CANADIAN MUTUAL FUND FLOWS AND PERFORMANCE: NON-LINEARITY, FRICTIONS AND DIMINISHING RETURNS TO SCALE

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Abstract

Canadian Mutual Fund Flows and Performance:
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This thesis investigates the nature of the relationship between mutual fund flows and fund performance in Canada. Specifically, we investigate the non-linearity (or "asymmetry") of the relationship, and how the relationship differs for equity and fixed-income funds using both excess and raw returns. We also test whether frictions prevent investors from punishing poor performers, and whether there are decreasing returns to scale in mutual fund management.

Using a sample of 119 equity and 44 fixed-income funds managed by public fund sponsors, we find that when fund performance is measured on a risk-adjusted basis versus benchmark returns, there is evidence of rational asymmetry in the flow-performance relationship for Canadian equity funds. We note that non-performance factors, especially prior flow, are significant predictors of funds flow for both equity and fixed-income funds. We also find that frictions do affect the flow-performance relationship, and that returns to scale in mutual fund management appear to be constant.

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1. INTRODUCTION

Mutual funds are by far the investment vehicle of choice for retail investors in Canada. To illustrate, as of December 31, 2005, the Canadian Mutual Funds industry managed close to CDN$570 billion in assets, maintained over 48 million unitholder accounts, and offered investors almost 1,700 mutual fund products to choose from.[1]

While mutual fund investors have a wide selection of funds to choose from when making an investment decision, they base their choice on a number of specific fund characteristics. Capon, Fitzsimons and Prince (1996) attempt to quantify these factors and to assess their importance. They report that the chief selection criterion considered by investors when purchasing mutual funds is the fund's investment performance track record. When asked to rank the importance of information sources when purchasing mutual funds, published performance rankings come first by a significant margin. Their findings generally confirm anecdotal evidence that mutual fund performance is widely followed, and is considered to be a major factor by most investors when making their investment decisions.

Given the phenomenal growth of the mutual fund industry in the United States, many U.S. studies test the persistence of performance among mutual funds. For the most part, evidence from these studies does not support the notion that performance chasing is rational. Several studies fail to find evidence of a relationship between past and future

[1] IFIC Historical Overview, 2005. http://statistics.ificmembers.ca/English/Reports/MonthlyStatistics.asp.

fund performance. However, a subset of the literature supports the expectation of performance persistence among poor performing funds. In other words, a fund that has underperformed is likely to continue to underperform, but outperformance is not likely to continue.

Given the evidence from the performance persistence literature, this thesis examines the relationship in Canada between mutual fund flows and fund performance. Specifically, we investigate the non-linearity of the relationship, and how the relationship differs for equity and fixed-income funds using both excess and raw returns. Findings from these tests are compared with what we would rationally expect given the findings of the performance persistence asymmetry literature. We also test whether frictions prevent investors from punishing poor performers, and whether there are decreasing returns to scale in mutual fund management in Canada.

The remainder of this thesis is structured as follows: Section 2 reviews the literature on asymmetry in performance persistence. Section 3 tests the nature of the flow-performance relationship in Canada. Section 4 tests the effect of frictions on the flow-performance relationship. Section 5 tests for the presence of diminishing returns to scale. Section 6 concludes the thesis.

2. REVIEW OF THE MUTUAL FUND PERFORMANCE PERSISTENCE ASYMMETRY LITERATURE

Numerous studies examine the performance of actively managed mutual funds. While most of these studies are focused on whether funds outperform appropriate benchmarks, some focus on performance persistence by testing whether funds that outperform over any given period are inclined to outperform over subsequent periods. While no clear

consensus has emerged in this debate, the evidence is stronger against overall performance persistence, especially among the more recent studies.

Findings from the performance persistence literature are highly relevant in determining whether it is rational to expect a relationship between fund flows (new money) and fund performance. Many studies document the presence of a non-linearity in this relationship (henceforth, referred to as the "flow-performance relationship"), where the flow is stronger to top-performing funds. Findings from the literature reviewed below lay the foundation for the expectation of a rational *asymmetric* fund flow relationship with prior period performance.

2.1 Asymmetric Persistence in the Performance of U.S. Funds

Hendricks, Patel and Zeckhauser (1993) examine the "hot hands" phenomenon for a sample of 165 U.S. funds over the period 1974 to 1988. They note that funds that perform poorly continue to be inferior performers in the near term, and that the degree of inferiority, or "icy hands", is greater than the degree of superiority for hot hands. They construct rank portfolios and calculate Jensen's alphas against four separate benchmarks, and over four separate evaluation periods. The Jensen's alphas for the worst ranked portfolios are significantly smaller than for the top ranked portfolios for all evaluation periods. Using the samples from two other studies, they find that the Jensen's alphas for the low octile portfolios are smaller in value and individually significant, unlike the top octile portfolios that are positive but generally not significant.

Goetzmann and Ibbotson (1994) conduct tests for persistence over a similar period (1976-1988) but employ a larger sample. Reporting four-way results by raw return percentages and Jensen's alphas over successive three-year intervals, they show that the

lowest quartile ranked funds are more likely to remain in the fourth quartile in the subsequent period than top ranked funds are likely to remain in the first quartile.

Carhart (1997) examines a comprehensive and survivor bias free sample, consisting of data on 1,892 funds from January 1962 to December 1993. As in Hendricks, Patel and Zeckhauser (1993), Carhart's sample is sorted into equally weighted decile portfolios based on their returns in the previous calendar year. For the CAPM and a four-factor model, Carhart finds that the lowest ranked portfolios have intercepts (alphas) that are both smaller in value and greater in significance than the other decile portfolios. He reports that decile 10 funds are especially poor performers over a three year period, even after accounting for higher expenses and turnover.

Grinblatt and Titman (1992) find significant persistence among worst performers when their sample is split in half chronologically. Best (worst) performers persist in one (four) out of five random partitions.

Brown and Goetzmann (1995) report that previous year rankings are strong predictors of negative, but not positive alphas on a disaggregated basis. They also find that the aggregated results ascribe most of the persistence to the repeat-loser funds, and that the frequency of loser-loser funds increases dramatically in the second half of their sample (from 1982-1987) when the S&P500 is used as the benchmark. Finally, the worst ranked octile portfolios have significantly smaller alphas.

Gruber (1996) presents similar results when funds are ranked over one and three-year periods, with a statistically significant difference between the top and bottom fund deciles. Droms and Walker (2001) present the weakest evidence in support of persistence. Their five-year data exhibit some persistence for only poor performers.

2.2 Asymmetric Persistence in the Performance of Canadian Funds

Deaves (2004) reports mixed results. The probability of loser funds maintaining their status one and two years ahead is higher for the five-factor model but not for the one-factor model or the conditional CAPM. The mean performance differences between deciles 1 and 10, and between the top and bottom halves of funds, are positive and significant across all benchmarks for the subsequent year. Deaves interprets this as evidence of short-term persistence of successful managers in Canada.

Sinha and Jog (2005) also report mixed evidence. When good/poor performers are defined as the top/bottom 5 or 10 percent of the percentile rankings of the sample, poor performers are more likely to continue in the same performance group over the next 3, 6 and 12 month periods. However, when performers are defined by the top/bottom 15 or 20 percent of the percentile rankings, the results for the next 3 and 6 month periods are reversed. However, limited evidence for all four rankings exists that poor performers persist slightly more often than good performers over the subsequent 12 months.

2.3 Implications of this Literature

Since performance persistence is stronger for poorer-performing U.S. funds, we expect U.S. mutual fund investors to rationally react to performance in a non-linear fashion. Specifically, fund flows from investors should exhibit a disproportionately negative response to poor fund performance. Since the evidence for persistence for good performers is mixed, we expect investors to be either indifferent or to have a more tempered reaction to good fund performance. Based on the limited evidence for Canadian mutual funds, we tentatively expect similar investor behavior in Canada.

3. RELATIONSHIP BETWEEN FUND FLOWS AND FUND PERFORMANCE

The nature of the relationship between fund flows and fund performance is tested for a sample of Canadian mutual funds in this section of the thesis.

3.1 Review of the Relevant Literature

3.1.1 U.S. Studies

3.1.1.1 Early studies

Early studies on the relationship between mutual fund flows and fund performance focus exclusively on testing for the existence of a positive and significant relationship between these two variables. For a sample of 10 load and 10 no-load funds, Spitz (1970) finds evidence of association on a yearly basis that is weaker for the load funds. Smith (1978) finds stronger evidence of a performance-flow relationship on an annual basis, and notes that investors tend to respond more to risk-adjusted measures of performance as opposed to the less-sophisticated fund rankings.

3.1.1.2 Differential fund flow response to fund performance

More recent studies of the fund flow/fund performance relationship test for the non-linearity or asymmetry of the relationship. Consistent evidence of a stronger reaction in fund flows after good versus bad performances are documented for U.S. funds. For example, Ippolito (1992) finds that funds that outperform the market have disproportionately higher flows, and that the reaction to performance is stronger for no-load and "capital appreciation" funds. Ippolito suggests that the fees associated with load

funds are likely to act as barriers to performance chasing, and that flow response is more vigorous for actively managed funds.

Chevalier and Ellison (1997) identify a significant and non-linear relationship between flows and excess fund returns that is less drastic following poor performance. The authors report that the degree of non-linearity is more pronounced for older funds, especially when excess returns are negative. The authors also report that flows respond significantly to contemporaneous and lagged outperformance of up to 3 years prior.

Goetzmann and Peles (1997) find that top-quartile funds encounter significantly higher flows, while the response of fund flows to fund performance is the same for the other quartiles. The authors conclude that investors do not punish poor-performing funds by altering the rate of fund flows. Although Sirri and Tufano (1998) observe similar results, they find that the performance of both the top and all but the bottom quintile funds are significantly and positively related to fund flows, which support the assertions made by Goetzmann and Peles (1997). Sirri and Tufano include fund-objective flows as a control variable (highly significant), and report that the observed asymmetry is still present when including three and five-year lagged returns, even though recent performance is more strongly associated with flow.[2]

Del Guercio and Tkac (2002) illustrate the extent of the convex relationship between fund flows and fund performance graphically when flows are specified both as dollars and percentages. They report that top and poor performing mutual funds have positive

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[2] "Fund-objective" refers to the investment goal of the fund, namely balanced, growth, etc. Fund-objective flows, therefore, refer to new money for all funds with a similar objective.

growth rates that are large and small, respectively. Thus, they also conclude that poor-performing funds are not punished by investors.

3.1.1.3 Robustness to the specification of fund performance

A question that arises in studies of the relationship between mutual fund flows and fund performance is the robustness of the relationship to the specification of fund performance. Specifically, should raw or risk-adjusted returns be used when measuring fund performance? The evidence from the literature strongly supports the notion that investors respond to both types of returns.

Ippolito (1992) defines performance as Jensen's alpha plus a noise component, and finds a strong association with growth in assets. Patel, Zeckhauser and Hendricks (1994) report greater significance when performance is defined as net returns (i.e., the total pretax percentage gain that accrues to an investor annually). Patel et al. report that risk-adjusted performance measures (Jensen's alpha and Sharpe's measure) do not add any explanatory power to the model. Their results contradict their conjecture that the consideration of past performance by investors is "likely to focus on widely reported ranks rather than on cardinal measures indicating absolute or risk-adjusted performance". Harless and Peterson (1998) conclude that investors respond to extreme and recent raw returns and not to Jensen's alpha. Del Guercio and Tkac (2002) find a strong relation between mutual fund flows and both raw returns and Jensen's alpha.

3.1.1.4 Non-performance variables: Prior flow, fees, risk and size

While the literature focuses on tests of the relationship between mutual fund flows and performance, most of these studies also examine the role of non-performance factors, such as prior flows, fees, risk and size.

Patel, Zeckhauser and Hendricks (1994) appears to be the only U.S. study to explicitly include lagged fund flows as a predictor in their model, which is surprising given this variable's significance. While Sirri and Tufano (1998) do include the highly significant fund-objective flow (which is likely to be correlated with fund flow), they do not directly consider fund-level flow. However, these authors find that fees are negatively and significantly (at the 10% level) related to flows.

In contrast, Harless and Peterson (1998) report that funds with fees above 2% (the top decile of their sample) experience significantly higher flows at the 5% level, and that funds with fees below 0.7% (the bottom decile of their sample) experience significantly negative flows at the 5% level. Barber, Odean and Zheng (2005) find a negative relationship between flows and load fees, but not with what they refer to as "operating expenses".

Sirri and Tufano (1998) explicitly include risk as a predictor in their model, as they use raw returns for their base performance specification. Surprisingly, they find that the parameter estimate, while negative, is not significant. This result is robust to changes in the specifications of both risk and performance.

The natural logarithm of fund size is included as a control variable by Chevalier and Ellison (1997) and Sirri and Tufano (1998), who find a negative and highly significant

relationship between funds flow and this variable. This implies that larger funds grow less quickly, a result consistent with the law of diminishing returns.

3.1.2 Canadian Studies

Deaves (2004) tests the performance-flow relationship in Canada, using a sample of 64 mutual funds with a continuous history between 1988 and 1998. Although this introduces a selection bias into his results, Deaves finds strong support for a positive relationship between fund flow and current period risk-adjusted returns on a yearly basis. Previous period returns are only significant at the 10% level. The estimated coefficient for risk (as measured by the 12 month standard deviation in returns) and fund size are positive and negative, respectively, and significant at the 10% level. MERs, load fees and age are all statistically insignificant. Limiting his model to only contemporaneous variables, Deaves finds evidence of asymmetry in the flow-performance relationship, with high returns positively related to flow at the 1% level and no significant relation between low returns and flows.

Sinha and Jog (2005) employ a much larger sample than Deaves (2004) that consists of 968 funds with 68,346 monthly observations, representing about 27% of all assets invested in Canadian mutual funds at the end of 2002. Asymmetry is tested using star/loser dummies, based on whether the fund performs in either the top/bottom quartile or decile. The authors also include the following non-performance variables in their model: standard deviation of returns (risk), the log of fund assets (fund size), the log of fund age (age), the 12 month lagged MER average (MER), lagged monthly net inflow (lagged flow), and the log of fund family assets (family size). Using a fixed-effects panel regression, the authors report that performance, risk, lagged flow and family size are

significant and positively related to flow at the 1% level. Fund size and the loser dummy are significantly and negatively related to flow at the 1% level, whereas age, MER and the star dummy are insignificant. They report significant fund-specific heterogeneity but no significant period effects.

Several of the results of Sinha and Jog are surprising, both theoretically and relative to the literature. While Deaves (2004) dismisses his finding of a positive and significant effect of risk as an anomaly, this result is confirmed by Sinha and Jog. MERs are not negatively related to flows, as per expectations. The finding of no significant period effects seems to be inconsistent with the year-to-year variability in fund asset growth over the past 10-15 years. The insignificance of age differs from the result reported by Chevalier and Ellison. Their finding of an insignificant star dummy and a strongly significant (negative) loser dummy implies that Canadian mutual fund investors heavily punish poor performing mutual funds. This differs markedly from the results of Deaves (2004) as well as the earlier reported results for U.S. funds.

3.1.3 Implications of the Funds Flow Literature

There are several implications of the literature reviewed above that are relevant to this thesis. First, we do observe asymmetry in the flow-performance relationship in the U.S., but not in the manner that we would rationally expect. While top performing funds receive disproportionately higher flows than other funds, investors are often insensitive to poor performance. Secondly, the asymmetric flow-performance relationship holds both for raw and risk-adjusted (excess) returns. Third, several non-performance variables are significant factors in explaining fund flows, especially lagged flows.

In Canada, the limited evidence is contradictory in that one study finds asymmetry with top performers, and another finds evidence of asymmetry with poor performers. The Canadian studies find similar results for the effect of non-performance factors on fund flows that differ from those reported in U.S. studies as previously detailed.

Lastly, all of the relevant literature on the flow-performance relationship focuses exclusively on equity or balanced mutual funds. This is surprising since Canadian fixed-income funds account for slightly more than one-third of mutual funds assets as of December 2005 (see Appendix 1). In this thesis, separate equity and fixed income samples are used to investigate the flow-performance relationship.

3.2 Hypothesis

The first hypothesis to be tested, H_0^1, is that no relationship exists between the asset flows of mutual funds and their performance. The alternative hypothesis, H_A^1, is that such a relationship exists but it differs for equity and fixed-income funds.

A two-way fixed effects panel regression, which controls for both fund-specific and time period-specific heterogeneity, is estimated to test this hypothesis. The non-linear nature of the relationship is controlled for using a piecewise methodology on both a lagged and contemporaneous basis. The specific model to be estimated, and the expectations and interpretations of the coefficients are discussed in Section 3.4 below.

3.3 Sample and Data Collection

The sample studied herein consists of all publicly-traded mutual fund sponsors for the 10 year period, 1996-2005. Public sponsors represent a convenient sub-sample of the asset management industry in Canada, since they manage a significant portion of the

assets tracked by the Investment Funds Institute of Canada or IFIC (between 20-40%, depending on the year examined). Berkowitz and Qiu (2003) examine how ownership affects the risk and performance of mutual funds by management companies, and find similar levels of risk-adjusted performance between public and non-public sponsors. The similarity in the performance results among both groups implies that public sponsors are an appropriate sample for this study.

3.3.1 Determining Public Sponsors

In order to determine which sponsors in Canada are publicly-traded, a master list of all mutual fund managers in Canada over the studied time period was compiled through various sources, including IFIC, the academic literature, The Globe & Mail's globefund.com list of fund companies, the Canadian Financial Markets Research Centre (CFMRC) database, and the TSX Review. Sponsors are excluded from the sample if: (1) stock return data for the firm are not available from the CFMRC database, (2) the sponsor is not a member of the Investment Funds Institute of Canada (IFIC), or (3) the sponsor is a bank. This reduced the sample to twelve public fund sponsors (see Appendix 2 for the list), which is a larger list of fund sponsors than that employed by Berkowitz and Qiu (2003).

3.3.2 Data Sources

The main data source for this study is a set of survivorship-free monthly reports for the 144 months starting January 1994 through December 2005, obtained from the Investment Funds Institute of Canada (IFIC) by purchasing a one-time, monthly membership. These monthly spreadsheet reports contain data on the following variables

for each fund of each IFIC member: fund name, net assets (i.e., of all expenses), amount of assets held in cash and short-term securities, gross sales, reinvested distributions, shares redeemed, transfers in, transfers out, net sales, number of unitholder accounts, capital gains and other income. Definitions of these variables are given in Appendix 3. Total and non-reinvested distributions are equal to the sum of "capital gains" and "other income", and as the difference between total and reinvested distributions, respectively.

The remaining variables in the IFIC reports are of a descriptive nature. They include a unique 3-letter code per sponsor, a unique 3-letter code per fund, fund type, whether the fund is RRSP eligible, the nature of the sales fee, and the manner in which the fund is distributed. "Fund-type" is a two letter code assigned to each fund depending on the objective of the fund; namely, BA (Balanced), BF (Foreign Bond & Income), BO (Bond & Income), CF (Foreign Common), CS (Canadian Common), DI (Dividend & Income), DM (Mortgage), MF (Foreign Money Market), MM (Canadian Money Market), RP (Real Property) and US (US Common). Added to each member report by the author is a hybrid identifier that combines the sponsor and fund codes. For example, if the sponsor and fund codes are "AGF" and "USG", respectively, the hybrid fund code is "AGFUSG".

The secondary source of data is the SEDAR filing system, which is used to obtain MER data for each fund from either the fund's Prospectus, Annual Report, or Management Report of Fund Performance. To facilitate the search on SEDAR for each full or partial missing record, the full name history of the fund is accounted for using the IFIC "New Funds, Name Changes and Mergers" reports obtained along with the member reports. MERs are collected as they are reported to investors, meaning that MER values

published prior to the effect of National Instrument 81-102 (which required that the Goods and Services Tax, or GST, be included) are collected without restatement.

3.3.3 Equity and Fixed-Income Samples

The sample of funds is now drawn. At January of each year that the fund sponsor is publicly traded, each sponsor's list of funds is separated into the equity and fixed-income categories based on the fund-type listed in the IFIC member reports. The fund-types in the equity category are taken to be Balanced, Foreign Common, Canadian Common and US Common. The remaining fund types, Foreign Bond & Income, Bond & Income, Dividend & Income, Mortgage, Foreign Money Market, Canadian Money Market and Real Property, are included in the fixed-income category. The funds that consist of the top 75% of each fund sponsor's assets form the sample for that 12 month period. This methodology is used to restrict the size of the sample given that fee data are manually collected from SEDAR. Fund-year observations are dropped from the sample if no MER value is found for the period, or if there are not enough monthly records in existence for the calculation of flow and performance values as described in Section 3.4 below. Upon acquisition of one sponsor by another, any funds continuing to be managed by the acquiring sponsor are treated like separate entities to account for the new management's philosophy, different distribution channels and marketing efforts. This process results in a sample of 119 equity and 44 fixed-income funds, for a total of 572 equity and 215 fixed-income fund-year observations. A complete list of the funds by sponsor is provided in Appendix 4.

3.4 Methodology

3.4.1 Flow and Performance Variables

In most flow-performance studies, the performance of the fund is pre-determined by the data provider (i.e., the return data are exogenous). Flow is then endogenously derived by subtracting the fund's performance from the change in net assets of the fund over the same period. For example, Chevalier and Ellison (1997) define flow as:

$$FLOW_{i,t} = \left(\frac{Assets_{i,t} - Assets_{i,t-1}}{Assets_{i,t-1}} \right) - r_{i,t} \tag{1}$$

where $Assets_{i,t}$ and $Assets_{i,t-1}$ are the net assets of fund i in period t and t-1, respectively; and $r_{i,t}$ is the percentage calendar return of fund i for period t.

This calculation method implicitly assumes that all distributions are reinvested, which may be a reasonable assumption for samples that only include equity funds. However, as this study also examines the flow-performance relationship for fixed-income funds, a more exact calculation is employed by using the six components of fund flows that are recorded as individual variables in the IFIC data set; namely: gross sales, redemptions, transfers in, transfers out, total distributions and reinvested distributions. As such, fund flow is *exogenously* defined herein as:[3]

$$FLOW_{i,t} = \frac{\left(\begin{array}{l} Gross\ Sales_{i,t} - Redemptions_{i,t} + Transfers\ In_{i,t} - Transfers\ Out_{i,t} \\ - Non\text{-}Reinvested\ Distributions_{i,t} \end{array} \right)}{Assets_{i,t-1}} \tag{2}$$

[3] Note that the yearly components of flow as shown in the numerator of equation (2) are calculated by simply summing the monthly component values, as the IFIC reports exist on a monthly basis.

where $Non\text{-}Reinvested\ Distributions_{i,t} = Total\ Distributions_{i,t} - Reinvested\ Distributions_{it}$, if $Reinvested\ Distributions_{it} < Total\ Distributions_{i,t}$, and 0 otherwise. While one would expect that Reinvested Distributions would always be less than Total Distributions by definition, there are occasional exceptions to this in the IFIC dataset when there are positive/negative adjustments, even when no declarations occur. When these infrequent adjustments exist, they are excluded from the flow calculations.

Rearranging (1), fund performance is then endogenously defined as:

$$PERF_{i,t} = \left(\frac{Assets_{i,t} - Assets_{i,t-1}}{Assets_{i,t-1}} \right) - FLOW_{i,t} \tag{3}$$

Equation (3) represents the base specification using raw return performance. Alternative specifications for performance are described in Section 3.4.3 below.

This thesis also differs with the literature in terms of the twelve month period used to calculate the variables. As the flow-performance relationship is determined by mutual fund investor reaction, flow and performance are calculated "off-calendar" to capture the effect of fund reporting. This is based on the assumption that investors are more likely to base decisions about MERs on the fund's reports once they have received them than to do so at the beginning of the fund's fiscal period.

Consider the following example as an illustration of the off-calendar calculation of flow and performance. Assume fund "XYZ" has December 31 as its fiscal year end, and that the year end in question is December 1999. Allowing 3 months for fund XYZ's annual report to reach investors, flow and performance for the 12 month period are calculated using IFIC's April 2000 to March 2001 monthly reports. Using Gross Sales as an example, fund XYZ's monthly Gross Sales values from April 2000 to March 2001 are summed, and then added to the other components of flow which are calculated in the

same manner. The summed value is then divided by the fund's net assets at the end of March 2000, as described in equation (2) above. Raw performance is then calculated as the change in fund XYZ's net assets from the end of March 2000 to the end of March 2001 minus the fund's flow during the same period. One-year lagged values for these variables are calculated in the same fashion, except that the period used is from April 1999 to March 2000.

3.4.2 Non-Performance Variables

Several non-performance variables are incorporated into the models described in Section 3.4.3 below. Consistent with the findings of the literature, these include the fund's prior flow (FLOW), management expense ratio (MER), riskiness (STDEV), fund-type flow (TFLOW), fund-type performance (TPERF) and prior net assets (SIZE). MERs are collected in the manner described in Section 3.3.2, and are matched with the relevant flow and performance values based on the fund's year end, as described in Section 3.4.1 above. STDEV is the standard deviation of the fund's raw monthly returns. TFLOW and TPERF are calculated in the same fashion as FLOW and PERF, with the exception that they represent the flow and performance of all funds in the IFIC data set of the given fund type. SIZE is the natural logarithm of the fund's net assets in the prior period.

3.4.3 Estimation of the Flow-Performance Relationship

An interaction variable DIFFRES is also included to test for the existence of non-linearity in the flow-performance relationship. This variable tests for a differential flow response when the fund's return exceeds that of its fund-type. It is defined as:

$$DIFFRES_{i,t} = \begin{cases} (PERF_{i,t} - TPERF_{i,t}) \text{ if } PERF_{i,t} > TPERF_{i,t} \\ 0 \text{ if not} \end{cases} \quad (4)$$

The specific models estimated for the equity and fixed-income samples, respectively, are:

$$\begin{aligned} FLOW_{i,t} = {} & \beta_0 + \beta_1 (PERF_{i,t}) + \beta_2 (PERF_{i,t-1}) + \beta_3 (DIFFRES_{i,t}) + \beta_4 (DIFFRES_{i,t-1}) \\ & + \beta_5 (FLOW_{i,t-1}) + \beta_6 (MER_{i,t-1}) + \beta_7 (STDEV_{i,t}) + \beta_8 (STDEV_{i,t-1}) \\ & + \beta_9 (TFLOW_{i,t}) + \beta_{10} (TFLOW_{i,t-1}) + \beta_{11} (TPERF_{i,t}) + \beta_{12} (TPERF_{i,t-1}) \\ & + \beta_{13} (SIZE_{i,t-1}) + \sum_{j=14}^{119} \beta_j (FUNDDUM) + \sum_{k=133}^{19} \beta_k (YEARDUM) + \varepsilon_{i,t} \end{aligned} \quad (5)$$

$$\begin{aligned} FLOW_{i,t} = {} & \beta_0 + \beta_1 (PERF_{i,t}) + \beta_2 (PERF_{i,t-1}) + \beta_3 (DIFFRES_{i,t}) + \beta_4 (DIFFRES_{i,t-1}) \\ & + \beta_5 (FLOW_{i,t-1}) + \beta_6 (MER_{i,t-1}) + \beta_7 (STDEV_{i,t}) + \beta_8 (STDEV_{i,t-1}) \\ & + \beta_9 (TFLOW_{i,t}) + \beta_{10} (TFLOW_{i,t-1}) + \beta_{11} (TPERF_{i,t}) + \beta_{12} (TPERF_{i,t-1}) \\ & + \beta_{13} (SIZE_{i,t-1}) + \sum_{j=14}^{44} \beta_j (FUNDDUM) + \sum_{k=58}^{19} \beta_k (YEARDUM) + \varepsilon_{i,t} \end{aligned} \quad (6)$$

where the variables are sorted by fund and by time period within each fund's observations. FUNDDUM and YEARDUM represent the fixed-effects tested by the model, and they consist of dummy variables for each fund, and for each semi-annual period. The difference between the two models is simply the number of fund dummy variables, corresponding to the difference in sample size. As this methodology requires at least two fund-year observations for each fund (as discussed in Section 3.3.3), funds with only one fund-year observation are dropped from the sample.

To deal with the issue of multicollinearity, correlated predictor variables are orthogonalized prior to their inclusion in the model. In the results of the model discussed in Section 3.5 below, orthogonalized variables are identified by the inclusion of "RESID" in the variable name, and the nature of the multicollinearity is specified in the relevant table.

The first hypothesis of the thesis (see Section 3.2) is accepted or rejected based on the PERF and DIFFRES variables. Specifically, at least one of the four variables needs to be statistically significant in order to reject the null hypothesis of no relationship between flow and performance. If the alternative hypothesis is concluded, the nature of the relationship and the presence of non-linearity for both the equity and fixed-income sample are examined for similarity.

As a test of robustness, the model is also estimated with excess returns, calculated relative to benchmarks and fund type. Specifically:

$$\begin{aligned} &EXCESSPERF_{i,t} = PERF_{i,t} - TPERF_{i,t} \\ &or \\ &EXCESSPERF_{i,t} = PERF_{i,t} - Benchmark\ Return_{i,t} \end{aligned} \tag{7}$$

A list of the benchmarks and the return series used are provided in Appendix 5.

TPERF is removed as an independent variable in the resulting performance models, and its effect is now accounted for either directly or indirectly within EXCESSPERF. The resulting models are:

$$\begin{aligned} FLOW_{i,t} = {} & \beta_0 + \beta_1 (EXCESSPERF_{i,t}) + \beta_2 (EXCESSPERF_{i,t-1}) \\ & + \beta_3 (DIFFRES_{i,t}) + \beta_4 (DIFFRES_{i,t-1}) + \beta_5 (FLOW_{i,t-1}) + \beta_6 (MER_{i,t-1}) \\ & + \beta_7 (STDEV_{i,t}) + \beta_8 (STDEV_{i,t-1}) + \beta_9 (TFLOW_{i,t}) + \beta_{10} (TFLOW_{i,t-1}) \\ & + \beta_{13} (SIZE_{i,t-1}) + \sum_{j=14}^{119} \beta_j (FUNDDUM) + \sum_{k=133}^{19} \beta_k (YEARDUM) + \varepsilon_{i,t} \end{aligned} \tag{8}$$

$$\begin{aligned} FLOW_{i,t} = {} & \beta_0 + \beta_1 (EXCESSPERF_{i,t}) + \beta_2 (EXCESSPERF_{i,t-1}) \\ & + \beta_3 (DIFFRES_{i,t}) + \beta_4 (DIFFRES_{i,t-1}) + \beta_5 (FLOW_{i,t-1}) + \beta_6 (MER_{i,t-1}) \\ & + \beta_7 (STDEV_{i,t}) + \beta_8 (STDEV_{i,t-1}) + \beta_9 (TFLOW_{i,t}) + \beta_{10} (TFLOW_{i,t-1}) \\ & + \beta_{13} (SIZE_{i,t-1}) + \sum_{j=14}^{44} \beta_j (FUNDDUM) + \sum_{k=133}^{19} \beta_k (YEARDUM) + \varepsilon_{i,t} \end{aligned} \tag{9}$$

3.5 Empirical Results

Tables 1 and 2 report the results for equations (5) and (6), respectively. In each case, two subsets of the model are presented, due to multicollinearity that is persistent after orthogonalization. Subset A' represents the removal of outliers from each sample, that are defined as observations whose studentized residuals are more/less than ±3. The outliers removed from the equity and fixed-income samples represent 2.45% and 1.40% of all observations in each sample, respectively. In both cases, this subset results in a better fit of the model, which is fairly high in both cases, and it is these results that are discussed. The Hausman test for random effects tests the null hypothesis that a random effects model is consistent and efficient when compared to a fixed effects model. The F-test for "No Fixed Effects" tests the null hypothesis that none of the cross-sectional or time-series effects are statistically significant. Therefore, the rejection of both null hypotheses implies that the model should be structured as a fixed effects rather than a random effects model, and that at least one of the fixed effects is significant (this justifies their inclusion in the model). A 10% significance level is used for both tests.

3.5.1 Basic Flow-Performance Relationship

Clear evidence of a relationship between fund flows and performance exists on both a lagged and contemporaneous basis for the equity sample. On a contemporaneous basis, the estimates for PERF and DIFFRESRESID are positive and significant (10% and 5% confidence levels, respectively). On a lagged basis, the estimate for PERF and DIFFRESRESID are positive and significant (1% and 5% confidence levels, respectively). These results contrast with those of the fixed-income sample where only the contemporaneous variables are positive and significant at the 1% confidence level.

This implies that equity fund investors respond, both on a current and lagged basis, in an overall positive manner that becomes disproportionate when performance is above average. However, this is only the case on a current basis for fixed-income investors. While the null hypothesis detailed in Section 3.2 is rejected, the alternative is only partially concluded as fixed-income investors do react similarly to equity investors on a contemporaneous basis.

With regard to the presence of non-linearity in the relationship, the significant DIFFRES variables, in combination with the significance of the base performance variables, indicate that Canadian investors do punish below-average performers, but also reward above-average performers in a disproportionate fashion. This finding is in contrast to most of the U.S. literature, as well as the findings presented in both Deaves (2004), who finds non-linearity only among good performers, and Sinha and Jog (2005).

For both the equity and fixed-income sample, it is evident from Tables 1 and 2 that the prior flows for both the fund and its fund type are strong predictors of the current period flow (both significant at the 1% level), as reported in Sinha and Jog (2005). They are strong indicators that future studies in this field should take the autocorrelation of fund flows into account. The results for the effect of fees are unlike those reported in U.S. studies but like those reported in Canadian studies. The estimate for MER is insignificantly negative for both the equity and fixed-income samples. The effect of size is similar across both samples and consistent with most flow-performance studies in that the estimate is negative and highly significant.

The effects of risk differ between the equity and fixed-income samples. For equity funds, the estimates are negative but statistically insignificant. Like the fee results, these

findings are similar to Deaves (2004) and Sinha and Jog (2005), but contrast with those reported by U.S. studies. For the fixed-income sample, the effect of risk is also negative but marginally significant at the 10% confidence level for the contemporaneous effect and at the 5% confidence level for the lagged effect. This suggests that the flow of funds is related (inversely) to the risk level of fixed-income but not equity funds. This is consistent with investment theory, as we would expect fixed-income investors to be more risk-averse than equity investors.

3.5.2 Alternative Flow-Performance Relationship

Tables 3 and 4 report the results of equations (8) and (9), respectively. For the equity sample, regardless of whether benchmark returns or fund-type performance are used to calculate excess returns, both contemporaneous and lagged performance estimates are similarly positive and significant at the 1% confidence level. However, when testing for differential returns, the results depend on the basis of comparison. Comparing fund performance to benchmark returns, which are more commonly used in the literature, we observe negative and significant differential response on a lagged basis. When fund-type returns are used instead, we observe positive and significant differential response on a contemporaneous basis. The fits of the models are almost the same, so in both cases about the same percentage of variation is explained.

For the fixed-income sample, we observe similar reactions to absolute flow on a contemporaneous basis. Lagged excess returns are only marginally significant when fund-type returns are used. The model fit is slightly better for the BM model by only about 3%.

In summary, the results from the alternative performance specifications suggest that the basis of comparison matters to equity but not fixed-income investors. Of particular importance from the equity results is the negative and significant estimate for the differential response when calculating excess returns using benchmarks. As this model is the most similar to the methodology employed in academic studies, the parameter estimate provides evidence of a muted response to risk-adjusted outperformance. Taken together with a linear response to risk-adjusted underperformance, this relationship matches the theoretical behavior that is expected given the prior literature on performance persistence asymmetry. It supports the principle of investor rationality. As the results differ for the fixed-income sample, the same inference can not be drawn for fixed-income investors. Given these results and academic convention, excess returns compared to benchmarks are used as the performance specification in the remaining sections of the thesis.

4. RESPONSE OF FUND FLOW COMPONENTS TO PERFORMANCE

As mentioned earlier, the prevalent findings of both the performance persistence and fund flows literatures suggest that investors may not be acting rationally. While evidence to the contrary is presented in the previous section for Canada, this evidence contrasts with the results of the U.S. studies. Several authors in the U.S. have attempted to provide an explanation for the observed behavior of investors, mainly focusing on transactional arguments. As both a further test of rationality, as well as an attempt to document how the structural effects of the Canadian fund industry affect investor decision making, this section tests the role of frictions in the flow-performance relationship.

4.1. Relevant Literature

As discussed in Section 3.1.1.2, Ippolito (1992) finds evidence of flow asymmetry. The author rationalizes this finding within the context of rational learning by stating that transaction costs act as a barrier for investors to reallocate their funds to top performers. Specifically, he hypothesizes that the flow reaction to performance should be stronger for fund purchases than for redemptions. While the author interprets his findings of disproportionately higher flow for good performers as evidence of differences between purchases and redemptions, he does not explicitly model or test the variables as such.

Fant (1999) examines the effect of frictions on stock market returns instead of on fund performance. He tests the behavior of investors by dividing fund flows into its four major components; namely, new sales, redemptions, exchanges-in and exchanges-out.[4] The relationship between aggregate fund flows and stock market returns is then examined by testing the hypothesis that differences in the relationship will be observed among the components due to frictions. Specifically, Fant argues that a stronger flow-performance relationship should be observed among exchanges than among sales and redemptions since investors can more easily move money between funds in the same fund complex via exchanges. His findings confirm his conjecture as the relationship between fund flows and market performance occurs entirely between market returns and exchanges-in and out. Fant's findings provide support for investor rationality as frictions appear to play a significant role in investors' decisions to react to performance.

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[4] Exchanges-in and out are defined in a similar fashion to the transfers-in and out defined in Appendix 3.

Sigurdsson (2004) reports evidence to the contrary in that the flow-performance relationship observed in the literature is mainly driven by the net inflow of new money to the industry. The rationale behind his hypothesis stems from the idea that new investors, or old investors allocating new money, will rationally take performance into account when selecting which funds to invest in. Once the decision to invest new money is made, frictions are a certainty and are unlikely to act as barriers to chasing performance. In contrast, existing investors are not likely to exercise their transfer option due to uncertainty about future returns, and transaction costs.

According to IFIC documentation, it is common for Canadian fund sponsors to allow investors to switch among funds in the same fund family without facing a redemption fee. While investors may be required to pay a transfer fee, mutual fund dealers may only levy a charge of up to 2% of assets.[5] By contrast, if investors redeem an existing position in order to move to funds that they believe will provide better risk-adjusted returns in the future, they face fees significantly in excess of 2%. In the case of rear-load funds, deferred sales charge (DSC) fees regularly exceed 6% in the first year after purchase, and often do not fall below 2% until the fund has been held for a total of 6 years. Ruckman (2003) cites anecdotal evidence that Canadian investors "buy rear-loaded funds four times as often as front-loaded funds". While front-end fees are generally lower than their DSC counterparts, they are still generally higher than 2%. Moreover, if an investor sells a position in a front-end load fund and purchases a rear-loaded fund to avoid redemption and sales fees, she would only be able to do this once before she would again face friction.

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[5] From "Mutual Fund Fees", in Series 1 of IFIC's Investor Frequently Asked Questions. Last updated October 24th, 2005. http://ific.ca/eng/frames.asp?l1=Investor_Education

Despite the arguments raised in Sigurdsson (2004), given the evidence of poor-performer persistence in the literature we expect that the flow-performance relationship is stronger among inter-fund transfers than among sales and redemptions. This is because the present value of gains (or rather losses avoided) that is earned by switching away from poorly performing funds likely exceeds the current cost of the transfer fee.

4.2. Hypothesis

The second hypothesis of this thesis to be tested, H_0^2, is that the flow-performance relationship is stronger for inter-fund transfers than for sales and redemptions, with no observable difference in the relationship between equity and fixed-income flow components. The alternative hypothesis, H_A^2, is that the flow-performance relationship is stronger for sales and redemptions than for inter-fund transfers, with an observable difference in the relationship between equity and fixed-income flow components.

A two-way fixed-effects panel regression is estimated in a similar fashion to the regression used in Section 3 to test this hypothesis. However, both fund and fund-type flows are split into their major components, and four separate models are tested (one per component). Performance estimates among inter-fund transfers that are larger and more significant than among sales and redemptions result in a failure to reject the null hypothesis. The specific model to be estimated, and the expectations and interpretations of the coefficients are discussed in the next section.

4.3. Methodology

The methodology followed in this section is similar to that used earlier. In equation (2) above, Flow was defined as the addition/subtraction of the four major components;

Gross Sales, Redemptions, Transfers-In and Out, minus an adjustment for non-reinvested distributions. These components are defined separately in the following four equations:

$$SALES_{i,t} = \frac{Gross\ Sales_{i,t}}{Assets_{i,t-1}} \tag{10}$$

$$REDEM_{i,t} = \frac{Redemptions_{i,t}}{Assets_{i,t-1}} \tag{11}$$

$$TRANSIN_{i,t} = \frac{Transfers\ In_{i,t}}{Assets_{i,t-1}} \tag{12}$$

$$TRANSOUT_{i,t} = \frac{Transfers\ Out_{i,t}}{Assets_{i,t-1}} \tag{13}$$

To facilitate the comparison of the equity and fixed-income samples, non-reinvested distributions are not included in any of the models below. In general, the four major components often account for over 90-95% of the aggregated flow variable defined in equation (2). Fund-type flow is similarly divided into its components, calculated in the same fashion as equations (10) to (13) above. These variable labels are TSALES, TREDEM, TTRANSIN and TTRANSOUT.

4.3.1. Estimation of the Component Flow Models

The following models are used to test the second hypothesis for the equity sample:

$$\begin{aligned} SALES_{i,t} = {} & \beta_0 + \beta_1 (EXCESSPERF_{i,t}) + \beta_2 (EXCESSPERF_{i,t-1}) + \beta_3 (DIFFRES_{i,t}) \\ & + \beta_4 (DIFFRES_{i,t-1}) + \beta_5 (SALES_{i,t-1}) + \beta_6 (MER_{i,t-1}) + \beta_7 (STDEV_{i,t}) \\ & + \beta_8 (STDEV_{i,t-1}) + \beta_9 (TSALES_{i,t}) + \beta_{10} (TSALES_{i,t-1}) + \beta_{11} (SIZE_{i,t-1}) \\ & + \sum_{j=12}^{119} \beta_j (FUNDDUM) + \sum_{k=130}^{19} \beta_k (YEARDUM) + \varepsilon_{i,t} \end{aligned} \tag{14}$$

$$REDEM_{i,t} = \beta_0 + \beta_1(EXCESSPERF_{i,t}) + \beta_2(EXCESSPERF_{i,t-1}) + \beta_3(DIFFRES_{i,t}) + \beta_4(DIFFRES_{i,t-1}) + \beta_5(REDEM_{i,t-1}) + \beta_6(MER_{i,t-1}) + \beta_7(STDEV_{i,t}) + \beta_8(STDEV_{i,t-1}) + \beta_9(TREDEM_{i,t}) + \beta_{10}(TREDEM_{i,t-1}) + \beta_{11}(SIZE_{i,t-1}) + \sum_{j=12}^{119}\beta_j(FUNDDUM) + \sum_{k=130}^{19}\beta_k(YEARDUM) + \varepsilon_{i,t} \quad (15)$$

$$TRANSIN_{i,t} = \beta_0 + \beta_1(EXCESSPERF_{i,t}) + \beta_2(EXCESSPERF_{i,t-1}) + \beta_3(DIFFRES_{i,t}) + \beta_4(DIFFRES_{i,t-1}) + \beta_5(TRANSIN_{i,t-1}) + \beta_6(MER_{i,t-1}) + \beta_7(STDEV_{i,t}) + \beta_8(STDEV_{i,t-1}) + \beta_9(TTRANSIN_{i,t}) + \beta_{10}(TTRANSIN_{i,t-1}) + \beta_{11}(SIZE_{i,t-1}) + \sum_{j=12}^{119}\beta_j(FUNDDUM) + \sum_{k=130}^{19}\beta_k(YEARDUM) + \varepsilon_{i,t} \quad (16)$$

$$TRANSOUT_{i,t} = \beta_0 + \beta_1(EXCESSPERF_{i,t}) + \beta_2(EXCESSPERF_{i,t-1}) + \beta_3(DIFFRES_{i,t}) + \beta_4(DIFFRES_{i,t-1}) + \beta_5(TRANSOUT_{i,t-1}) + \beta_6(MER_{i,t-1}) + \beta_7(STDEV_{i,t}) + \beta_8(STDEV_{i,t-1}) + \beta_9(TTRANSOUT_{i,t}) + \beta_{10}(TTRANSOUT_{i,t-1}) + \beta_{11}(SIZE_{i,t-1}) + \sum_{j=12}^{119}\beta_j(FUNDDUM) + \sum_{k=130}^{19}\beta_k(YEARDUM) + \varepsilon_{i,t} \quad (17)$$

The following models are used to test the second hypothesis for the fixed-income sample:

$$SALES_{i,t} = \beta_0 + \beta_1(EXCESSPERF_{i,t}) + \beta_2(EXCESSPERF_{i,t-1}) + \beta_3(DIFFRES_{i,t}) + \beta_4(DIFFRES_{i,t-1}) + \beta_5(SALES_{i,t-1}) + \beta_6(MER_{i,t-1}) + \beta_7(STDEV_{i,t}) + \beta_8(STDEV_{i,t-1}) + \beta_9(TSALES_{i,t}) + \beta_{10}(TSALES_{i,t-1}) + \beta_{11}(SIZE_{i,t-1}) + \sum_{j=12}^{44}\beta_j(FUNDDUM) + \sum_{k=56}^{19}\beta_k(YEARDUM) + \varepsilon_{i,t} \quad (18)$$

$$REDEM_{i,t} = \beta_0 + \beta_1(EXCESSPERF_{i,t}) + \beta_2(EXCESSPERF_{i,t-1}) + \beta_3(DIFFRES_{i,t}) + \beta_4(DIFFRES_{i,t-1}) + \beta_5(REDEM_{i,t-1}) + \beta_6(MER_{i,t-1}) + \beta_7(STDEV_{i,t}) + \beta_8(STDEV_{i,t-1}) + \beta_9(TREDEM_{i,t}) + \beta_{10}(TREDEM_{i,t-1}) + \beta_{11}(SIZE_{i,t-1}) + \sum_{j=12}^{44}\beta_j(FUNDDUM) + \sum_{k=56}^{19}\beta_k(YEARDUM) + \varepsilon_{i,t} \quad (19)$$

$$TRANSIN_{i,t} = \beta_0 + \beta_1(EXCESSPERF_{i,t}) + \beta_2(EXCESSPERF_{i,t-1}) + \beta_3(DIFFRES_{i,t}) + \beta_4(DIFFRES_{i,t-1}) + \beta_5(TRANSIN_{i,t-1}) + \beta_6(MER_{i,t-1}) + \beta_7(STDEV_{i,t}) + \beta_8(STDEV_{i,t-1}) + \beta_9(TTRANSIN_{i,t}) + \beta_{10}(TTRANSIN_{i,t-1}) + \beta_{11}(SIZE_{i,t-1}) + \sum_{j=12}^{44}\beta_j(FUNDDUM) + \sum_{k=56}^{19}\beta_k(YEARDUM) + \varepsilon_{i,t} \quad (20)$$

$$
\begin{aligned}
TRANSOUT_{i,t} = {} & \beta_0 + \beta_1 (EXCESSPERF_{i,t}) + \beta_2 (EXCESSPERF_{i,t-1}) + \beta_3 (DIFFRES_{i,t}) \\
& + \beta_4 (DIFFRES_{i,t-1}) + \beta_5 (TRANSOUT_{i,t-1}) + \beta_6 (MER_{i,t-1}) + \beta_7 (STDEV_{i,t}) \\
& + \beta_8 (STDEV_{i,t-1}) + \beta_9 (TTRANSOUT_{i,t}) + \beta_{10} (TTRANSOUT_{i,t-1}) \\
& + \beta_{11} (SIZE_{i,t-1}) + \sum_{j=12}^{44} \beta_j (FUNDDUM) + \sum_{k=56}^{19} \beta_k (YEARDUM) + \varepsilon_{i,t}
\end{aligned}
\tag{21}
$$

where the variables are sorted by fund and by time period within each fund's observations, as described in Section 3.4.4. All non-performance variables have the same meaning as in the aggregated flow models, and the orthogonalization procedure described previously is similarly employed.

The second null hypothesis is not rejected if the parameter estimates for the EXCESSPERF and DIFFRES variables are larger and more significant for the TRANSIN and TRANSOUT models than for the SALES and REDEM models. If the null hypothesis is rejected, the results of the equity and fixed-income models are then examined for similarity.

4.4 Empirical Results

The results for equations (14) through (21) are summarized in tables 5 through 8. Each model that is denoted with an apostrophe represents the removal of outliers from each sample, defined as observations whose studentized residuals are greater/less than ±3. The outliers removed from the equity and fixed-income SALES, REDEM, TRANSIN and TRANSOUT models represent 2.62%, 1.22%, 1.92% and 1.4% of all observations in the equity sample, and 2.79%, 3.25%, 1.86% and 1.86% of all observations in the fixed-income sample, respectively. In all cases, the removal of outliers results in a significantly better fit of the model, and it is these results that are discussed. The Hausman test for

Random Effects and the F-test for No Fixed Effects are similar to those discussed in Section 3.5.

Table 5 indicates that there is clear evidence of a reaction to performance for the equity external flow models (SALES and REDEM). There is a positive reaction to performance on both a lagged and contemporaneous basis for the SALES model, and a differential response to lagged performance that is similar to the results shown in Table 3. On a contemporaneous basis, redemptions are higher for the REDEM model when excess returns are higher with a positive differential response, which is consistent with profit taking.

In contrast to the external flow models, the results from the equity internal flow models (TRANSIN/OUT) in Table 6 show limited evidence of a relationship with performance. In the TRANSIN model, there is only evidence of a response to contemporaneous performance, similar to that found in the SALES model (although the latter result is more significant). However, there is no evidence of a relationship with lagged performance on a lagged basis unlike that for the SALES model. Moreover, no evidence exists of any type of relationship with performance in the TRANSOUT model, as the parameter estimates for lagged and contemporaneous EXCESSPERF are insignificant.

The fixed-income results shown in Tables 7 and 8 are markedly different than those for the equity sample. Only marginal evidence exists of a relationship with performance for the SALES (not REDEM) model. The TRANSOUT (but not TRANSIN) model exhibits a relationship with performance. The highly significant negative DIFFRES parameter estimate is consistent with expectations, as an increase in excess returns results

in a substantial reduction in transfers out of the funds. The marginally significant positive performance estimate is probably anomalous as this implies that transfers out also decrease as excess performance decreases.

In summary, there is ample evidence to reject the null hypothesis. We therefore conclude the alternate hypothesis of a stronger component flow-performance relationship for sales and redemptions than for inter-fund transfers, and of observable differences between equity and fixed-income flow components.

5. DIMINISHING RETURNS TO SCALE

In this section, the presence of diminishing returns to scale in Canadian fund management is tested to examine our expectations of rational asymmetric flow to performance.

5.1 Relevant Literature

Edelen (1999) presents a cost-based argument about mutual fund performance persistence, focusing on the trading costs incurred by fund managers. He shows that a statistically significant liquidity cost is responsible for the findings of negative fund performance in the literature as fund managers provide investors with a liquid entry position to investors at low cost. If true, the flow-performance relationship often observed in the literature would not be irrational, as investors would actually be causing the underperformance that they are supposed to be reacting to.

Berk and Green (2004) present a line of reasoning that is conceptually similar to that of Edelen (1999). They substitute the effect of liquidity costs for the effect of diminishing returns to scale. They argue that a strong response of flows to performance can be

consistent with rationality, because investors themselves temper future performance of top-performing funds by purchasing units of these funds. Given decreasing returns to scale, funds become less likely to outperform as in the past as they grow larger. In support of their claim, Berk and Green present results that are consistent with the flow-performance relationship documented by Chevalier and Ellison (1997).

5.2 Hypothesis

The third hypothesis of this thesis to be tested, H^3_0, is that fund size has no effect on the likelihood of future outperformance, due to constant returns to scale in mutual fund management. The alternative hypothesis, H^3_A, is that fund size has a negative effect on the likelihood of future outperformance due to decreasing returns to scale in mutual fund management. A simple logistic regression is used to test the third hypothesis by examining whether lagged fund size has any effect on the probability of future outperformance, after controlling for the possibility of persistence in performance.

5.3 Methodology

The methodology employed in this section uses the excess return data relative to benchmarks from equations (8) and (9) after the removal of outliers. The equity and fixed-income models contain 559 and 210 observations, or 97.7% and 97.6% of each sample's total observations, respectively. The returns to scale model for both samples is:

$$WINNER_{i,t} = \left[\frac{\exp\left(\beta_0 + \beta_1 \left(WINNER_{i,t-1}\right) + \beta_2 \left(SIZE_{i,t-1}\right)\right)}{1 + \exp\left(\beta_0 + \beta_1 \left(WINNER_{i,t-1}\right) + \beta_2 \left(SIZE_{i,t-1}\right)\right)} \right] + \varepsilon_{i,t} \qquad (22)$$

where funds are defined as winners (WINNER = 1) if their excess returns relative to the benchmarks are positive, and losers otherwise (WINNER = 0). The SIZE variable is the same as employed previously.

The third hypothesis of the thesis is accepted or rejected based on the significance of the coefficient of the SIZE variable. In the event of a significantly negative parameter estimate, the null hypothesis is rejected with confidence.

5.4 Empirical Results

The results for equation (21) are presented in Tables 9 and 10. While SIZE has a negative parameter estimates in both cases, it is not a significant factor for either the equity or fixed-income sample. This evidence does not lead to a rejection of the null hypothesis, implying that returns to scale in Canadian mutual fund management are constant.

There is evidence of performance persistence in the equity sample since the parameter estimate of the lagged WINNER variable is highly significant, and the odds ratio estimates imply that it is roughly one and a half to three times as likely that a prior winner/loser stands to be a future winner/loser. Consistent with most of the findings in the literature, there is evidence that a majority of this effect is due to the persistence of poor performers rather than good performers.[6]

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[6] Of the 559 observations in the equity sample, 340 observations have identical lagged and contemporaneous WINNER variables (either 1/1 or 0/0). However, out of these 340 cases, 220 are due to poor performer persistence (0/0), leaving only 120 cases due to persistence of good performers.

6. CONCLUSIONS

In this thesis, the nature of the relationship between mutual fund flows and performances for Canadian mutual funds was examined. Specifically, we investigated the non-linearity of the relationship, and how the relationship differs for equity and fixed-income funds using excess and raw returns. We also test whether frictions prevent investors from punishing poor performers, and whether there are decreasing returns to scale in mutual fund management in Canada.

There are several relevant findings presented in this thesis. First, Canadian equity investors do punish poor performers by avoiding funds that underperform on a risk-adjusted basis. This finding contrasts with most of the U.S. evidence. Funds that outperform on a risk-adjusted basis do experience increases in funds flow, but at a lower rate than the loss in funds incurred by underperformers. On the other hand, fixed-income investors avoid poor performers and disproportionately embrace good performers.

Second, funds flows in Canada are heavily autocorrelated. There is substantial evidence of a momentum effect in the movement of money among funds at both the fund-specific and fund-objective level for both equity and fixed-income funds. Fixed-income (equity) investors respond negatively (are indifferent) to risk even when performance is measured on a risk-adjusted basis. Larger funds grow more slowly than their smaller counterparts.

Third, frictions affect investor decision making, as a stronger relationship exists between flows and performances for sales and redemptions than for inter-fund transfers for equity funds. The reverse is true for fixed-income funds. However, the specifics of how frictions affect investor decision making are as yet undetermined.

Fourth, no evidence exists in either sample that fund size affects the likelihood of future outperformance. This implies that investors should be as willing to (re)allocate money to larger funds as they would be to growing funds. While evidence of performance persistence is present in the equity sample, the majority of this effect is due to the persistence of poor rather than good performers. This finding is consistent with the performance persistence literature. No evidence of persistence is found among the fixed-income funds, which implies that fixed-income mutual funds in Canada add little value.

There are a number of possibilities for future research in this area. It would be interesting to assess how flow-performance non-linearity has evolved over time, and whether there is any evidence of learning on the part of investors. The rationality of investors can be further tested by controlling for the status of the funds flow, namely, whether it is due to a new allocation or to a reallocation.

Table 1 – Aggregated Equity Flow Model with Absolute Performance

Results of a fixed-effects panel regression of the equity sample with current year Fund Flow ($FLOW_t$) as the dependent variable. MER represents the fund's prior year's Management Expense Ratio, $FLOW_{t-1}$ represents the fund's prior year Fund Flow, $PERF_t$ and $PERF_{t-1}$ represent the fund's current and prior year absolute (raw) return, $STDEV_t$ and $STDEV_{t-1}$ represent the fund's current and prior 12-month standard deviation of returns, $DIFFRES_t$ and $DIFFRES_{t-1}$ represent current and prior year indicator variables taking the value of (PERF - TPERF) if PERF > TPERF, or zero otherwise, $TFLOW_t$ and $TFLOW_{t-1}$ represent current and prior year flows to the fund's objective class (or "fund-type"), $TPERF_t$ and $TPERF_{t-1}$ represent current and prior year absolute (raw) returns of the fund's objective class (or "fund-type"), and SIZE is the natural logarithm of the fund's prior year Net Assets. $DIFFRESRESID_t$ and $DIFFRESRESID_{t-1}$ represent the residuals of $DIFFRES_t$ and $DIFFRES_{t-1}$ regressed against $PERF_t$ and $PERF_{t-1}$, respectively. $TFLOWRESID_{t-1}$ represents the residuals of $TFLOW_{t-1}$ regressed against $TFLOW_t$. $TPERFRESID_t$ represents the residuals of $TPERF_t$ regressed against $PERF_t$. All fund-type variables are calculated using all available equity funds in the IFIC dataset, not just those of public sponsors. As the $PERF_{t-1}$ / $TPERF_{t-1}$, $DIFFRESRESID_t$ / $TPERFRESID_t$ and $DIFFRESRESID_{t-1}$ / $TPERF_{t-1}$ variables still had high positive or negative correlations after orthogonalization, Subsets A and B reflect substitution of these variables. Subset A' represents the removal of 14 observations whose studentized residual values from the Subset A model were greater/less than 3/-3. Bolded values represent estimates significant at the 1%, 5%, or 10% level.

Parameter Estimates	Subset A	P-Values	Subset B	P-Values	Subset A'	P-Values
Intercept	**3.1617**	**<.0001**	**3.4526**	**<.0001**	**1.5638**	**0.0001**
$PERF_t$	0.0580	0.5661	0.1169	0.3407	**0.1317**	**0.0863**
$PERF_{t-1}$	**0.2092**	**0.0003**			**0.2658**	**<.0001**
$DIFFRESRESID_t$	**0.6091**	**0.0070**			**0.3666**	**0.0326**
$DIFFRESRESID_{t-1}$	0.1001	0.5666			**0.3271**	**0.0298**
$FLOW_{t-1}$	**0.0836**	**<.0001**	**0.1246**	**<.0001**	**0.1056**	**<.0001**
MER	-3.0821	0.3766	-2.0260	0.5699	-0.0585	0.9819
$STDEV_t$	0.1487	0.8689	**1.6452**	**0.0539**	-0.1677	0.8036
$STDEV_{t-1}$	0.3386	0.5725	0.1553	0.7969	-0.2777	0.5339
$TFLOW_t$	**0.3155**	**0.0433**	**0.4493**	**0.008**	**0.3544**	**0.0025**
$TFLOWRESID_{t-1}$	-0.0645	0.6793	0.0711	0.6735	-0.1158	0.3176
$TPERFRESID_t$			-0.1946	0.3716		
$TPERF_{t-1}$			-0.1285	0.5016		
$SIZE_{t-1}$	**-0.2840**	**<.0001**	**-0.2852**	**<.0001**	**-0.1671**	**<.0001**
Hausman Test for Random Effects	**49.19**	**<.0001**	**50.09**	**<.0001**	**41.60**	**<.0001**
F-Test for No Fixed Effects	**2.64**	**<.0001**	**2.46**	**<.0001**	**2.75**	**<.0001**
Number of Funds	119		119		117	
Number of Semi-Annual Time Periods	19		19		19	
Number of Fund-Years (Observations)	572		572		558	
Adjusted R-Square	52.06%		49.64%		57.87%	

Table 2 – Aggregated Fixed-Income Flow Model with Absolute Performance

Results of a fixed-effects panel regression of the fixed-income sample with current year Fund Flow ($FLOW_t$) as the dependent variable. MER represents the fund's prior year Management Expense Ratio, $FLOW_{t-1}$ represents the fund's prior year Fund Flow, $PERF_t$ and $PERF_{t-1}$ represent the fund's current and prior year absolute (raw) return, $STDEV_t$ and $STDEV_{t-1}$ represent the fund's current and prior 12-month standard deviation of returns, $DIFFRES_t$ and $DIFFRES_{t-1}$ represent current and prior year indicator variables taking the value of (PERF - TPERF) if PERF > TPERF, or zero otherwise, $TFLOW_t$ and $TFLOW_{t-1}$ represent current and prior year flow to the fund's objective class (or "fund-type"), $TPERF_t$ and $TPERF_{t-1}$ represent current and prior year absolute (raw) return of the fund's objective class (or "fund-type"), and SIZE is the natural logarithm of the fund's prior year Net Assets. $DIFFRESRESID_t$ and $DIFFRESRESID_{t-1}$ represent the residuals of $DIFFRES_t$ and $DIFFRES_{t-1}$ regressed against $PERF_t$ and $PERF_{t-1}$, respectively. All fund-type variables are calculated using all available fixed-income funds in the IFIC dataset, not just those of public sponsors. As the $DIFFRESRESID_t$ / $TPERF_t$ and $DIFFRESRESID_{t-1}$ / $TPERF_{t-1}$ variables still had high negative correlations after orthogonalization, Subsets A and B reflect substitution of these variables. Subset A' represents the removal of 3 observations whose studentized residual values from the Subset A model were greater/less than 3/-3. Bolded values represent estimates significant at the 1%, 5%, or 10% level.

Parameter Estimates	Subset A	P-Values	Subset B	P-Values	Subset A'	P-Values
Intercept	**3.1540**	**<.0001**	**3.2299**	**<.0001**	**2.6258**	**<.0001**
$PERF_t$	**0.7292**	**0.0064**	**0.7574**	**0.0092**	**0.7618**	**0.0008**
$PERF_{t-1}$	0.2712	0.2673	0.3223	0.2341	0.2413	0.2441
$DIFFRESRESID_t$	**1.1032**	**0.0229**			**1.1265**	**0.0061**
$DIFFRESRESID_{t-1}$	0.6432	0.1511			0.5639	0.1356
$FLOW_{t-1}$	**0.1705**	**<.0001**	**0.1783**	**<.0001**	**0.1889**	**<.0001**
MER	11.2035	0.1636	11.6183	0.1558	9.7480	0.1512
$STDEV_t$	-2.2196	0.1931	-0.5762	0.7070	**-2.5441**	**0.0778**
$STDEV_{t-1}$	**-4.3424**	**0.0076**	**-3.4726**	**0.0172**	**-3.0735**	**0.0260**
$TFLOW_t$	**0.3663**	**0.0039**	**0.3836**	**0.0052**	**0.4080**	**0.0002**
$TFLOW_{t-1}$	-0.0213	0.8483	-0.0026	0.9820	-0.0801	0.3959
$TPERF_t$			-0.1887	0.5052		
$TPERF_{t-1}$			-0.2704	0.3398		
$SIZE_{t-1}$	**-0.3244**	**<.0001**	**-0.3204**	**<.0001**	**-0.2740**	**<.0001**
Hausman Test for Random Effects	**78.52**	**<.0001**	**62.11**	**<.0001**	**77.24**	**<.0001**
F-Test for No Fixed Effects	**2.88**	**<.0001**	**2.61**	**<.0001**	**3.17**	**<.0001**
Number of Funds	44		44		44	
Number of Semi-Annual Time Periods	19		19		19	
Number of Fund-Years (Observations)	215		215		212	
Adjusted R-Square	66.91%		65.55%		73.79%	

Table 3 – Aggregated Equity Flow Model with Relative Performance

Results of a fixed-effects panel regression of the equity sample with current year Fund Flow ($FLOW_t$) as the dependent variable. MER represents the fund's prior year Management Expense Ratio, $FLOW_{t-1}$ represents the fund's prior year Fund Flow, $EXCESSPERF_t$ and $EXCESSPERF_{t-1}$ represent the fund's current and prior year excess return, $STDEV_t$ and $STDEV_{t-1}$ represent the fund's current and prior 12-month standard deviation of returns, $DIFFRES_t$ and $DIFFRES_{t-1}$ represent current and prior year indicator variables taking the value of EXCESSPERF if EXCESSPERF > 0, or zero otherwise, $TFLOW_t$ and $TFLOW_{t-1}$ represent current and prior year flow to the fund's objective class (or "fund-type"), $TPERF_t$ and $TPERF_{t-1}$ represent current and prior year absolute (raw) return of the fund's objective class (or "fund-type"), and SIZE is the natural logarithm of the fund's prior year Net Assets. $DIFFRESRESID_t$ and $DIFFRESRESID_{t-1}$ represent the residuals of $DIFFRES_t$ and $DIFFRES_{t-1}$ regressed against $EXCESSPERF_t$ and $EXCESSPERF_{t-1}$, respectively. $TFLOWRESID_{t-1}$ represents the residuals of $TFLOW_{t-1}$ regressed against $TFLOW_t$. All fund-type variables are calculated using all available equity funds in the IFIC dataset, not just those of public sponsors. BM identifies the model where benchmark returns were used to calculate EXCESSPERF. FT identifies the model where fund-type returns (TPERF) were used to calculate EXCESSPERF. BM' and FT' represent the removal of 13 observations whose studentized residual values from the BM and FT models were greater/less than 3/-3. Bolded values represent estimates significant at the 1%, 5%, or 10% level.

Parameter Estimates	BM	P-Values	FT	P-Values	BM'	P-Values	FT'	P-Values
Intercept	**3.3487**	**<.0001**	**3.1762**	**<.0001**	**1.9070**	**<.0001**	**1.7670**	**<.0001**
$EXCESSPERF_t$	**0.2398**	**0.0026**	**0.2448**	**0.0039**	**0.2510**	**<.0001**	**0.2301**	**0.0005**
$EXCESSPERF_{t-1}$	**0.1950**	**0.0005**	**0.2393**	**<.0001**	**0.1776**	**0.0008**	**0.2679**	**<.0001**
$DIFFRESRESID_t$	-0.1071	0.6445	**0.8056**	**0.0049**	-0.1277	0.4686	**0.5161**	**0.0196**
$DIFFRESRESID_{t-1}$	**-0.5277**	**0.0058**	-0.2721	0.2242	**-0.4896**	**0.0024**	-0.0929	0.6276
$FLOW_{t-1}$	**0.0951**	**<.0001**	**0.0872**	**<.0001**	**0.0982**	**<.0001**	**0.0940**	**<.0001**
MER	-3.2312	0.3531	-3.6047	0.2981	0.1387	0.9578	-0.2325	0.9296
$STDEV_t$	0.9574	0.2741	-0.0600	0.9465	0.2491	0.7067	-0.4474	0.5146
$STDEV_{t-1}$	0.3256	0.5865	0.6197	0.3062	-0.0439	0.9224	0.1067	0.8167
$TFLOW_t$	**0.3437**	**0.0246**	**0.3262**	**0.0303**	**0.3646**	**0.0017**	**0.3752**	**0.0012**
$TFLOWRESID_{t-1}$	-0.0717	0.6413	0.0301	0.8402	-0.1362	0.2424	-0.0541	0.6352
SIZE	**-0.2836**	**<.0001**	**-0.2846**	**<.0001**	**-0.1672**	**<.0001**	**-0.1746**	**<.0001**
Hausman Test for Random Effects	**49.98**	**<.0001**	**50.94**	**<.0001**	**45.01**	**<.0001**	**45.46**	**<.0001**
F-Test for No Fixed Effects	**2.65**	**<.0001**	**2.62**	**<.0001**	**2.72**	**<.0001**	**2.64**	**<.0001**
Number of Funds	119		119		117		117	
Number of Semi-Annual Time Periods	19		19		19		19	
Number of Fund-Years (Observations)	572		572		559		559	
Adjusted R-Square	52.05%		52.78%		56.34%		56.19%	

Table 4 – Aggregated Fixed-Income Flow Model with Relative Performance

Results of a fixed-effects panel regression of the fixed-income sample with current year Fund Flow ($FLOW_t$) as the dependent variable. MER represents the fund's prior year Management Expense Ratio, $FLOW_{t-1}$ represents the fund's prior year Fund Flow, $EXCESSPERF_t$ and $EXCESSPERF_{t-1}$ represent the fund's current and prior year excess return, $STDEV_t$ and $STDEV_{t-1}$ represent the fund's current and prior 12-month standard deviation of returns, $DIFFRES_t$ and $DIFFRES_{t-1}$ represent current and prior year indicator variables taking the value of EXCESSPERF if EXCESSPERF > 0, or zero otherwise, TFLOW t and $TFLOW_{t-1}$ represent current and prior year flow to the fund's objective class (or "fund-type"), $TPERF_t$ and $TPERF_{t-1}$ represent current and prior year absolute (raw) return of the fund's objective class (or "fund-type"), and LOGFUNDNA is the natural logarithm of the fund's prior year Net Assets. $DIFFRESRESID_t$ and $DIFFRESRESID_{t-1}$ represent the residuals of $DIFFRES_t$ and $DIFFRES_{t-1}$ regressed against $EXCESSPERF_t$ and $EXCESSPERF_{t-1}$, respectively. $TFLOWRESID_{t-1}$ represents the residuals of $TFLOW_{t-1}$ regressed against $TFLOW_t$. All fund-type variables are calculated using all available fixed-income funds in the IFIC dataset, not just those of public sponsors. BM identifies the model where benchmark returns were used to calculate EXCESSPERF. FT identifies the model where fund-type returns (TPERF) were used to calculate EXCESSPERF. FT' represents the removal of 2 observations whose studentized residual values from the FT model were greater/less than 3/-3. Bolded values represent estimates significant at the 1%, 5%, or 10% level.

Parameter Estimates	BM	P-Values	FT	P-Values	BM'	P-Values	FT'	P-Values
Intercept	**3.3085**	**<.0001**	**3.3267**	**<.0001**	**2.7574**	**<.0001**	**2.7788**	**<.0001**
$EXCESSPERF_t$	**0.5435**	**0.0136**	**0.5772**	**0.0142**	**0.6440**	**0.0004**	**0.6347**	**0.0023**
$EXCESSPERF_{t-1}$	0.1935	0.3257	0.3535	0.1329	0.1433	0.3711	**0.3402**	**0.0998**
$DIFFRESRESID_t$	**1.2165**	**0.0087**	**2.0329**	**0.0038**	**1.4888**	**0.0001**	**1.8996**	**0.0021**
$DIFFRESRESID_{t-1}$	0.0815	0.8593	0.6168	0.3502	-0.0565	0.8811	0.3523	0.5432
$FLOW_{t-1}$	**0.1881**	**<.0001**	**0.1811**	**<.0001**	**0.2045**	**<.0001**	**0.2000**	**<.0001**
MER	**13.5746**	**0.0920**	10.7277	0.1809	**12.0495**	**0.0660**	10.1004	0.1516
$STDEV_t$	-0.9024	0.5386	-2.6329	0.1301	-1.5983	0.1825	**-3.0029**	**0.0497**
$STDEV_{t-1}$	**-3.0738**	**0.0286**	**-4.1754**	**0.0126**	**-2.2896**	**0.0523**	**-2.8207**	**0.0563**
$TFLOW_t$	**0.4481**	**0.0003**	**0.3690**	**0.0026**	**0.4703**	**<.0001**	**0.4380**	**<.0001**
$TFLOW_{t-1}$	-0.1446	0.2260	-0.0491	0.6406	**-0.1971**	**0.0449**	-0.0877	0.3434
SIZE	**-0.3176**	**<.0001**	**-0.3377**	**<.0001**	**-0.2685**	**<.0001**	**-0.2842**	**<.0001**
Hausman Test for Random Effects	**37.73**	**<.0001**	**90.12**	**<.0001**	**31.28**	**0.0010**	**45.83**	**<.0001**
F-Test for No Fixed Effects	**2.69**	**<.0001**	**2.83**	**<.0001**	**3.30**	**<.0001**	**2.94**	**<.0001**
Number of Funds	44		44		43		44	
Number of Semi-Annual Time Periods	19		19		19		19	
Number of Fund-Years (Observations)	215		215		210		213	
Adjusted R-Square	66.88%		67.04%		75.66%		72.12%	

Table 5 – Component Equity External Flow Models with Relative Performance

Results of a fixed-effects panel regression of the equity sample with current year Sales (SALES $_t$) and Redemptions (REDEM $_t$) as the dependent variables. EXCESSPERF $_t$ and EXCESSPERF $_{t-1}$ represent the fund's current and prior year excess return relative to benchmarks, DIFFRES $_t$ and DIFFRES $_{t-1}$ represent current and prior year indicator variables taking the value of EXCESSPERF if EXCESSPERF > 0, or zero otherwise, SALES $_{t-1}$ and REDEM $_{t-1}$ represent the fund's prior year Sales and Redemptions, MER represents the fund's prior year Management Expense Ratio, STDEV $_t$ and STDEV $_{t-1}$ represent the fund's current and prior 12-month standard deviation of absolute returns, TSALES $_t$ / TREDEM $_t$ and TSALES $_{t-1}$ / TREDEM $_{t-1}$ represent current and prior year Sales and Redemptions of the fund's objective class (or "fund-type"), and SIZE is the natural logarithm of the fund's prior year Net Assets. DIFFRESRESID $_t$ and DIFFRESRESID $_{t-1}$ represent the residuals of DIFFRES $_t$ and DIFFRES $_{t-1}$ regressed against EXCESSPERF $_t$ and EXCESSPERF $_{t-1}$, respectively. All fund-type variables are calculated using all available equity funds in the IFIC dataset, not just those of public sponsors. Models with an apostrophe represent the removal of 15 (SALES') & 7 (REDEM') observations whose studentized residual values from the 572-observation model were greater/less than 3/-3. Bolded values represent estimates significant at the 1%, 5%, or 10% level.

Parameter Estimates	SALES	P-Values	REDEM	P-Values	SALES'	P-Values	REDEM'	P-Values
Intercept	**1.6165**	**<.0001**	0.0527	0.5524	**0.8363**	**0.0003**	0.0111	0.8836
EXCESSPERF $_t$	**0.1968**	**0.0001**	**0.0476**	**0.0001**	**0.2021**	**<.0001**	**0.0569**	**<.0001**
EXCESSPERF $_{t-1}$	**0.1527**	**<.0001**	-0.0120	0.1556	**0.0655**	**0.0435**	-0.0115	0.1071
DIFFRESRESID $_t$	-0.0701	0.6439	**0.0850**	**0.0207**	0.0541	0.5979	**0.0838**	**0.0077**
DIFFRESRESID $_{t-1}$	**-0.2042**	**0.0973**	0.0272	0.3620	**-0.3405**	**0.0005**	0.0185	0.4645
SALES $_{t-1}$ / REDEM $_{t-1}$	**0.1117**	**<.0001**	**0.1805**	**<.0001**	**0.2015**	**<.0001**	**0.1887**	**<.0001**
MER	-1.8790	0.4097	**-1.2289**	**0.0254**	-1.5329	0.3114	**-1.1603**	**0.0129**
STDEV $_t$	0.1276	0.8271	0.1316	0.3364	-0.0029	0.9941	0.1618	0.1621
STDEV $_{t-1}$	0.3331	0.3959	-0.1470	0.1205	0.1916	0.4657	-0.1032	0.1978
TSALES $_t$ / TREDEM $_t$	**0.5276**	**0.0007**	**0.7717**	**<.0001**	**0.4475**	**<.0001**	**0.7793**	**<.0001**
TSALES $_{t-1}$ / TREDEM $_{t-1}$	0.2567	0.1507	-0.0372	0.2993	0.1289	0.2768	-0.0423	0.1640
SIZE	**-0.1466**	**<.0001**	-0.0012	0.8108	**-0.0758**	**<.0001**	-0.0001	0.9768
Hausman Test for Random Effects	**31.36**	**0.0010**	**49.31**	**<.0001**	**27.10**	**0.0044**	**55.13**	**<.0001**
F-Test for No Fixed Effects	**2.31**	**<.0001**	**2.57**	**<.0001**	**1.75**	**<.0001**	**3.43**	**<.0001**
Number of Funds	119		119		115		119	
Number of Semi-Annual Time Periods	19		19		19		19	
Number of Fund-Years (Observations)	572		572		557		565	
Adjusted R-Square	56.46%		58.35%		64.80%		64.95%	

Table 6 – Component Equity Internal Flow Models with Relative Performance

Results of a fixed-effects panel regression of the equity sample with current year Transfers In (TRANSIN $_t$) and Transfers Out (TRANSOUT $_t$) as the dependent variables. EXCESSPERF $_t$ and EXCESSPERF $_{t-1}$ represent the fund's current and prior year excess return relative to benchmarks, DIFFRES $_t$ and DIFFRES $_{t-1}$ represent current and prior year indicator variables taking the value of EXCESSPERF if EXCESSPERF > 0, or zero otherwise, TRANSIN $_{t-1}$ and TRANSOUT $_{t-1}$ represent the fund's prior year Transfers In and Out, MER represents the fund's prior year Management Expense Ratio, STDEV $_t$ and STDEV $_{t-1}$ represent the fund's current and prior 12-month standard deviation of absolute returns, TTRANSIN $_t$ / TRANSOUT and TTRANSIN $_{t-1}$ / TTRANSOUT $_{t-1}$ represent current and prior year Sales and Redemptions of the fund's objective class (or "fund-type"), and SIZE is the natural logarithm of the fund's prior year Net Assets. DIFFRESRESID $_t$ and DIFFRESRESID $_{t-1}$ represent the residuals of DIFFRES $_t$ and DIFFRES $_{t-1}$ regressed against EXCESSPERF $_t$ and EXCESSPERF $_{t-1}$, respectively. TTRANSOUTRESID $_{t-1}$ represents the residuals of TTRANSOUT $_{t-1}$ regressed against TTRANSOUT $_t$. All fund-type variables are calculated using all available equity funds in the IFIC dataset, not just those of public sponsors. Models with an apostrophe represent the removal of 11 (TRANSIN') & 8 (TRANSOUT') observations whose studentized residual values from the 572-observation model were greater/less than 3/-3. Bolded values represent estimates significant at the 1%, 5%, or 10% level.

Parameter Estimates	TRANSIN	P-Values	TRANSOUT	P-Values	TRANSIN'	P-Values	TRANSOUT'	P-Values
Intercept	**1.6654**	**0.0465**	-0.1182	0.8689	**1.3499**	**0.0018**	0.3059	0.3818
EXCESSPERF $_t$	0.0309	0.8013	-0.0278	0.7979	**0.1918**	**0.0026**	0.0542	0.3084
EXCESSPERF $_{t-1}$	-0.0568	0.4831	-0.0731	0.2789	0.0299	0.4816	-0.0100	0.7622
DIFFRESRESID $_t$	**0.6205**	**0.0921**	0.4990	0.1308	-0.0157	0.9348	0.2538	0.1194
DIFFRESRESID $_{t-1}$	-0.0551	0.8561	0.2497	0.3524	-0.1669	0.2836	0.1538	0.2426
TRANSIN $_{t-1}$ / TRANSOUT $_{t-1}$	**0.1058**	**0.0092**	**0.1909**	**<.0001**	**0.0923**	**<.0001**	**0.1219**	**<.0001**
MER	-6.8228	0.2164	-4.1023	0.4077	-2.0460	0.4679	-0.8507	0.7248
STDEV $_t$	**2.6537**	**0.0553**	1.5895	0.2020	-0.0904	0.9022	0.5339	0.3820
STDEV $_{t-1}$	0.3753	0.6982	0.5106	0.5546	-0.3203	0.5188	0.0633	0.8808
TTRANSIN $_t$ / TTRANSOUT $_t$	**1.0361**	**0.0013**	**0.7809**	**0.0080**	**0.7139**	**<.0001**	**0.6022**	**<.0001**
TTRANSIN $_{t-1}$ / TTRANSOUTRESID $_{t-1}$	0.8447	0.6393	**1.5258**	**0.0004**	-0.9336	0.3149	**0.6432**	**0.0028**
SIZE	**-0.1309**	**0.0116**	0.0110	0.8121	**-0.0637**	**0.0188**	-0.0106	0.6395
Hausman Test for Random Effects	**35.83**	**0.0002**	**39.14**	**<.0001**	**73.31**	**<.0001**	**147.71**	**<.0001**
F-Test for No Fixed Effects	**2.19**	**<.0001**	**1.96**	**<.0001**	**4.87**	**<.0001**	**5.48**	**<.0001**
Number of Funds	119		119		119		119	
Number of Semi-Annual Time Periods	19		19		19		19	
Number of Fund-Years (Observations)	572		572		561		564	
Adjusted R-Square	42.56%		47.51%		61.66%		68.18%	

Table 7 – Component Fixed-Income External Flow Models with Relative Performance

Results of a fixed-effects panel regression of the fixed-income sample with current year Sales (SALES $_t$) and Redemptions (REDEM $_t$) as the dependent variables. EXCESSPERF $_t$ and EXCESSPERF $_{t-1}$ represent the fund's current and prior year excess return relative to benchmarks, DIFFRES $_t$ and DIFFRES $_{t-1}$ represent current and prior year indicator variables taking the value of EXCESSPERF if EXCESSPERF > 0, or zero otherwise, SALES $_{t-1}$ and REDEM $_{t-1}$ represent the fund's prior year Sales and Redemptions, MER represents the fund's prior year Management Expense Ratio, STDEV $_t$ and STDEV $_{t-1}$ represent the fund's current and prior 12-month standard deviation of absolute returns, TSALES $_t$ / TREDEM $_t$ and TSALES$_{t-1}$ / TREDEM$_{t-1}$ represent current and prior year Sales and Redemptions of the fund's objective class (or "fund-type"), and SIZE is the natural logarithm of the fund's prior year Net Assets. DIFFRESRESID $_t$ and DIFFRESRESID $_{t-1}$ represent the residuals of DIFFRES $_t$ and DIFFRES $_{t-1}$ regressed against EXCESSPERF$_t$ and EXCESSPERF$_{t-1}$, respectively, and REDEMRESID $_{t-1}$ and TSALESRESID $_t$ represent the residuals of REDEM $_{t-1}$ and TSALES $_t$ regressed against MER, respectively. All fund-type variables are calculated using all available fixed-income funds in the IFIC dataset, not just those of public sponsors. Models with an apostrophe represent the removal of 6 (SALES') & 7 (REDEM') observations whose studentized residual values from the 215-observation model were greater/less than 3/-3. Bolded values represent estimates significant at the 1%, 5%, or 10% level.

Parameter Estimates	SALES	P-Values	REDEM	P-Values	SALES'	P-Values	REDEM'	P-Values
Intercept	**2.2086**	**0.0009**	0.7036	0.0839	**2.2033**	**<.0001**	**1.0719**	**0.0001**
EXCESSPERF $_t$	0.1517	0.4754	-0.0514	0.6877	**0.2569**	**0.1003**	-0.0334	0.7169
EXCESSPERF $_{t-1}$	-0.1224	0.5340	-0.0753	0.5425	-0.0963	0.4838	-0.0205	0.8046
DIFFRESRESID $_t$	**1.5208**	**0.0023**	**0.6637**	**0.0260**	0.5889	0.1124	-0.0841	0.6917
DIFFRESRESID $_{t-1}$	0.1141	0.8164	0.2814	0.3437	-0.0329	0.9233	0.2431	0.2317
SALES $_{t-1}$ / REDEMRESID $_{t-1}$	**0.2851**	**<.0001**	**0.5564**	**<.0001**	**0.2509**	**<.0001**	**0.5941**	**<.0001**
MER	-8.5322	0.4020	**-26.3120**	**<.0001**	-2.7063	0.7026	**-29.7428**	**<.0001**
STDEV $_t$	**4.9779**	**0.0017**	**3.6997**	**0.0001**	0.8668	0.6538	1.1780	0.2982
STDEV $_{t-1}$	0.6059	0.6843	-0.5397	0.5619	1.3645	0.1894	0.3745	0.5505
TSALESRESID $_t$ / TREDEM $_t$	**0.5003**	**<.0001**	**0.7548**	**0.0003**	**0.2910**	**0.0012**	**0.5035**	**0.0007**
TREDEM $_{t-1}$			0.0650	0.4636			0.0748	0.2189
SIZE	**-0.1689**	**0.0011**	-0.0104	0.7299	**-0.1779**	**<.0001**	-0.0297	0.1489
Hausman Test for Random Effects	**18.24**	**0.0510**	15.49	0.1611	**22.98**	**0.0108**	**18.04**	**0.0806**
F-Test for No Fixed Effects	**3.08**	**<.0001**	1.26	0.1337	**5.73**	**<.0001**	**1.97**	**0.0006**
Number of Funds	44		44		43		44	
Number of Semi-Annual Time Periods	19		19		19		19	
Number of Fund-Years (Observations)	215		215		209		208	
Adjusted R-Square	83.05%		90.39%		88.68%		94.77%	

Table 8 – Component Fixed-Income Internal Flow Models with Relative Performance

Results of a fixed-effects panel regression of the fixed-income sample with current year Transfers In (TRANSIN $_t$) and Transfers Out (TRANSOUT $_t$) as the dependent variables. EXCESSPERF $_t$ and EXCESSPERF $_{t-1}$ represent the fund's current and prior year excess return relative to benchmarks, DIFFRES $_t$ and DIFFRES $_{t-1}$ represent current and prior year indicator variables taking the value of EXCESSPERF if EXCESSPERF > 0, or zero otherwise, SALES $_{t-1}$ and REDEM $_{t-1}$ represent the fund's prior year Sales and Redemptions, MER represents the fund's prior year Management Expense Ratio, STDEV $_t$ and STDEV $_{t-1}$ represent the fund's current and prior 12-month standard deviation of absolute returns, TSALES $_t$ / TREDEM $_t$ and TSALES $_{t-1}$ / TREDEM $_{t-1}$ represent current and prior year Sales and Redemptions of the fund's objective class (or "fund-type"), and SIZE is the natural logarithm of the fund's prior year Net Assets. DIFFRESRESID $_t$ and DIFFRESRESID $_{t-1}$ represent the residuals of DIFFRES $_t$ and DIFFRES $_{t-1}$ regressed against EXCESSPERF $_t$ and EXCESSPERF $_{t-1}$, respectively, and TTRANSOUTRESID $_t$ represents the residuals of TTRANSOUT $_t$ against MER. Both lagged fund-type flow variables are excluded due multicollinearity that is persistent after orthogonalization. All fund-type variables are calculated using all available fixed-income funds in the IFIC dataset, not just those of public sponsors. Models with an apostrophe represent the removal of 6 (TRANSIN') & 7 (TRANSOUT') observations whose studentized residual values from the 215-observation model were greater/less than 3/-3. Bolded values represent estimates significant at the 1%, 5%, or 10% level.

Parameter Estimates	TRANSIN	P-Values	TRANSOUT	P-Values	TRANSIN'	P-Values	TRANSOUT	P-Values
Intercept	2.3492	0.4681	-0.3529	0.9149	2.7094	0.1897	1.6054	0.4486
EXCESSPERF $_t$	1.3269	0.1983	**2.7657**	**0.0071**	-0.2925	0.6581	0.7452	0.2650
EXCESSPERF $_{t-1}$	1.4525	0.1249	1.4961	0.1326	0.6182	0.3019	**1.0764**	**0.0955**
DIFFRESRESID $_t$	**5.3606**	**0.0259**	**4.5433**	**0.0682**	1.7603	0.2516	0.7419	0.6458
DIFFRESRESID $_{t-1}$	-0.8230	0.7383	**-5.7730**	**0.0160**	-0.0056	0.9971	**-3.9161**	**0.0110**
TRANSIN $_{t-1}$ / TRANSOUT $_{t-1}$	**0.2090**	**0.0078**	**0.3479**	**0.0002**	**0.3860**	**<.0001**	**0.5029**	**<.0001**
MER	**-109.3340**	**0.0119**	-36.5985	0.3892	**-64.8865**	**0.0182**	-23.5473	0.3852
STDEV $_t$	-7.0892	0.3573	**-14.3176**	**0.0657**	2.2748	0.6427	-2.5017	0.6187
STDEV $_{t-1}$	-5.6676	0.4348	-0.8528	0.9084	-2.2245	0.6247	1.6624	0.7251
TTRANSINRESID $_t$ / TTRANSOUTRESID $_t$	**4.1390**	**<.0001**	1.2992	0.1776	**2.6655**	**<.0001**	0.7599	0.2331
SIZE	0.0736	0.7705	0.2199	0.3958	-0.0946	0.5574	-0.0407	0.8069
Hausman Test for Random Effects	**19.66**	**0.0326**	**21.92**	**0.0155**	**25.37**	**0.0047**	**34.66**	**0.0001**
F-Test for No Fixed Effects	1.22	0.1730	1.04	0.4186	**1.47**	**0.0338**	1.29	0.1141
Number of Funds	44		44		44		44	
Number of Semi-Annual Time Periods	19		19		19		19	
Number of Fund-Years (Observations)	215		215		211		211	
Adjusted R-Square	58.35%		53.30%		65.27%		60.08%	

Table 9 –Returns to Scale Model: Equity Sample

Results of a simple logistic regression with the dependent variable, WINNER $_t$, taking the value of 1 if the fund's excess return, relative to its benchmark, is positive, and 0 otherwise. SIZE is the natural logarithm of the fund's prior year Net Assets. The observations employed in the model correspond to the equity BM' model presented in Table 3 above.

Response Profile: Winner $_t$	
Value	Frequency
1	209
0	350
Total	559

Maximum Likelihood Estimates				
	Estimate	SE	Wald Chi-Square	P-Value
Intercept	0.6565	1.2790	0.2633	0.6079
Winner $_{t-1}$	**0.8051**	**0.1792**	**20.1900**	**<.0001**
Size	-0.1158	0.8907	1.4998	0.2207

Odds Ratio Estimates			
	Estimate	95% Wald C.L.	
Winner $_{t-1}$	2.237	1.574	3.178
Size	0.891	0.74	1.072

Model Fit Statistics		
Criterion	Int. Only	Int. w/ Covariates
AIC	740.986	721.701
SC	745.312	734.68
-2 Log L	738.986	715.701

Table 10 – Returns to Scale Model: Fixed-Income Sample

Results of a simple logistic regression with the dependent variable, WINNER $_t$, taking the value of 1 if the fund's excess return, relative to its benchmark, is positive, and 0 otherwise. SIZE is the natural logarithm of the fund's prior year Net Assets. The observations employed in the model correspond to the fixed-income BM' model presented in Table 4 above.

Response Profile: Winner $_t$

Value	Frequency
1	89
0	121
Total	210

Maximum Likelihood Estimates

	Estimate	SE	Wald Chi-Square	P-Value
Intercept	-0.2722	1.4786	0.0339	0.8540
Winner $_{t-1}$	0.0689	0.2824	0.0595	0.8073
Size	-0.0050	0.1135	0.0019	0.9651

Odds Ratio Estimates

	Estimate	95% Wald C.L.	
Winner $_{t-1}$	1.071	0.616	1.863
Size	0.995	0.797	0.1243

Model Fit Statistics

Criterion	Int. Only	Int. w/ Covariates
AIC	288.227	292.166
SC	291.574	302.208
-2 Log L	286.227	286.166

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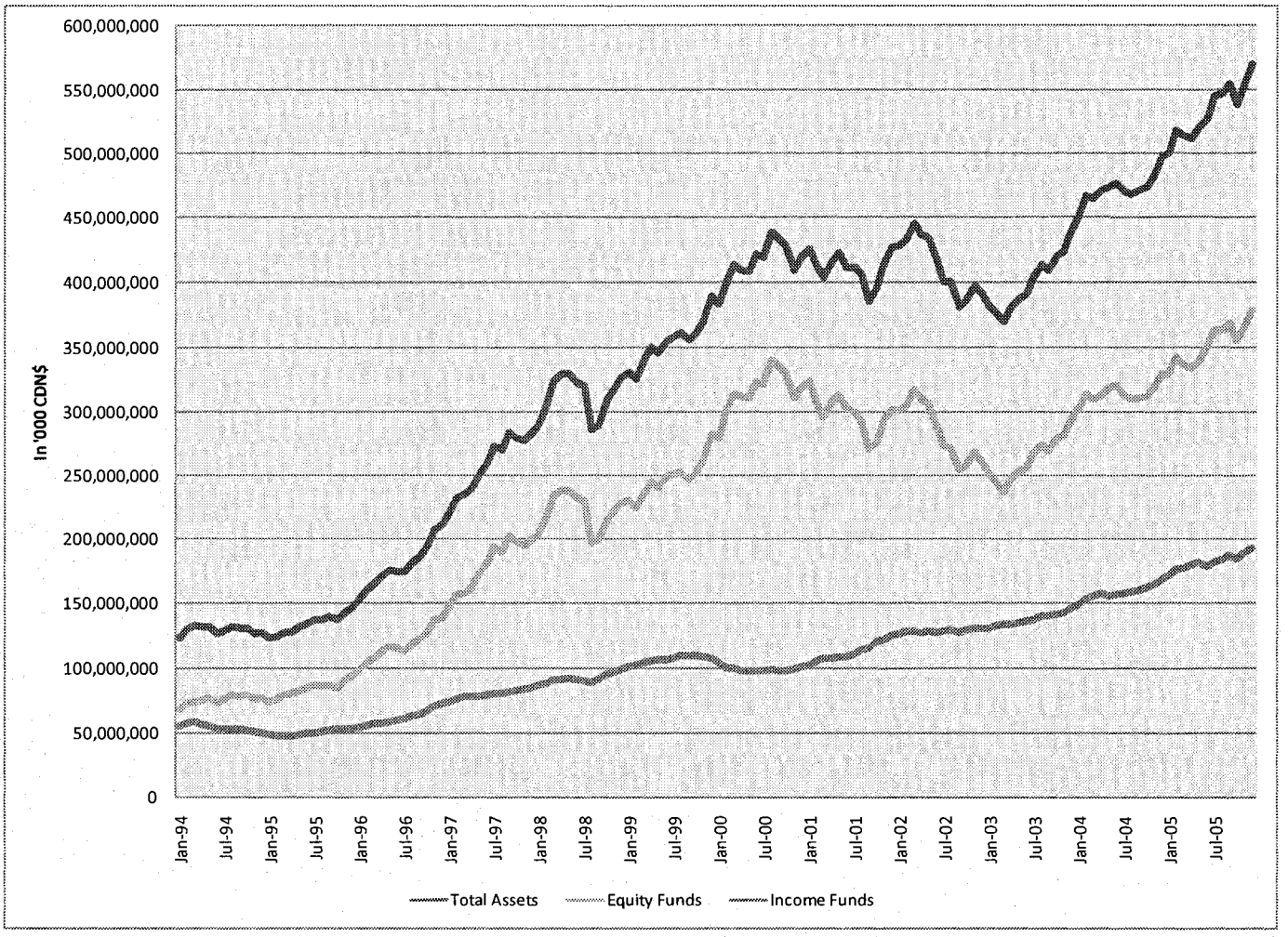
APPENDICES

Appendix 1 – CDN Mutual Fund Assets, January 1994 to December 2005 (Source: IFIC)



Appendix 2 – List of Public Fund Sponsors Included in the Sample

List of Public Fund Sponsors	Ticker Symbol	Industry*
AGF Management Ltd.	AGF.NV	Mutual Funds
Bissett & Associates Investment Management Ltd.	BIM	Investment Mgt
BPI Financial Corporation	BPF	Mutual Funds
C.I. Financial Inc.	CIX	Mutual Funds
CT Financial Services Inc.	CFS	Financial Services
Dundee Corporation & Dundee Wealth Management Inc.**	DBC.SV.A & DW	Investment Mgt
Guardian Capital Group Ltd.	GCG.NV	Mutual Funds
IGM Financial Inc.***	IGM	Financial Services
Mackenzie Investment Management Inc.	MCI	Investment Mgt
O'Donnell Investment Management Corportation	ODM	Investment Mgt
Sceptre Investment Counsel Limited	SZ	Investment Company
Trimark Financial Corporation	TMF	Mutual Funds

*As reported in the "Stock Header Information" section of the CFMRC database

** Parent company of Dynamic Mutual Funds

*** Parent company of Investors Group, and as of 2003, Mackenzie Investment Management

Appendix 3 – Variable Definitions

Excerpt from page 2 and 3 of IFIC's Statistical Reporting Guidelines 2002:

"Definitions of Data Fields (within the mutual fund category)

Eleven fields of information are reported for each individual mutual fund including; total net assets, cash and short-term liabilities, sales, reinvested dividends, redemptions, transfers in, transfers out, net sales, number of unitholders, distribution of capital gains and distribution of income.

Further clarification of these terms is as follows:

1. TOTAL NET ASSETS – are defined as the sum of all securities within the fund, at market, at close of the last business day of the current month. Included in this category should be cash, accrued income (i.e. dividend and interest), accrued liabilities (for the current period), commission payable, tax liabilities, broker receivable/payable, any outstanding sales or redemption orders (e.g. wire transfers) and any other outstanding payables or receivables. All assets should be expressed in Canadian dollars.

2. CASH AND SHORT-TERM INVESTMENTS - includes the value of short-term bonds and notes, up to and including a term of 365 days (which is in accordance with standard GAAP convention for short term). Liabilities accrued in net assets must be accrued in cash and short-term also. This is also in accordance with standard GAAP convention for short term. Liabilities accrued in net assets must be accrued in cash and short-term also. This number can be negative (if the fund is over invested), but can never be greater than the asset values. Reported cash must be net of unrealized derivative exposure where applicable. If the derivative is closed out, it would be treated as cash and the value calculated at the date of close out.

3. GROSS SALES - include all sales for the accounting period, exclusive of Reinvested Distributions and Transfers In and Transfers Out. Gross Sales should also include all outstanding wire orders, where applicable and must be net of interfund gross sales, and net of sales charges/loads.

4. REINVESTED DISTRIBUTIONS - must include all capital gains, dividends, interest income and return of capital for the accounting period. To the extent that distributions by a Fund in any year exceed the net income and net realized taxable *capital gains* of the Fund for that year, those distributions will be a return of capital.

5. REDEMPTIONS - must include all redemptions for the accounting period and must include all outstanding wire orders, where applicable. Redemptions must be net of interfund redemptions.

6. TRANSFERS IN/OUT must include all outstanding wire orders, where applicable and must be net of interfund transfers. *Transfers in and out must be equal for the month for each member firm. Where a manager has products other than mutual funds and a customer transfers out of mutual funds into another product (i.e. term deposit), the transfer should be reported as a redemption rather than a transfer out. Where a customer transfers out of a non-mutual fund product (i.e. term deposit) into a mutual fund it should be reported as a sale rather than a transfer in.*

7. DISTRIBUTIONS - must include all capital gains, dividends, interest income and return of capital for the accounting period. The total distributions should always be greater than the reinvested distributions. The exception to this would be when there are positive/negative adjustments, even when no declarations have been made."

Appendix 4 – List of Funds in Equity and Fixed-Income Samples by Sponsor

Equity Sample			
Sponsor	Code	Type	Most Recent Fund Name
AGF Funds Inc.	AGFAAA	BA	AGF World Balanced Fund
AGF Funds Inc.	AGFAEQ	CS	AGF Canadian Aggressive Equity Fund
AGF Funds Inc.	AGFAGB	US	AGF American Growth Class
AGF Funds Inc.	AGFAGG	US	AGF Aggressive Growth Fund
AGF Funds Inc.	AGFASB	CF	AGF Asian Growth Class
AGF Funds Inc.	AGFCAA	BA	AGF Canadian Real Value Balanced Fund
AGF Funds Inc.	AGFCEB	CS	AGF Canadian Equity Fund Limited
AGF Funds Inc.	AGFEGB	CF	AGF European Equity Class
AGF Funds Inc.	AGFGEB	CS	AGF Canadian Growth Equity Fund
AGF Funds Inc.	AGFGIB	BA	AGF Canadian Balanced Fund
AGF Funds Inc.	AGFGRO	CS	AGF Canadian Stock Fund
AGF Funds Inc.	AGFIEQ	CF	AGF RSP International Equity Allocation Fund
AGF Funds Inc.	AGFISS	CF	AGF International Stock Class
AGF Funds Inc.	AGFRIV	CF	AGF RSP International Value Fund
AGF Funds Inc.	AGFSMA	CS	AGF Canadian Small Cap Fund
AGF Funds Inc.	AGFUSG	CF	AGF International Value Fund
Bissett & Associates Investment Mgmt	BISCDN	CS	Bissett Canadian Equity Fund
Bissett & Associates Investment Mgmt	BISSC	CS	Bissett Small Cap Fund
BPI Capital Management Corp.	BPICAF	CS	BPI Canadian Small Companies Fund
BPI Capital Management Corp.	BPICEI	CS	BPI Canadian Equity Value Fund
BPI Capital Management Corp.	BPIEQU	CF	BPI Global Equity Fund
Dynamic Mutual Funds	DYNCGF	CS	Dynamic Canadian Growth Fund
Dynamic Mutual Funds	DYNEQU	CS	Dynamic Focus+ Equity Fund
Dynamic Mutual Funds	DYNEUR	CF	Dynamic European Value Fund
Dynamic Mutual Funds	DYNFOC	CS	Dynamic Value Fund of Canada
Dynamic Mutual Funds	DYNFOF	BA	Dynamic Strategic Growth Portfolio
Dynamic Mutual Funds	DYNGRO	CS	Dynamic Focus+ Wealth Management Fund
Dynamic Mutual Funds	DYNIBA	US	Dynamic Focus+ American Fund
Dynamic Mutual Funds	DYNINF	BA	Dynamic Focus+ Balanced Fund
Dynamic Mutual Funds	DYNITF	CF	Dynamic International Value Fund
Dynamic Mutual Funds	DYNNBF	BA	Dynamic Value Balanced Fund
Dynamic Mutual Funds	DYNPAM	US	Dynamic Power American Growth Fund
Dynamic Mutual Funds	DYNPAR	BA	Commonwealth Canadian Balanced Fund
Dynamic Mutual Funds	DYNPCA	CS	Dynamic Power Canadian Growth Fund
Dynamic Mutual Funds	DYNPOB	BA	Dynamic Power Balanced Fund
Dynamic Mutual Funds	DYNPRE	CS	Dynamic Precious Metals Fund
Guardian Group of Funds Ltd.	GUGAME	US	GGOF American Value Fund Ltd.
Guardian Group of Funds Ltd.	GUGBAL	BA	GGOF Canadian Balanced Fund
Guardian Group of Funds Ltd.	GUGENT	CS	GGOF Enterprise Fund
Guardian Group of Funds Ltd.	GUGGLO	CF	GGOF Global Growth Fund
Guardian Group of Funds Ltd.	GUGGRO	CS	GGOF Canadian Equity Fund

Sponsor	Code	Type	Most Recent Fund Name
Mackenzie Financial Corporation	INDBAL	BA	Mackenzie Balanced Fund
Mackenzie Financial Corporation	INDCBA	BA	Mackenzie Universal Canadian Balanced Fund
Mackenzie Financial Corporation	INDCDN	CS	Mackenzie Ivy Canadian Fund
Mackenzie Financial Corporation	INDCEF	CS	Mackenzie Universal Canadian Growth Fund
Mackenzie Financial Corporation	INDDIV	CS	Mackenzie Maxxum Dividend Growth Fund
Mackenzie Financial Corporation	INDEUR	CF	Mackenzie Universal European Opportunities Fund
Mackenzie Financial Corporation	INDFUT	CS	Mackenzie Universal Future Fund
Mackenzie Financial Corporation	INDGRO	CS	Mackenzie Growth Fund
Mackenzie Financial Corporation	INDHOR	CS	Mackenzie Maxxum Canadian Value Fund
Mackenzie Financial Corporation	INDIAM	CF	Mackenzie Ivy Foreign Equity Fund
Mackenzie Financial Corporation	INDIBO	BA	Mackenzie Ivy Growth & Income Fund
Mackenzie Financial Corporation	INDINC	BA	Mackenzie Sentinel Income Fund
Mackenzie Financial Corporation	INDRFE	CF	Mackenzie Ivy RSP Foreign Equity Fund
Mackenzie Financial Corporation	INDSMF	CF	Mackenzie Select Managers Fund
Mackenzie Financial Corporation	INDWST	CF	Universal World Science & Technology Fund
Investors Group Inc.	INVAA	BA	Investors Asset Allocation Fund
Investors Group Inc.	INVBAL	BA	Investors Canadian Balanced Fund
Investors Group Inc.	INVCSC	CS	Investors Canadian Small Cap Fund
Investors Group Inc.	INVEQU	CS	Investors Canadian Equity Fund
Investors Group Inc.	INVEUR	CF	Investors European Growth Fund
Investors Group Inc.	INVGLO	CF	Investors Global Fund
Investors Group Inc.	INVGP	CF	Investors Growth Portfolio
Investors Group Inc.	INVGPP	BA	Investors Growth Plus Portfolio
Investors Group Inc.	INVGRO	US	Investors North American Growth Fund
Investors Group Inc.	INVGST	CF	Investors Global Science & Technology Fund
Investors Group Inc.	INVIPP	BA	Investors Income Plus Portfolio
Investors Group Inc.	INVIUG	US	Investors U.S. Large Cap Value RSP Fund
Investors Group Inc.	INVMLC	CS	IG AGF Canadian Growth Fund
Investors Group Inc.	INVMUT	BA	Investors Mutual of Canada
Investors Group Inc.	INVPAC	CF	Investors Pacific International Fund
Investors Group Inc.	INVRAL	BA	IG AGF Canadian Balanced Fund
Investors Group Inc.	INVRET	CS	Investors Canadian Large Cap Value Fund
Investors Group Inc.	INVRGP	CS	Investors Retirement Growth Portfolio
Investors Group Inc.	INVRPP	BA	Investors Retirement Plus Portfolio
Investors Group Inc.	INVSUM	CS	Investors Summa Fund
Investors Group Inc.	INVUSG	US	Investors U.S. Large Cap Value Fund
Investors Group Inc.	INVWG	CF	Investors World Growth Portfolio
O'Donnell Investment Management	OIMCEG	CS	O'Donnell Canadian Emerging Growth Fund
O'Donnell Investment Management	OIMGRO	CS	O'Donnell Growth Fund

Sponsor	Code	Type	Most Recent Fund Name
CT Investment Management Group Inc.	PERBAL	BA	Canada Trust Balanced Fund-Inv
CT Investment Management Group Inc.	PEREAG	US	Canada Trust Amerigrowth Fund-Inv
CT Investment Management Group Inc.	PERGRO	CS	Canada Trust Stock Fund-Inv
CT Investment Management Group Inc.	PERSPE	CS	Canada Trust Special Equity Fund-Inv
Sceptre Investment Counsel Limited	SCEBAL	BA	Sceptre Balanced Growth Fund
Sceptre Investment Counsel Limited	SCEEQU	CS	Sceptre Equity Growth Fund
Sceptre Investment Counsel Limited	SCEITL	CF	Sceptre Global Equity Fund
Trimark Investment Management Inc.	TRIBAL	BA	Trimark Select Balanced Fund
Trimark Investment Management Inc.	TRIFUN	CF	Trimark Fund
Trimark Investment Management Inc.	TRIGRO	CF	Trimark Select Growth Fund
Trimark Investment Management Inc.	TRISCG	CS	Trimark Select Canadian Growth Fund
Trimark Investment Management Inc.	TRISEL	CS	Trimark RSP Equity Fund
C.I. Investments	UNVAEQ	US	C.I. American Equity Fund
C.I. Investments	UNVCAF	CS	C.I. Explorer Fund
C.I. Investments	UNVCBA	BA	C.I. Canadian Balanced Fund
C.I. Investments	UNVCIC	CS	C.I. Canadian Growth Fund
C.I. Investments	UNVDEF	CS	C.I. Signature Select Canadian Fund
C.I. Investments	UNVEME	CF	C.I. Emerging Markets Fund
C.I. Investments	UNVEQU	CF	BPI Global Equity Fund
C.I. Investments	UNVGBR	BA	C.I. Global Boomernomics RSP
C.I. Investments	UNVGBS	CF	C.I. Global Biotechnology Corporate Class
C.I. Investments	UNVGEE	CF	BPI Global Equity RSP Fund
C.I. Investments	UNVGEQ	CF	C.I. Global RSP Fund
C.I. Investments	UNVGLO	CF	C.I. Global Fund
C.I. Investments	UNVGOF	CF	BPI Global Opportunities I Fund
C.I. Investments	UNVHFF	CS	C.I. Harbour Fund
C.I. Investments	UNVHGI	BA	C.I. Harbour Growth & Income Fund
C.I. Investments	UNVIBA	BA	C.I. International Balanced Fund
C.I. Investments	UNVIBR	BA	C.I. International Balanced RSP Fund
C.I. Investments	UNVIGF	BA	C.I. Signature Canadian Balanced
C.I. Investments	UNVINC	BA	C.I. Signature Canadian Income Fund
C.I. Investments	UNVLAM	CF	C.I. Latin American Fund
C.I. Investments	UNVMSS	CF	C.I. Global Managers Corporate Class
C.I. Investments	UNVPAC	CF	C.I. Pacific Fund
C.I. Investments	UNVSGB	BA	C.I. Global Boomernomics Corporate Class
C.I. Investments	UNVSGH	CF	C.I. Global Health Sciences Corporate Class
C.I. Investments	UNVSGL	CF	C.I. Global Corporate Class
C.I. Investments	UNVSGT	CF	C.I. Global Telecommunications Sector Shares
C.I. Investments	UNVSGU	CF	C.I. Global Science & Technology Corporate Class

Fixed-Income Sample			
Sponsor	Code	Type	Most Recent Fund Name
AGF Funds Inc.	AGFCBB	BO	AGF Canadian Bond Fund
AGF Funds Inc.	AGFDIV	DI	AGF Canadian Large Cap Dividend Fund
AGF Funds Inc.	AGFHIB	BO	AGF Canadian Conservative Income Fund
AGF Funds Inc.	AGFMMB	MM	AGF Canadian Money Market Fund
Bissett & Associates Investment Mgmt	BISBON	BO	Bissett Bond Fund
Bissett & Associates Investment Mgmt	BISMMF	MM	Bissett Money Market Fund
BPI Capital Management Corp.	BPIBIL	MM	BPI T-Bill Fund
BPI Capital Management Corp.	BPIIF	DI	BPI Income Fund
Dynamic Mutual Funds	DYNCDI	DI	Dynamic Canadian Dividend Fund Ltd.
Dynamic Mutual Funds	DYNDGF	DI	Dynamic Dividend Value Fund
Dynamic Mutual Funds	DYNDIV	DI	Dynamic Dividend Fund
Dynamic Mutual Funds	DYNINC	BO	Dynamic Income Fund
Dynamic Mutual Funds	DYNMMF	MM	Dynamic Money Market Fund
Guardian Group of Funds Ltd.	GUGHIF	DI	GGOF Monthly High Income Fund
Guardian Group of Funds Ltd.	GUGITL	BF	GGOF RSP Global Bond Fund
Guardian Group of Funds Ltd.	GUGPFD	DI	GGOF Monthly Dividend Fund Ltd.
Mackenzie Financial Corporation	INDBON	BO	Mackenzie Sentinel Bond Fund
Mackenzie Financial Corporation	INDCAS	MM	Mackenzie Sentinel Cash Management Fund
Mackenzie Financial Corporation	INDCBF	BF	Mackenzie Sentinel RRSP Global Bond Fund
Mackenzie Financial Corporation	INDDIV	DI	Mackenzie Maxxum Dividend Growth Fund
Mackenzie Financial Corporation	INDMMO	DM	Industrial Mortgage Securities Fund
Mackenzie Financial Corporation	INDSHT	MM	Mackenzie Sentinel Money Market Fund
Investors Group Inc.	INVBON	BO	Investors Government Bond Fund
Investors Group Inc.	INVDIV	DI	Investors Dividend Fund
Investors Group Inc.	INVIP	BO	Investors Income Portfolio Fund
Investors Group Inc.	INVIPP	BO	Investors Income Plus Portfolio
Investors Group Inc.	INVMDF	DI	IG Mackenzie Maxxum Dividend Growth Fund
Investors Group Inc.	INVMMF	MM	Investors Canadian Money Market Fund
Investors Group Inc.	INVMOR	DM	Investors Mortgage Fund
O'Donnell Investment Management	OIMHIF	BO	O'Donnell High Income Fund
CT Investment Management Group Inc.	PERBON	BO	Canada Trust Bond Fund-Inv
CT Investment Management Group Inc.	PERRMO	DM	Canada Trust Mortgage Fund-Inv
CT Investment Management Group Inc.	PERSHO	MM	Canada Trust Money Market Fund-Inv
Sceptre Investment Counsel Limited	SCEBON	BO	Sceptre Bond Fund
Sceptre Investment Counsel Limited	SCEMMF	MM	Sceptre Money Market Fund
Trimark Investment Management Inc.	TRIABO	BO	Trimark Advantage Bond Fund
Trimark Investment Management Inc.	TRIGIF	BO	Trimark Government Income Fund
Trimark Investment Management Inc.	TRIINT	MM	Trimark Interest Fund
C.I. Investments	UNVCBO	BO	C.I. Canadian Bond Fund
C.I. Investments	UNVGBO	BF	C.I. Global Bond RSP Fund
C.I. Investments	UNVHIF	DI	C.I. Signature High Income Fund
C.I. Investments	UNVIF	DI	C.I. Signature Dividend Income Fund
C.I. Investments	UNVMMF	MM	C.I. Money Market Fund
C.I. Investments	UNVWBF	BF	C.I. Global Bond Fund

Appendix 5 – Relevant Benchmarks by Fund-Type

Equity Sample						
Fund-Type	Code	Funds	% of Sample	Benchmark Return Index	Source	Correl*
Canadian Common	CS	40	33.61%	S&P TSX	CFMRC	94.28%
Foreign Common	CF	38	31.93%	MSCI EAFE	Bloomberg	87.94%
Balanced	BA	31	26.05%	75% S&P TSX + 25% Long-Term GOC Bonds	CFMRC	88.62%
US Common	US	10	8.40%	S&P 500	CRSP	87.78%
TOTAL		**119**	100.00%			

Fixed-Income Sample						
Fund-Type	Code	Funds	% of Sample	Benchmark Return Index	Source	Correl*
Bond & Income	BO	14	31.82%	Long-Term GOC Bonds	CFMRC	36.08%
Dividend & Income	DI	12	27.27%	S&P TSX	CFMRC	59.91%
Canadian Money Market	MM	11	25.00%	Scotia Capital 30 Day T-Bills	Datastream	25.73%
Foreign Bond & Income	BF	4	9.09%	Citigroup World Government Bond All Maturity	Datastream	11.21%
Mortgage	DM	3	6.82%	Scotia Capital MBS Overall	Datastream	17.94%
TOTAL		**44**	100.00%			

* Correlation of monthly benchmark returns with monthly fund-type returns