilvand, Switzer and Tang (2000) and El-Masry (2006). These authors report that the reason given by half of the non-financial companies in their studies that do not use derivatives is the limited level of risk exposures. Among other reasons given for not using derivatives, a popular one is the cost involved in supporting a derivatives program exceeding the benefits of such a program. Further,

El-Masry (2006) finds that some firms are concerned about "the perception of derivative use by investors, regulators, analysts or the public" and that some firms claim to manage their exposures more effectively by other means.

4.1.3. Preference and relationship between exchange traded derivatives and OTC derivatives use

In the survey, 23 investment managers answer questions five and six, describing the relationship between OTC derivatives use and exchange traded derivatives use. The results are listed in Table 3. A majority of them describe the relationship as complementary and indicate that they are indifferent in their preference to use OTC derivatives as opposed to exchange traded derivatives. Similar results are observed when including sample firms that actually use derivatives. Six firms state that they prefer to use OTC derivatives. The reasons given by the investment management firms that prefer OTC over exchange traded derivatives were lower transaction costs, higher liquidity and more products offered in the OTC market. None of them indicate that their relationship with banks that offered OTC products is a factor for preferring OTC derivatives.

4.1.4 Challenges to trading Canadian exchange traded options and futures

Questions seven and eight gather responses from investment management firms regarding what they consider as a challenge to trading in Canadian exchange traded

options and futures. 'Large spreads', 'Liquidity' and 'Lack of products' are recognized as the challenges for trading exchange traded options. 'Liquidity' and 'Lack of products' are concerns regarding futures use. For both options and futures 'Compliance' and 'Time consuming' are not seen as challenges. The results for exchange traded options and futures are reported in Table 4.

When considering the responses from firms that did not have any company policy or client restrictions on using derivatives, most respondents indicate 'Large spreads' and 'Liquidity' as challenges to trading Canadian exchange traded options. 'Liquidity' and 'Lack of products' are viewed as challenges to trading futures in the Canadian market. As encountered previously, 'Compliance' and 'Time consuming' are not seen as challenges to both options and futures markets. These results are shown in Table 5.

Therefore, we believe that the MX should improve liquidity and product design to increase trading volumes. The design of a contract is instrumental in determining the opportunities, both risk management and yield enhancement, provided to investors and in turn ensure its success. Liquidity, on the other hand, is a key factor that helps retain existing customers and attract new customers to a market.

The MX is one of the few exchanges in the world that owns their clearing house and its technology. Therefore, the MX could develop new products with much flexibility and introduce them to the market with minimal lead-time. In order to improve liquidity in the derivatives market the MX could strengthen its efforts in increasing its number of approved participants, including foreign participants. In addition, the MX could increase

access to its trading platform and continue offering volume discounts for certain customers. Developing and introducing products targeting the needs of small business firms, too, may help in increasing trading volume because exchange traded derivatives are typically more suitable for small investors than OTC derivatives.

From the initial questionnaires that were sent to the directors of pension funds and investment management firms, results of which are not reported here, we find that price transparency and a regulated market are considered as the two main benefits of using exchange traded derivatives. Further, we observe that the use of derivatives by Canadian institutional investors seems to be case dependent. 92 percent of respondents indicate that the firm does not have a risk management group that coordinates the use of derivatives in the firm's investment strategy. A similar result is reported by Jalilvand, Switzer and Tang (2000). In addition, a significantly higher percentage of exchange traded derivatives are traded by respondents on US exchanges than on the MX. This may be a result of the perceived lack of liquidity in the Canadian exchange traded derivatives market and the preference of investment managers to use more liquid US exchange traded derivatives or more flexible OTC derivatives.

The survey results are similar those reported by the survey of investment professionals included in the Investment Dealers Association (IDA) database carried out by Dr. Lorne N. Switzer under the auspices of the Autorité des Marches Financiers (AMF),

Québec, and the MX. Dr. Switzer generously made the data of his study available and some of the findings of that survey which relates to the current study are as follows:

Work experience

The majority (80.5 percent) of the respondents to the survey of investment professionals are Investment Advisors. On average, the respondents have worked in the industry for 16 years and with their current employer for 10 years.

Trading activities

The survey results shown in Table 6 indicate that exchange traded options are more popular than futures among the respondents, with 64 percent currently trading or advising in trading of exchange traded options while only 8 percent use futures. However, the average number of futures contracts used by the respondents per month is higher than that of options.

With regards to the choice of markets, the survey shows that a slightly higher percentage of options or futures are traded by the respondents on US exchanges than on the MX. A similar result is observed from the responses for the initial survey of directors of investment management firms and pension funds.

In addition, the survey results indicate that the use of derivatives to enhance a portfolio's return or as a risk management tool seem to be popular among the respondents. Several earlier studies such as Kiss and Valenti (1997), Alkebäck and

Hagelin (1999), Jalilvand, Switzer and Tang (2000), Purnanandam (2004), El-Masry (2006), too, find that derivatives are mainly used for hedging purposes. Further, Guay and Kothari (2003) examine the derivatives use of non-financial firms and conclude that firms "clearly" use derivatives for hedging purposes.

Derivative market structures

As can be seen in Panel A of Table 7, 70.97 percent of respondents name 'Liquidity' as a challenge and 62.27 percent indicate that 'Large spreads' is a concern for trading Canadian exchange traded options. In addition, 42.08 percent believe that 'Compliance' is not a challenge.

When considering the respondents who provided an answer for the questions on derivative market structures, who can be expected to be more familiar with derivative markets in Canada than those who did not answer the questions, the results are more striking (see Panel B of Table 7). For example, 86.05 percent of respondents show that 'Liquidity' is a challenge; 81.02 percent indicate that 'Large spreads' are a challenge; while 60.12 percent do not think 'Compliance' is a concern. Respondents to the survey of investment management firms, too, report similar views on what is considered a challenge to trading Canadian exchange traded derivatives.

Benefits of using exchange traded derivatives

According to the responses received, greater price transparency, a regulated market and increased standardization are ranked as the greatest benefits of using exchange traded derivatives (see Table 8). Central counterparty clearing, increased speed of transactions and cost reduction per trade are other benefits that are considered important by the respondents. Responses for the initial survey of directors of investment management firms and pension funds reveal similar results. Further, these results are comparable to the findings reported by PWC (2005) in their study of broker dealers and their clients.

Factors that would encourage more use of exchange traded derivatives

The respondents comment that improving the liquidity of the market with lower commissions and brokerage; providing more products such as instruments with more strike prices and longer duration; and careful monitoring of the market would encourage them to use more exchange traded derivatives.

The survey conducted by FOA in association with PWC (PWC (2005)) reports that the respondents prefer to have more flexible products trading on the exchanges. Kirzner (1998) commenting on the Canadian derivatives market explains that launching of products that meet the actual requirements of investors will be crucial for the success of an exchange traded derivatives market. He states that even though "some derivative products have been introduced in the past based on marketing initiatives rather than a

proven risk management and investment need" (pg. 67) recently a new approach has been adopted by the authorities where financial products are introduced after examining the requirements of investors, especially institutional investors.

In addition, many respondents indicate that providing education on derivative strategies is vital for the development of the Canadian derivatives market. They feel that clients need to be educated about derivatives. Some respondents think that it takes a considerable amount of time to educate a client and that it is far more convenient to maintain a simple and conventional investment portfolio rather than spending time providing information on derivatives to a client. Further, some respondents comment that the compliance officers focus more on the risk side of derivatives instead of regarding derivatives as risk management tools. Therefore, the respondents believe compliance officers, too, need to update their knowledge on derivatives. Stulz (2004) comment that "those in charge of taking derivatives positions must have proper training" (pg. 19) because even though firms could hedge their risk exposure efficiently by using derivatives they can also create risks for the firm if a firm is "inexperienced in their use".

4.2 Analysis of the CPF Manager Database

To investigate the use of derivatives by the investment management firms in Canada, we examine 198 investment managers listed in the spring 2006 version of the CPF Investment Manager Database.

Table 9 provides a statistical summary of assets under management. The firms included in the CPF Investment Manager Database manage assets from a variety of clients including pension funds. Canadian pension assets account for 31.27 percent of total Canadian assets managed by the 198 investment management firms and are the largest asset type under management.

Table 10 presents a summary of the use of derivatives by Canadian investment management firms. The results indicate that resources to support derivatives activity seem to be an important factor that determines the use of derivatives. We find that derivatives are most likely to be used by a few large investment management firms. In the database, about one third of the Canadian investment management firms indicate that they use derivatives for currency hedging, and the use of futures or options. However, these firms control more than two thirds of total Canadian assets and their average size is more than twice the average size of the 198 firms in the database. These findings are similar to those reported by Koski and Ponfitt (1999). They find that most mutual funds do not use derivatives and that funds belonging to a family of funds are more likely to use derivatives because of the associated economies of scale. The authors explain that funds in a family of funds are able to employ managers who are more familiar with derivatives because these funds are more likely to be larger in size and that it is more likely for large funds to employ a large number of staff.

Further, medium size firms are likely to use hedge funds or managed futures. In the database, 12.63 percent of the firms show more than 0.0 percent of total assets invested

in 'Hedge Funds' and 2.53 percent of the firms shows more than 0.0 percent of total assets invested in 'Managed Futures', respectively. The average size of these two kinds of firms is higher than that of the whole sample, but is much less than the firms in the classes of 'Currency', 'Futures' or 'Options'.

We attempt to identify whether investment management firms use external advisors to manage derivatives by examining the different types of sub advisors in categories that are more likely to use derivatives. In the database, the firms are allowed to indicate up to 12 sub advisors and to indicate the Service/Product provided by these sub advisors. There are 81 Service/Product codes in the database, such as private equities, large cap stocks etc. We find that investment management firms are most likely to use internal expertise for derivatives investment. As shown in Table 10, nine firms indicate that they use sub advisors for hedge funds. These firms have 3.25 percent of total Canadian assets under management and their average size is smaller than the average size of firms in the whole sample. In addition, we discover that only one firm indicates the use of a sub advisor for managed futures. Moreover, although derivatives and option & futures are listed in the Service/Product code of the database to identify sub advisors of a firm, there are no firms indicating the use of sub advisors for derivatives and option & futures.

When analyzing the percentage of assets invested by investment management firms in different asset classes we observe that, compared with the average of the whole sample, firms in 'Currency', 'Futures', 'Options' and 'Other Der' have a lower percentage of their assets invested in Canadian equities, hedge funds and managed futures but a

higher percentage of their assets invested in Canadian bonds. The average size of these firms is larger than the average size of the whole sample and the availability of sufficient resource to handle derivative investments in these firms could account for their lower investment in hedge funds and managed futures.

Table 9 shows that the 198 firms control $360,877.55 of the Pooled Pension assets and $387,564.97 of the Segregated Pension assets, which account for 15.07 percent and 16.19 percent of the total Canadian assets under management. The database provides information on the investments made by the Pooled and Segregated pension assets in different asset classes, such as Canadian equity, US equity, global equity, Canadian bonds and other investments etc. Table 11 lists the investment of the Canadian pensions under management by the investment management firms in asset classes where derivatives may be employed. It is clear from the table that only a very small proportion of pension assets under management are invested in derivative products. The mandatory restrictions of the Canadian pension plans may be responsible for the lower use of derivatives. The main reason given by Ilkiw (1994) for the reluctance by Canadian pension plans to include derivatives in their investment strategies is that "pension money is nervous money" (pg. 20). He goes on to explain that a majority of pension plan sponsors regard derivatives to be speculative instruments. In addition, derivatives may appear to be complicated instruments to sponsors of pension plans.

4.3 Logit regression analysis

We use an econometric model to more closely examine the derivatives use by investment management firms in Canada.

4.3.1 Analysis of derivatives use by firms listed in the CPF Manager Database

In order to identify the characteristics associated with investment management firms which utilize derivatives we use 198 firms listed in the spring 2006 edition of the CPF Manager Database. The sample excludes investment management firms which did not report total assets under management thus reducing the original sample from 198 to 177 firms.

We regress an indicator variable representing the use of derivatives on various sources of funds and investment types. The sources of funds include mutual funds, high net worth individuals, insurance companies, endowment funds and pension funds. We argue that different sources may allow or place restrictions on the use of derivatives by investment management firms. Equity (for example Canadian equities, US equities), debt (for example Canadian bonds, Global bonds) and other investments (for example real estate) are the investment types included in the analysis. We argue that the main type of investment made by a firm may affect the decision to use or not to use derivatives. In addition, we include compliance with AIMR performance presentation standards and size of total Canadian assets in the regression.

We expect the investment management firms receiving funds from insurance companies to be less likely in using derivatives. Liabilities of insurance companies, especially life insurance companies are long term in nature. It is possible that insurance companies do not consider derivatives as one of the risk management tools available for them because derivatives are primarily short term. Therefore, we argue that insurance companies providing funds would impose restrictions in using derivatives by investment management firms at the time of providing funds for investment management firms.

Similarly, high net worth individuals are more likely to place restrictions on the use of derivatives because it would be cost effective and efficient for them to manage the risks or enhance returns of total investments on their own centrally, instead of permitting investment management firms to do these tasks separately.

With regard to endowment funds we predict that they are more likely to restrict the use of derivatives because these institutions, which typically engage in social service, educational, religious and charitable activities, may view derivatives as risky and complex instruments.

On the contrary, we argue that investment management firms receiving funds from pension funds are more likely to use derivatives. Recently there have been reports to indicate that low interest rates and equity returns have caused pension plans in general to be significantly underfunded leading to a pension fund crisis. In such a scenario pension fund returns could be significantly improved by combining derivatives with traditional asset classes, especially since pension funds are return oriented in nature, and would not

impose restrictions on using derivatives by investment management firms in which they invest. An alternative argument would be that investment management firms receiving funds from pension funds are less likely to use derivatives due to the restrictions on using derivatives placed by pension funds on them. It is possible that pension funds would place these restrictions because they view derivatives as risky speculative instruments and also because of their preference for traditional asset classes.

With regard to mutual funds the existing literature explains that it is beneficial for mutual funds to use derivatives for risk management and market entry or exit purposes. Derivatives offer a low cost and quicker means to enter or exit the market rather than trading the underlying security. However, in line with prior empirical findings concerning the reluctance of these funds in using derivatives we expect investment management firms receiving funds from mutual funds to be less likely in using derivatives because of the restriction placed on such use.

In the case of investment management firms investing in equity we argue that these firms are more likely to use derivatives. Derivatives are generally viewed as risky and complex instruments and it is likely that firms investing in equity, which is more risky compared to investing in debt, are also likely to use derivatives in line with their risk appetite. From this argument it follows that investment firms investing in debt are less likely to use derivatives. We do not make any prediction regarding investment firms investing in other categories of investments.

AIMR performance presentation standards are used by investment management

firms to present and communicate their investment performance to prospective clients. These were formulated by the Association for Investment Management and Research currently known as CFA Institute. Since their introduction, these standards have been reviewed and revised to meet the present conditions in the investment industry. They have been accepted by the investment industry in many countries and have gained wide acceptance in the US and Canada. We argue that firms which comply with AIMR performance presentation standards have systems for sophisticated reporting in place and are more familiar with regulatory requirements and the accounting treatment of derivatives, leading to more use of derivatives by these firms.

In agreement with the prediction we made, the regression results shown in Table 12 indicate that investment management firms receiving funds from insurance companies are less likely to use derivatives. We argue that insurance companies do not consider derivatives as one of the risk management tools available for them because derivatives are primarily short term in nature while liabilities of insurance companies, especially life insurance companies, are long term. However, in contrast to the prediction we made the results indicate that investment management firms investing in debt instruments are more likely to use derivatives. A possible explanation for this is that the investment management firms attempt to enhance their overall returns through the use of derivatives because debt returns are typically lower than equity returns. The regression results also indicate that large investment management firms are more likely to use derivatives. This can be explained by the significant economies of scale in using derivatives. We also

observe that the coefficients for the variables identifying high net worth individuals and endowment funds are negative even though statistically insignificant.

4.3.2 Analysis of futures use by firms listed in the CPF Manager Database

Even though the CPF Manager Database provides information on the use of futures and options by investment management firms it does not contain information on identifying whether the options used are exchange traded or OTC. Therefore, when we attempt to identify the characteristics associated with investment management firms using exchange traded derivatives we are compelled to restrict our regression analysis to the use of futures.

For this regression, too, we use 198 firms listed in the spring 2006 edition of the CPF Manager Database. Again the sample excludes investment management firms which did not report total assets under management thus reducing the original sample from 198 to 177 firms. The variables and the predictions with regard to each variable are the same as what is given under section 4.3.1. The regression results (shown in Table 13) indicate that investment management firms receiving funds from insurance companies are less likely to use futures. In addition, investment management firms investing in debt and large investment management firms are more likely to use futures. These results are similar to what was observed in section 4.3.1. The finding that large investment management firms are more likely to use futures differs from the findings of Bodnar, Hayt, Marson and Smithson (1995) who report that small firms use more exchange traded derivatives than

large firms.

4.3.3 Analysis of exchange traded derivatives use by respondents to the survey of firms listed in the CPF Manager Database

We attempt to identify the influence of different sources of funds for investment management firms and factors considered by investment management firms as challenges to using exchange traded options and futures on the actual use of exchange traded derivatives by conducting logit regression analyses. The sample consists of respondents to the survey of investment management firms included in the spring 2006 edition of the CPF Manager Database, providing an answer to the questions on what they consider a challenge to using exchange traded options and futures. The sources of funds include mutual funds, high net worth individuals, insurance companies, endowment funds and pension funds. The predictions with regard to different sources of funds are the same as those made in section 4.3.1. The factors considered as challenges to trading exchange traded options and futures include 'Time consuming', 'Compliance', 'Large spreads', 'Liquidity' and 'Lack of products'.

The results in Table 14 indicate that investment management firms receiving funds from high net worth individuals are less likely to use exchange traded options. It seems that high net worth individuals place restrictions on investments management firms that they are funding. It is interesting to note that although only few firms identify 'Compliance' as a challenge to using exchange traded options during the survey, the regression results

show that the investment firms that view 'Compliance' as a challenge are less likely to use exchange traded options. Strangely, 'Time consuming' seems to promote the use of exchange traded options. Further, even though many respondents to the survey express 'Liquidity' and 'Large spreads' as challenges, the regression results reveal that 'Liquidity' and 'Large spreads' per se do not discourage trading in options. The regression results also indicate that large investment management firms are more likely to use exchange traded options which again differs from the findings of Bodnar, Hayt, Marson and Smithson (1995). It appears that economies of scale are associated with the use of exchange traded options. Further, the results indicate that the coefficient of insurance companies is negative although statistically insignificant.

The results reported in Table 15 show that economies of scale are associated with the use of futures. In addition, investment management firms receiving funds from high net worth individuals are less likely to use futures. The coefficients for the dummy variables 'Liquidity' and 'Large spreads', in line with the results of our survey, are negative although not significant.

5. Results and Analysis: Canadian Pension Fund Database

Previous analysis shows that pension assets are the largest asset type managed by investment management firms in Canada. The data on derivatives use by pension funds

listed in the spring 2006 edition of the Canadian Pension Fund Database is summarized in Table 16.

We find that 10.32 percent of the pension funds use derivatives and that the large pension funds are more likely to use derivatives. The rate of derivatives use reported in the current study seems to be considerably lower when compared with the rates reported by prior studies such as Bodnar, Hayt and Marson (1998) and Howton and Perfect (1998) involving non-financial firms. However, it is similar to the rates reported in earlier research such as Block and Gallagher (1988), Carter and Sinkey (1998), and Purnanandam (2004) relating to financial firms.

In the database, even though only a small number of the Canadian pension funds use derivatives, the assets under management by these funds account for more than half (58.56 percent) of the total Canadian pension assets. These results are similar to the findings of the third annual survey of European asset managers (May 2006 by Financial news)[1] where it was revealed that small fund managers rarely use derivatives. Further, Sinkey and Carter (1994) and Purnanandam (2004) find that large US banks are more likely to use derivatives. In studies concerning insurance firms, Cummins, Phillips and Smith (1996) and Colquitt and Hoyt (1997) report that use of derivatives by US insurance companies is related to the size of these firms. The lack of resources in small funds to support derivatives use may be responsible for the fact that only a few large pension funds use derivatives. Colquitt and Hoyt (1997) comment that the size effect observed in

[1] http://www.efinancialnewsnetwork.com/financialnews//attachments/7111388230203034/6361029043020303.pdf

US insurance firms is related to economies of scale associated with human resources dealing with derivatives.

Comparing with the overall pension fund average (78.09 percent) of assets managed externally, those indicating use of derivatives have a higher portion of assets (82.11 percent) managed by outside fund managers. To further investigate the extent of funds managed by external managers trading or advising in derivatives we use information on up to twenty internal or external managers of each pension fund along with their identifiers, such as Canadian equities, emerging markets, balanced funds, etc. contained in the database. We find that the funds with investment manager identifiers of derivatives, managed futures and options & futures, to indicate their internal or external managers, have almost all assets managed externally (Panel B of Table 16). This fact also implies that derivatives are more likely to be managed by external managers. However, from our analysis of the CPF Manager Database in section 4.2 we find that only a very small proportion of the Canadian pension fund assets under management are invested in derivatives which indicates that pension assets managed externally may not be for derivatives use. Since derivatives are considered more risky than equity or fixed income securities, the Canadian pension funds seem to manage derivatives investments internally.

When examining the purposes of using derivatives we find that the Canadian pension funds are more likely to use derivatives for hedging foreign exchange exposures. In the database, about half of the pension funds using derivatives also indicate using

derivatives for hedging foreign exposures. These funds control 32.46 percent of total Canadian pension assets. Only 2.51 percent of pension funds, with 27.35 percent of total Canadian pension assets under management, indicate that they use derivatives for asset allocation purposes. A similar result is reported by Ilkiw (1994) who find that derivatives are mainly being used to hedge foreign exchange exposures by Canadian pension funds.

Panel A of Table 16 also shows that pension funds which indicate using derivatives, using derivatives for foreign exposures and using derivatives for asset allocation have a smaller percentage of fund assets invested in cash/short-term securities and money market instruments than the funds that do not use derivative products. Purnanandam (2004) record a similar result when he finds that US banks which use derivatives maintain a lower level of liquid assets in contrast to banks that do not use derivatives.

We then examine the use of exchange traded derivatives and find that Canadian pension funds are less likely to use exchange traded derivatives. There are only three pension funds indicating managed futures as one of the manager identifiers and only two pension funds showing option and futures as one of the manager identifiers (Panel B of Table 16) when identifying their internal or external managers. In addition, the average size of pension funds that use exchange traded derivatives is small.

It is possible that the small pension funds use exchange traded derivatives because they do not have established relationships with banks to use OTC derivatives extensively. On the other hand, since currency derivatives are more popular in the OTC market, it is possible that large pension funds use established relationships with the Canadian

chartered banks in the currency forward markets. This customer relationship in the foreign currency market may be convenient for these pension funds to trade other derivatives in the OTC market. In addition, they may obtain better quotes on other products in the OTC market because their demand for other derivatives is smaller than the demand for foreign currency derivatives. With their desire to expand their earnings base, banks are likely to offer customized OTC products to large institutional investors, which place OTC derivatives in a position to better meet the requirements of these investors than exchange traded derivatives. The dominant position of Canadian chartered banks may give them an excellent reputation which is unmatched by other investment managers, which further strengthen their position as the main suppliers of OTC products.

6. Conclusions

Company policy restrictions and client restrictions on derivative investments are not common among investment management firms. Even though more than 74 percent of the investment management firms we surveyed did not have any company policy or client restrictions in trading exchange traded derivatives only 25.3 percent of the respondents actually use them. Therefore, we argue that conclusions drawn from data representing permission to use derivatives, similar to data obtained from N-SAR forms, but not their actual use, may be unreliable.

Respondents to the investment management firms' survey indicate that lack of liquidity and large spreads are challenges to trading exchange traded options while lack of liquidity and lack of products are challenges to trading futures. 'Compliance' and 'Time consuming' are not considered as concerns. However, logit regression results show that lack of liquidity per se does not discourage trading in exchange traded options and futures. We believe that the MX should provide adequate attention to creating proper product designs, especially foreign exchange products, and ensuring sufficient liquidity to improve trading in its market. The MX is one of the few exchanges that own their clearinghouse and its technology. Therefore, the MX has great flexibility in developing new products and introducing them to the market with minimal lead-time. To improve liquidity in the derivatives market, the MX could allow more investors and traders to access the market. In this context, the MX could strengthen its efforts in increasing its number of approved participants, including foreign participants. In addition, providing access to its trading platform could help increase trading volumes. The MX should continue offering volume discounts and limits on fees for certain customers with a view to increasing market liquidity. Enhanced liquidity would result in narrowing the spreads, which is also commented as a challenge to using Canadian exchange traded derivatives. In addition, creating investor awareness on benefits of using derivatives through marketing promotions and online education programs would help in attracting new customers. Finally, the promotion of financial institutions' and investment professionals'

awareness of Canadian derivatives is essential for the development of the exchange traded derivatives market in Canada.

Further, we conclude that derivatives are only used by a few large pension funds and investment management firms. This may be due to economies of scale associated with initiating and maintaining a derivatives program. In addition, pension funds and investment management firms most likely use internal expertise for derivatives investment and those firms which use derivatives are more likely to use them to hedge foreign exposures.

Exchange traded derivatives are less popular among pension funds and only a very small proportion of the Canadian pension fund assets under management is invested in exchange traded derivatives. The restrictions on derivatives use placed by Canadian pension plan sponsors may be responsible for this lower use of derivatives. In addition, because pension funds mainly use derivatives to manage foreign currency exposures it is possible that the funds use established relationships with chartered banks in the OTC market, in which foreign exchange derivatives are more popular, to manage these exposures rather than using exchange traded products.

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Table 1. Policy restrictions on the use of derivatives

Policy restrictions	Number of responses for exchange traded derivatives	Number of responses for OTC derivatives
Total number of firms	79	79
Firms without a limiting policy	55	52
Firms limiting the use up to a certain % of the portfolio	3	2
Firms limiting the use up to a certain % of risk	1	4
Firms with limiting firm policies	13*	14**
Firms with limiting client policies	8*	9**

* One firm has both firm policies as well as client policies restricting the use of exchange traded derivatives. ** Two firms have both firm policies as well as client policies restricting the use of OTC derivatives

Table 2. Reasons for not using derivatives

Reasons	Number of responses for exchange traded derivatives	Number of responses for OTC derivatives
Total number of firms	59	55
They are viewed as too risky	7	5
They are viewed as too complex	2	1
There is a shortage of resources/ sufficient training to manage the positions	1	0
There is a firm policy or client policy that forbids the use of derivatives	20	21
They are viewed as too costly	2	2
There is no need to use derivatives	28	28

Table 3. Relationship between exchange traded derivatives and OTC derivatives

Type of response	All Respondents *		Respondents who actually use derivatives	
	Number	Percent	Number	Percent
Total number of firms	23	N/A	23	N/A
View exchange traded derivatives and OTC derivatives as substitutes	5	21.7	5	25
View OTC derivatives and OTC derivatives as complements	18	78.3	15	75
Prefer exchange traded derivatives over OTC derivatives	2	8.7	2	10
Prefer OTC derivatives over exchange traded derivatives	6	26.1	6	30
Indifferent between exchange traded derivatives and OTC derivatives	11	47.8	10	50
Preference depends upon the type of instrument	4	17.4	2	10

* One firm did not use derivatives. Two firms use OTC derivatives even though they did not use exchange traded derivatives.

Table 4. Challenges to trading Canadian exchange traded options and futures (All responses)

Panel A: Canadian exchange traded options (37 responses)

	Compliance	Large spreads	Liquidity	Lack of products	Time consuming
Considered as a challenge					
Number	6	20	28	20	5
Percent	16.2	54.1	75.7	54.1	13.5
Not considered as a challenge					
Number	31	17	9	17	32
Percent	83.8	45.9	24.3	45.9	86.5

Panel B: Canadian futures (37 responses)

	Compliance	Large spreads	Liquidity	Lack of products	Time consuming
Considered as a challenge					
Number	7	10	19	23	7
Percent	18.9	27.0	51.4	62.2	18.9
Not considered as a challenge					
Number	30	27	18	14	30
Percent	81.1	73.0	48.6	37.8	81.1

Table 5. Challenge to trading Canadian exchange traded options and futures (Responses from firms that do not have restrictions on using derivatives)

Panel A: Canadian exchange traded options (29 responses)

	Compliance	Large spreads	Liquidity	Lack of products	Time consuming
Considered as a challenge					
Number	1	15	22	14	2
Percent	3.4	53.6	75.9	48.3	6.9
Not considered as a challenge					
Number	28	14	7	15	27
Percent	96.6	48.3	24.1	51.7	93.1

Panel B: Canadian futures (29 responses)

	Compliance	Large spreads	Liquidity	Lack of products	Time consuming
Considered as a challenge					
Number	2	7	16	18	3
Percent	6.9	24.1	55.2	62.1	10.3
Not considered as a challenge					
Number	27	22	13	11	26
Percent	93.1	75.9	44.8	37.9	89.7

Table 6. Trading activities in options and futures

Panel A: Trading of options and futures

		Respondents			Average Contract/Month	
		Yes	No	No answer	Respondents	Average number of Contracts
Exchange traded options	Number	457	252	4	331	546.74
	Percent	64.10	35.34	0.56	46.42	
Exchange traded futures	Number	57	540	116	30	604.2
	Percent	7.99	75.74	16.27	4.21	

Panel B: Use of derivatives

	Respondents		Percent of Use	
	Number	Percent	Average	Median
Montreal exchange	563	78.96	42.05	40.00
US exchanges	562	78.82	44.17	50.00

Panel C: Purpose of using derivatives

	Percent		Number of Respondents
	Average	Median	
Risk management	30.14	20.00	
Stock substitutes	19.91	1.50	
Enhance return	37.04	30.00	577

Table 7. Challenges to trading Canadian options

Panel A: All 713 respondents

Challenges	Yes		No		No Answer	
	Number	Percent	Number	Percent	Number	Percent
Compliance	199	27.91	300	42.08	214	30.01
Large spreads	444	62.27	104	14.59	165	23.14
Liquidity	506	70.97	82	11.50	125	17.53
Lack of products	303	42.50	185	25.95	225	31.56
Time consuming	277	38.85	255	35.76	181	25.39

Panel B: Respondents who provided an answer

Challenges	Yes		No		No Answer	
	Number	Percent	Number	Percent	Number	Percent of survey
Compliance	199	39.88	300	60.12	499	69.99
Large spreads	444	81.02	104	18.98	548	76.86
Liquidity	506	86.05	82	13.95	588	82.47
Lack of products	303	62.09	185	37.91	488	68.44
Time consuming	277	52.07	255	47.93	532	74.61

Table 8. Benefit scores of exchange traded derivatives

(1=biggest benefit, 6=least benefit)

	Standardization	Clearing	Speed	Cost	Transparency	Regulation	Arbitration
Average score	2.81	3.30	3.07	3.23	2.39	2.76	3.90
Median score	3	3	3	3	2	2	4
Number of respondents	482	476	491	480	499	484	384
Percent of respondents	67.60	66.76	68.86	67.32	69.99	67.88	53.86

Table 9. Assets under management by investment management firms (in $MM)

Types of assets under management	Total size	Average size	Percent of total Canadian assets
Total Canadian assets	2,394,519.77	12216.94	N/A
Total Canadian pension assets	748,879.52	5094.42	31.27
Total assets invested by mutual funds	441,205.81	4412.06	18.43
Total assets invested by high net worth individuals	108,061.71	1,256.53	4.51
Total assets invested by endowment funds	42,485.16	451.97	1.77
Total assets invested by insurance companies	286,088.45	7,946.90	11.95
Total assets invested by pooled funds (pension assets only)	360,877.55	3280.71	15.07
Total assets invested by pension segregated funds	387,564.97	3075.91	16.19

There are other assets that are not included in the table, so that the sum of Percent of total Canadian asset is not 100%.

Table 10. Summary of derivatives use by investment management firms (Size figures in $MM)

Asset invested	Number of firms	Percent of total firms	SIZES	Percent of total assets	Average						Oth Percent	Number of responses
					Size	CA	BO	MM	HF	MFU		
Investment Manager	198	N/A	2,394,519.77	N/A	12,093.53	38.00	30.93	6.40	11.16	5.04	66.37	6
Hedge Funds	25	12.63	406,992.04	17.00	16,279.68	29.63	22.97	7.18	12.06	10.50	23.85	1
Managed Futures	5	2.53	74,037.10	3.09	14,807.42	25.21	11.67	3.06	52.50	7.06	50.66	1
Currency	71	35.86	1,717,384.30	71.72	24,188.51	30.96	32.10	6.62	6.15	3.82	59.64	5
Futures	58	29.29	1,646,214.07	68.75	28,383.00	28.31	32.09	5.41	6.01	2.55	59.64	5
Options	53	26.77	1,605,354.75	67.04	30,289.71	28.20	32.99	7.06	7.42	3.06	49.55	4
Other Der	13	6.57	261,503.72	10.92	20,115.67	26.47	35.59	10.03	5.55	N/A	N/A	N/A
Sub HF	9	4.55	77,911.30	3.25	8,656.81	27.53	31.31	8.08	26.93	16.65	50.66	1

Only managers indicating the percentage of assets invested in the asset classes concerned are included in the calculation. In the table, Hedge Funds includes the managers indicating more than 0.0 % of total assets invested in Hedge Funds. Managed Futures includes the managers indicating more than 0.0 % of total assets invested in Managed Futures. Currency indicates the use of currency hedging by investment managers. Futures indicates the use of futures by investment managers. Options indicates the use of options by investment managers. Other Der indicates other derivatives use, including swaps, forwards, and hedge funds. SIZES are the size of total Canadian assets; Percent of total asset is the proportion of different asset types in the total Canadian assets; CA is the average percentage of total assets invested in Canadian Equities; BO is the average percentage of total assets invested in Canadian Bonds; MM is the average percentage of total assets invested in Money Market/Cash Equivalents; HF is the average percentage of total assets invested in Hedge Funds; MFU is the average percentage of total assets invested in Managed Futures; For assets included under Other investments of the database, there are eight identifies such as Fund of Hedge Funds, Derivative products etc. for a firm. If any of Fund of Hedge Funds, Currency Overlay and Derivative Products is included by the firms in Other investments, we assign a value of 1 for Other investments of these firms. Oth Percent is the average percent of total assets invested in Other investments and Number of Responses is the number of firms that indicate Fund of Hedge Funds, Currency Overlay or Derivative Products as Other investments. In the database, the firms are allowed to indicate up to 12 sub advisors and to indicate the Service/Product provided by these sub advisors. There are 81 Service/Product codes in the database, such as Private Equities, Large Cap Stocks etc. Sub HF indicates that Service/Product Code contains Hedger Funds in up to 12 sub advisors.

Table 11. Investment of Canadian pension assets in derivatives (Size figures in $MM)

	Hedge Funds		Managed Futures		Other Investments			
	Dollar		Dollar				Only	
Pension Assets	Value	Percent	Value	Percent	Derivatives	Percent	Currency	Percent
Segregated								
Pension assets	50.9	0.01	6.0	0.00	6144.4	1.59	1866.4	0.48
Pooled								
Pension assets	13913.6	3.86	3866.0	1.07	1847.1	0.51	1847.1	0.51

For assets included under other investments of the database, there are eight identifies such as Fund of Hedge Funds, Derivative Products etc. for a firm. In this table Other Investments are indication of Currency, Currency Overlay, Derivative Products or Synthetics present in eight identifiers of other investments. Dollar Value is the dollar value of the pension assets invested. Percent is the percentage of the invested assets in the total of the Segregated Pension assets or the Pooled Pension assets under management. In Other investments, Derivatives is the dollar value of the pension assets invested in Currency, Currency Overlay, Derivative Products or Synthetics; Only Currency is the dollar value of the pension assets only invested in Currency or Currency Overlay.

Table 12. Logit analysis of derivatives use by firms listed in the CPF Manager Database

The sample consists of firms listed in the spring 2006 edition of the CPF Manager Database. The dependent variable is an indicator variable which equals one if an investment management firm uses derivatives, and zero otherwise. MF is the amount of funds in millions invested by mutual funds in an investment management firm. HN is the amount of funds in millions invested by high net worth individuals in an investment management firm. EN is the amount of funds in millions invested by endowment funds in an investment management firm. INS is the amount of funds in millions invested by insurance companies in an investment management firm. PF is the amount of funds in millions invested by pension funds in an investment management firm. EQUITY is the amount of funds in millions invested by an investment management firm in equity products. DEBT is the amount of funds in millions invested by an investment management firm in debt instruments. OTHER is the amount of funds in millions invested by an investment management firm in other miscellaneous categories of investments. SIZE is the natural log of the amount of Canadian assets under management measured in millions. AIMRSTD is an indicator variable which equals one when an investment management firm complies with AIMR performance presentation standards, and zero otherwise.

Variable	Parameter Estimates	*p*-value
Intercept	-0.014879	0.9396
MF	-0.002370	0.7586
HN	-0.016100	0.5286
EN	-0.000109	0.2401
INS	-0.015200	0.0593
PF	0.004650	0.2021
AIMRSTD	0.080781	0.3407
EQUITY	-0.006900	0.4107
DEDT	0.030200	0.0110
OTHER	0.000416	0.6648
SIZE	0.053171	0.0368
Adjusted R-squared		5.72
Observations		177

Table 13. Logit analysis of futures use by firms listed in the CPF Manager Database

The sample consists of firms listed in the spring 2006 edition of the CPF Manager Database. The dependent variable is an indicator variable which equals one if an investment management firm uses futures, and zero otherwise. MF is the amount of funds in millions invested by mutual funds in an investment management firm. HN is the amount of funds in millions invested by high net worth individuals in an investment management firm. EN is the amount of funds in millions invested by endowment funds in an investment management firm. INS is the amount of funds in millions invested by insurance companies in an investment management firm. PF is the amount of funds in millions invested by pension funds in an investment management firm. EQUITY is the amount of funds in millions invested by an investment management firm in equity products. DEBT is the amount of funds in millions invested by an investment management firm in debt instruments. OTHER is the amount of funds in millions invested by an investment management firm in other miscellaneous categories of investments. SIZE is the natural log of the amount of Canadian assets under management measured in millions. AIMRSTD is an indicator variable which equals one when an investment management firm complies with AIMR performance presentation standards, and zero otherwise.

Variable	Parameter Estimates	*p*-value
Intercept	-0.060292	0.7369
MF	0.002590	0.7132
HN	-0.003260	0.1625
EN	-0.024100	0.7756
INS	-0.012700	0.0838
PF	0.005210	0.1186
AIMRSTD	0.071995	0.3529
EQUITY	-0.007450	0.3314
DEBT	0.028600	0.0086
OTHER	0.000867	0.3237
SIZE	0.039298	0.0906
Adjusted R-squared		9.95
Observations		177

Table 14. Logit analysis of exchange traded options use

The sample consist of respondents to the survey of firms listed in the spring 2006 edition of the CPF Manager Database. The dependent variable is an indicator variable which equals one if an investment management firm uses exchange traded options, and zero otherwise. MF is the amount of funds in millions invested by mutual funds in an investment management firm. HN is the amount of funds in millions invested by high net worth individuals in an investment management firm. EN is the amount of funds in millions invested by endowment funds in an investment management firm. INS is the amount of funds in millions invested by insurance companies in an investment management firm. PF is the amount of funds in millions invested by pension funds in an investment management firm. Otime is an indicator variable which equals one if an investment management firm considers time consuming as a challenge to trading exchange traded options, and zero otherwise. Ocom is an indicator variable which equals one if an investment management firm considers compliance as a challenge to trading exchange traded options, and zero otherwise. Ospread is an indicator variable which equals one if an investment management firm considers large spreads as a challenge to trading exchange traded options, and zero otherwise. Oliquid is an indicator variable which equals one if an investment management firm considers lack of liquidity as a challenge to trading exchange traded options, and zero otherwise. Oprod is an indicator variable which equals one if an investment management firm considers lack of products as a challenge to trading exchange traded options, and zero otherwise. SIZE is the natural log of the amount of Canadian assets under management measured in millions.

Variable	Parameter Estimates	*p*-value
Intercept	0.346962	0.0995
MF	-0.000008	0.7550
HN	-0.000191	0.0340
EN	-0.000304	0.2618
INS	-0.000237	0.2101
PF	-0.000045	0.1111
Ocom	-0.609536	0.0330
Ospread	0.236654	0.2896
Oliquid	-0.263384	0.2722
Oprod	0.051387	0.7718
Otime	0.540887	0.0794
SIZE	0.000049	0.0115
Adjusted R-squared		31.35
Observations		37

Table 15. Logit analysis of futures use

The sample consist of respondents to the survey of firms listed in the spring 2006 edition of the CPF Manager Database. The dependent variable is an indicator variable which equals one if an investment management firm uses futures, and zero otherwise. MF is the amount of funds in millions invested by mutual funds in an investment management firm. HN is the amount of funds in millions invested by high net worth individuals in an investment management firm. EN is the amount of funds in millions invested by endowment funds in an investment management firm. INS is the amount of funds in millions invested by insurance companies in an investment management firm. PF is the amount of funds in millions invested by pension funds in an investment management firm. Ftime is an indicator variable which equals one if an investment management firm considers time consuming as a challenge to trading futures, and zero otherwise. Fcom is an indicator variable which equals one if an investment management firm considers compliance as a challenge to trading exchange traded options, and zero otherwise. Fspread is an indicator variable which equals one if an investment management firm considers large spreads as a challenge to trading futures, and zero otherwise. Fliquid is an indicator variable which equals one if an investment management firm considers lack of liquidity as a challenge to trading futures, and zero otherwise. Fprod is an indicator variable which equals one if an investment management firm considers lack of products as a challenge to trading futures, and zero otherwise. SIZE is the natural log of the amount of Canadian assets under management measured in millions.

Variable	**Parameter Estimates**	***p*-value**
Intercept	0.236440	0.1899
MF	-0.000004	0.8767
HN	-0.000223	0.0200
EN	0.000064	0.8233
INS	0.000301	0.1811
PF	-0.000033	0.2686
Fcom	-0.332123	0.2771
Fspread	-0.028898	0.8950
Fliquid	-0.133928	0.5213
Fprod	0.161129	0.3894
Ftime	0.240397	0.4627
SIZE	0.000032	0.0884
Adjusted R-squared		21.21
Observations		37

Table 16. Summary of derivatives usage by Canadian pension funds (Size figures in $MM)

Panel A: Asset class

Class		Number of firms	Percent of total number	SIZES	Percent of total asset	Average Size	EXT	CA	BO	CASH	MM
PENSION FUNDS	total	998	N/A	886,860.56	N/A	888.64	78.09	30.62	30.61	5.60	4.51
DERIVATIVE	use	103	10.32	519,318.39	58.56	5,041.93	82.11	26.25	31.22	2.40	0.40
	not use	895	89.68	367,542.17	41.44	410.66	77.63	31.42	30.49	5.05	4.95
FOREIGNEXP	use	54	5.41	287,917.18	32.46	5,331.80	78.16	25.90	28.83	2.41	0.40
	not use	944	94.59	598,943.38	67.54	634.47	78.09	31.05	30.78	4.76	4.95
ASSETMIX	use	25	2.51	242,556.49	27.35	9,702.26	76.72	25.97	30.32	3.72	N/A
	not use	973	97.49	644,304.07	72.65	662.18	78.13	30.80	30.62	4.55	4.91

Panel B: Up to 20 investment managers

Class		Number of firms	Percent of total number	SIZES	Percent of total asset	Average Size	EXT	CA	BO	CASH	MM
DE	Hired	7	0.70	13,878.31	1.56	1,982.62	83.76	27.38	33.08	5.67	N/A
FU	Hired	3	0.30	1,313.60	0.15	437.87	99.90	32.60	29.90	2.30	N/A
OP	Hired	2	0.20	3,062.80	0.35	1,531.40	98.50	38.85	28.75	1.45	N/A

Some statistical characteristics on the usage of derivatives by the Canadian pension funds are presented in the table. PENSION FUNDS represents the total population of 998 Canadian pension funds in the spring 2006 edition of the Canadian Pension Fund Database. SIZES is the size of pension assets. DERIVATIVE indicates that the fund uses derivatives. FOREIGNEXP indicates that the funds use derivatives for foreign exchange exposure. ASSETMIX indicates that the fund uses derivatives for asset mix allocation. In the database, pension funds are allowed to indicate up to 20 internal portfolio managers or external investment managers and their identifiers. There are 80 identifiers such as Private Equities, Large Cap Stock etc. DE is the identifier for Derivatives, FU for Managed Futures and OP for Options & Futures. There are no overlaps among pension funds indicating DE, FU or OP in the database. EXT is the percentage of assets managed by external investment managers. CA is the percentage of funds invested in the Canadian Equities. BO is the percentage of funds invested in the Canadian Bonds. CASH is the percentage of funds invested in Cash/Short-term and MM is the percentage of funds invested in Money Market instruments.

Appendix 1

Investment management firms survey questionnaire

Investor Management Firms Survey Questionnaire
"Utilization of Exchange Traded Derivatives in Canada"

Company Name: .....

Please select the appropriate response(s) for each question listed below.

(1) Does your firm have a policy limiting the use of Exchange Traded derivatives?

No limiting policy ☐
Exchange Traded derivative usage is limited to .....% of overall portfolio ☐
Exchange Traded derivatives are not permitted by policy of firm ☐
Exchange Traded derivatives are not permitted by policy of clients ☐

(2) Does your firm have a policy limiting the use of OTC derivatives?

No limiting policy ☐
OTC derivative usage is limited to .....% of overall portfolio ☐
OTC derivatives are not permitted by policy of firm ☐
OTC derivatives are not permitted by policy of clients ☐

(3) If the firm does not utilize Exchange Traded derivatives, please indicate the reason or reasons:

They are viewed as too risky ☐
They are viewed as too complex ☐
There is a shortage of resources/ sufficient training to manage the positions ☐
There is a firm policy or client policy that forbids use of derivatives ☐
Other (please specify) ..... ☐

(4) If the firm does not utilize OTC derivatives, please indicate the reason or reasons:

They are viewed as too risky ☐
They are viewed as too complex ☐
There is a shortage of resources/ sufficient training to manage the positions ☐
There is a firm policy or client policy that forbids use of derivatives ☐
Other (please specify) ..... ☐

(5) Which describes the relationship between OTC derivatives usage and Exchange Traded derivative usage in your firm:

They are substitutes ☐

They are complements ☐

(6) Does your firm prefer to use OTC derivatives as opposed to Exchange Treaded derivatives?

Yes ☐

No ☐

Indifferent between the two ☐

If the answer to question (6) is yes, what are the reasons:

Relationship with banks that offer OTC products ☐

Lower transactions costs ☐

Perceived liquidity ☐

More products offered OTC (please specify examples) ..... ☐

Other (Please specify)..... ☐

(7) Which of the following do you consider a challenge to trading Canadian exchange traded options?

Compliance	Yes	☐	No	☐
Large Spreads	Yes	☐	No	☐
Liquidity	Yes	☐	No	☐
Lack of products	Yes	☐	No	☐
Time consuming	Yes	☐	No	☐

(8) Which of the following do you consider a challenge to trading Canadian exchange traded futures?

Compliance	Yes	☐	No	☐
Large Spreads	Yes	☐	No	☐
Liquidity	Yes	☐	No	☐
Lack of products	Yes	☐	No	☐
Time consuming	Yes	☐	No	☐

This survey was conducted during February and March 2007. The questionnaire was emailed to the contact person of each of the 198 investment firms listed in the spring 2006 CPF Investment Manager Database and was followed up by two reminders. 50 firms responded to the emailed questionnaire. While 33 firms completed the questionnaire, 17 firms indicated that they were unable to participate in the survey due to client restrictions, external communication policies and time limitations. In addition, we called investment managers using the telephone numbers listed in the database to gather responses to the questionnaire. Each questionable response was followed up by another call to verify the accuracy of the response made. Information on derivatives use was collected from 46 firms through telephone calls. Information was missing from other firms due to the following reasons: emails were retuned/emails were not deliverable, the telephone number was not in use, the call was transferred to an automated message system and there was no response to the message left by us, and the contact person did not know how to answer the questionnaire and was not able to direct the call to a person who could respond.