CANADIAN INVESTORS AND THE DISCOUNT ON CLOSED-END FUNDS

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ABSTRACT

Small investors' sentiment has been proposed by behaviouralists to explain the existence and behavior of discount on closed-end funds (CEFD). The empirical tests of this sentiment hypothesis so far provide equivocal results. Besides, most of out-of-sample tests outside U.S. are not robust in the sense that they fail to well control other firm characteristics and risk factors that may explain stock return and to provide a formal cross-sectional test of the link between CEFD and stock return. This thesis explores the role of CEFD in asset pricing and further validates CEFD as a sentiment proxy in Canadian context and augments the extant studies by examining the redemption feature inherent in Canadian closed-end funds and by enhancing the robustness of the empirical tests. Our empirical results document differential behaviors in discounts between redeemable funds and non-redeemable funds. However, we don't find supportive evidence of CEFD as a priced factor. Specifically, the stocks with different exposures to CEFD fail to provide significantly different average return. Nor does CEFD provide significant incremental explanatory power, after controlling other well-known firm characteristics and risk factors, in cross-sectional as well as time-series variation of stock return. This evidence, together with the findings from our direct test of CEFD as a sentiment index, suggests that CEFD, even the discount on traditional non-redeemable closed-end funds, is unlikely to be driven by elusive sentiment in Canada.

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LIST OF ABBREVIATIONS

MER: Management Expense Ratio.

Fund NAV: Net Asset Value of the Fund.

T-bill: Treasury Bill.

TSX: Toronto Stock Exchange.

TSX-CFMRC: Toronto Stock Exchange-Canadian Financial Markets Research Centre.

SEDAR: System for Electronic Document Analysis and Retrieval.

CHAPTER 1

INTRODUCTION

The existence and behavior of discount on closed-end funds present an enduring puzzle in financial economics. Once started, a typical closed-end fund is, on average, traded at a discount from the value of the underlying assets it holds and the discount exhibits wide cross-sectional and time-series variations. This empirical evidence seems to violate efficient market hypothesis and the theory based on limited rationality, namely, behavioral finance, provides a potential explanation.

The discount on closed-end funds (CEFD) as a sentiment indicator is first explicitly proposed by DeLong, Shleifer, Summers, and Waldmann (1990) as an empirical implication of their general noise trader theory on U.S. closed-end funds. Put briefly, closed-end funds in U.S. are mainly held by individual investors who are likely to trade on noise (sentiment) (Black, 1985), namely, beliefs about asset returns which are not justified by fundamentals. Their systematic sentiment-induced trading drives the price of closed-end funds away from its fundamental value in the presence of limits of arbitrage. Since the underlying assets of closed-end funds are normally held by institutional investors who are less likely to trade on the same sentiment as small investors, these sentiment-induced mispricings in the case of closed-end funds are finally reflected in the form of observable discount (pessimistic sentiment) or premium (optimistic sentiment) from fund NAVs. In addition, since the sentiment risk represents a new source of systematic risk, closed-end funds are, on average, traded at discount.

Following this seminal paper, a number of empirical studies have been conducted in U.S. to validate closed-end fund discount as a sentiment indicator and examine the relationship between this sentiment proxy and stock return. However, the empirical tests so far in U.S. show conflicting results. Evidence for investor sentiment documents that the change in discount is correlated to other proxies of sentiment, the

magnitude of the discounts is positively related to the difficulty of arbitrage, and ultimately the change in discount is a priced factor in stock market (e.g. Lee et al., 1991; Bodurtha et al., 1993; Pontiff, 1995, 1996, 1997; Swaminathan, 1996; Neal and Wheatley, 1998; Flynn, 2008). In contrast, the evidence against investor sentiment shows that the change in discount is not priced in both closed-end funds and common stocks in U.S. and discount or the change in discount can be explained by rational factors such as management fees and unrealized capital gains (e.g., Malkiel, 1977; Chen et al., 1993; Elton et al., 1998; Ross, 2005).

Recently, an increasing volume of researches using data outside U.S. has contributed to this debate. To date, data from both developed markets (such as U.K.) and emerging markets (such as China and Greece) have been tested. However, these out-of-sample tests still provide ambiguous results (e.g., Gemmill and Thomas, 2002; Doukas and Milonas, 2004; Chen, Rui and Xu, 2004; Zhang, Li and Malone, 2004).

In light of this discussion, the objective of this thesis is to contribute to this long standing debate by empirically exploring relevant issues for discount on Canadian closed-end funds. Specifically, our thesis intends to examine the role of CEFD in asset pricing in cross-sectional and time-series frameworks and also to provide a validation of CEFD as sentiment indicator in Canadian context. The contributions the thesis makes are mainly threefold: 1) To the best of our knowledge, there has been no test on Canadian closed-end funds.[1] So our study adds to the literature of out-of-sample tests. Actually, without testing the robustness of the findings outside the environment where they were found, it remains unclear whether the empirical results in U.S. are merely spurious findings which may not apply to financial markets outside the U.S. 2) Most of the tests outside U.S. fail to provide a formal cross-sectional test of the link between CEFD and stock return. Nor do most of prior out-of-sample tests well control the other firm characteristics and risk factors that may explain stock return. To refine the robustness of prior out-of-sample tests, we construct size, book-to-market, and momentum factors for Canadian stock market and provide a formal Fama-MacBeth

[1] Flynn (2008) uses 462 funds in which only 4 are Canadian funds.

cross-sectional test with firm characteristics and risk factors well controlled. 3) More importantly, Canadian closed-end funds have a unique feature with the majority of funds allowing investors to redeem shares annually at NAV less expenses incurred for redemptions.[2] Theoretically, the annual redemption feature provides a possible way to acquire NAV annually, which is likely to eliminate the resale risk of arbitrage strategies exploiting the mispricing in closed-end funds and thus render the price very close to NAV to only reflect other arbitrage costs or effects of rational factors, such as unrealized capital gains and management fees. As such, this redemption feature provides additional testable implications for the sentiment hypothesis for discount on traditional non-redeemable closed-end funds in the literature and help our study shed new light on the ongoing debate regarding CEFD.

The empirical results of our study document differential behaviors in discounts between redeemable funds and non-redeemable funds. However, there is no evidence of CEFD as a priced factor. Specifically, the stocks with different exposures to CEFD fail to provide significantly different average return. Nor does CEFD provide significant incremental explanatory power, after controlling other well-known firm characteristics and risk factors, in cross-sectional as well as time-series variation of stock return. This evidence, together with the findings from our direct test of CEFD as a sentiment indicator, suggests that CEFD, even the discount on traditional non-redeemable closed-end funds, is unlikely to be driven by elusive sentiment in Canada.

The remainder of this thesis is organized as follows. In the next chapter, we provide a brief literature review. Chapter 3 outlines the data source, the sample, the construction of various variables, and relevant summary statistics. Chapter 4 presents the empirical methodologies and further discusses the empirical results. In chapter 5, we conclude this thesis and discuss some research avenues.

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[2] Source: Closed-End Funds Report 2006 from Investor Economics.

CHAPTER 2

LITERATURE REVIEW

A rich literature is devoted to explaining the existence and behavior of closed-end funds discounts. Rational factors are proposed to support the efficient market hypothesis whereas sentiment explanation is proposed in favor of behavioral models.[3] Since the main purpose of the thesis is to test the latter explanation, the following brief literature review focuses on the direct empirical evidence for and against the sentiment explanation.

2.1 Rational Factors for Discounts

There are mainly three types of rational factors proposed in the literature to explain funds' discounts and these factors fail to fully account for the empirical behavior of CEFD. The first factor relies on agency costs. One of the most convincing rational explanations may be management fees and other expenses. In the closed-end fund industry, managers receive periodic management fees as a fixed percentage of NAV. Ross (2005) shows that if δ is a percentage of NAV paid out as management fees (or as other expenses) and ξ is a percentage of NAV paid out as dividend to investors, the fee-based discount is $\delta/(\xi+\delta)$ of NAV which is not related to the interest rate (Gemmill and Thomas (2002) derive a similar formula). This explanation justifies the existence of discounts and why the price rises to NAV upon termination. However, it fails to account for temporal variation of discounts since both management fees and distribution policy are very stable over time.[4] Nor can it explain why funds can be traded at premiums. Another rational factor related to agency costs is fund performance. According to rational expectations, the discount or premium reflects investors' expectation for funds' future NAV performance. However,

[3] See Dimson and Minio-Kozerski (1999c) for a comprehensive survey.
[4] The management fees and distribution policy cannot be changed without approval by the shareholders or unitholders.

there is little empirical support for this argument. Most of prior studies, using various techniques to measure NAV performance, failed to find correlation between fund NAV performance and fund discount (see Malkiel, 1995; Lee et al., 1991; Dimson and Minio-Kozerski, 1999a).

The second factor is related to the biases in the NAV. In effect, some researchers attribute discounts to biases in calculating NAV. Tax liabilities from unrealized capital gains and illiquid underlying assets are two main causes (Malkiel, 1995). However, neither of them can explain why prices rise to NAV when funds are liquidated. Besides, for unrealized capital gains, UK funds behave remarkably like U.S. funds even though the British funds are not allowed to distribute any capital gains and for illiquid assets, many funds sell at discounts even though they barely hold illiquid assets (Lee et al., 1991).

The third factor is proposed by Brickley et al. (1991) and Kim (1994). They argue that closed-end funds should be traded at discounts because the managed funds deny taxable investors the tax-timing option available from holding the underlying individual securities. However, this proposition cannot account for funds selling at premiums. Besides, Seyhun and Skinner (1994) show that only a very small fraction of investors (5% to 7%) trade continually to minimize the present value of their net tax payments and thus the potential importance of tax-timing is negligible.

2.2 Empirical Tests of Sentiment Explanation

Extensive empirical tests are conducted to validate CEFD as a sentiment proxy from various perspectives. Since the sentiment explanation for CEFD is just an application of the noise trader theory, most of these tests focus on testing the empirical implications from the two basic assumptions of the theory: systematic sentiment and limits to arbitrage.[5]

2.2.1 CEFD and Size

[5] Tests on systematic sentiment and costly arbitrage may overlap. Actually, tests supporting sentiment as a priced factor imply that there are costs of arbitrage.

One important implication of systematic sentiment is that the time-series fluctuations of CEFD should be highly correlated to the trading or returns of securities which are also "habitats" for retail investors and thus are affected by the same sentiment. Stocks of small-size firm are widely used candidate of this type of test given the evidence that small-size firms are mainly held by individual investors.

Lee et al. (1991) first examine this implication by regressing returns of size-decile portfolios on market returns and discounts on closed-end funds. They identify significant incremental explanatory power of the discounts in returns of size-decile portfolios. This correlation between closed-end fund discounts and small firms is further investigated by a number of subsequent studies and the results are still divergent. Swaminathan (1996) and Neal and Wheatley (1998) test if current investor sentiment can predict future stock returns on the ground that the individual investor sentiment is mean reverting. Their evidence suggests that closed-end fund discounts can forecast future excess returns on small firms and information in discounts is independent of that in other commonly used forecasting variables in the stock predictability literature. In contrast, Elton et al. (1998), Zhang et al. (2004), and Doukas and Milonas (2004) argue that closed-end funds discounts cannot explain the size premium for U.S., Chinese, and Greek markets respectively. In particular, Elton et al. (1998) find that using five-index model rather than two-index model reverses the Lee et al. pattern of sensitivity and size.[6]

2.2.2 Noise Trader Risk as an Independent Pricing Factor

If discounts reflect investor sentiment which can affect many securities at the same time, the risk of unpredictable sentiment change, proxied by the change in discounts, poses a source of systematic risk and then should be priced in both

[6] Other empirical tests rely on the correlation of fund discounts with other sentiment indicators. Evidences in this perspective are still conflicting. Malkiel (1977) and Lee et al. (1991) identify positive correlation between open-end fund net redemption and close-end funds discount in the U.S. In U.K. studies, Gemmill and Thomas (2002) identify a highly significant relationship between retail flow into open-end funds and closed-end fund discounts. The above evidences support sentiment explanation. However, Hughen (2000) argues that the relative order-flow imbalance caused by individual investors does not have a statistically significant effect on large daily changes in discounts. Besides, Qiu and Welch (2006) validate closed-end discounts using more direct survey proxy and find out that it has no correlation with the direct UBS/ Gallup measure or other proxies of investor sentiment.

closed-end fund and other assets. Most of literature didn't find evidence for this contention. In U.S., Elton et al. (1998) show that sentiment index, proxied by closed-end funds discount, enters the return generating process no more than by chance and almost less often than industry return indices and indices computed from firms with high institutional ownership. In addition, they find that firms with high sensitivity to CEFD do not offer a higher expected return. Through comparing bond funds with stock funds, Abraham et al. (1993) find that in spite of same large risk of noise trader (the beta of CEFD), bond funds on average do not trade at large discounts as stock funds. In the U.K., Gemmill and Thomas (2002) show that discounts in the long run reflect not noise trader risk, proxied by betas when regressing each fund's discount on the average discount, but fundamental factors including management fees and dividend yield.

2.2.3 Tests on Costly Arbitrage

If persistent discounts of closed-end funds reflect mispricing, there should be costs to hamper the ability of arbitrageurs to eliminate mispricing through arbitrage pressure. The main potential costs of arbitrage are unhedged fundamental risks and noise trader risk. Unhedged fundamental risks stem from the uncertainty of the underlying portfolio composition (or no perfect substitutes for NAV). In closed-end funds industry, funds alter the composition of portfolio frequently and report it less frequently and the detailed list of all component assets is not necessarily available. Arbitrageurs can hedge risk of NAV with portfolio highly correlated to NAV and then the residual risk (unhedged fundamental risk) imposes costs for arbitrage. Noise trader risk stems from the risk of wider discounts when closing positions due to unpredictable sentiments. This risk can be avoided by taking over the closed-end funds and then open-ending them. However, this is opposed by fund managers.

Most of the prior studies investigating aforementioned costs of arbitrage indicate that discounts, at least part of discounts, reflect mispricing. Pontiff (1996) finds out that in U.S., the absolute values of discounts are bigger for funds with higher

unhedged fundamental risk,[7] for funds that pay lower dividend,[8] for fund have larger bid-ask spreads, and when interest rates are high and these cost factors can explain a quarter of the cross-sectional discount variation. In U.K. studies, using different methods to measure unhedged risk,[9] Dimson and Minio-Kozerski (1999a) show that the higher unhedged risk, the bigger are the discounts. The above findings of the relationship between magnitude of discount and arbitrage cost factors support sentiment explanation since if closed-end funds are pricing rationally, there should be no such relationship. However, the above studies do not directly identify if the noise trader risk deters arbitrage. Flynn (2008) refutes the evidence of the arbitrage cost identified by Pontiff (1996). He shows that the bigger magnitude of mispricing, the greater risk-adjusted excess return of arbitrage portfolio. Flynn attributes this excess return to the compensation for bearing noise trader risk through the evidence that fund-specific noise-trader risk increases as the mispricing increases.

In conclusion, the literature doesn't reach consensus for the sentiment hypothesis on CEFD. This may be attributable to the fact that discounts are the result of compounding factors (management fees, distribution policy, tax, performance, sentiment, force of arbitrage, etc) or of some factors we do not identify yet. However, it is this controversy that prompts us to write this thesis.

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[7] Pontiff (1996) measures unhedged risk of closed-end funds by residual standard deviation from regressing excess NAV returns on the excess returns of ten open-end mutual funds.

[8] A higher dividend yield on the fund makes arbitrage less costly since it is easier to cover the dividend obligation on the short position in the underlying assets.

[9] Dimson and Minio-Kozerski (1999a) use Sharpe's returns-based style analysis to infer the effective asset mix for hedging underlying assets.

CHAPTER 3

DATA, VARIABLES, AND PRICING FACTORS

3.1 Data Sources

The list of Canadian closed-end funds and their historical non-trading data are collected from multiple sources. The main source is from *Fundata* Canada Inc., whose closed-end fund data package reports funds' NAV and other important information, including name, investment objective, distribution, MER, activation and termination date, etc. Non-trading data, mainly NAV, of the funds which are not reported by *Fundata* are obtained from fund websites to complement fund data in *Fundata*.[10] Detailed information regarding underlying portfolio composition and redemption feature are obtained from funds' prospectus, annual report, or financial statements which are accessible in the *SEDAR* website. All the above non-trading data are combined with fund trading data (trading ticker, CUSIP, price, volume and shares outstanding) from TSX-CFMRC database to form a complete closed-end funds data.

The historical data regarding Canadian stock market are extracted from two databases. The trading data for individual common stocks, for T-bill, and for various market and industry indices are collected from TSX-CFMRC database. The accounting data, mainly book value of common equities, for Canadian firms, are collected from Compustat North America.

3.2 Sample of Canadian Closed-End Domestic Equity Funds

From the above data sources, 153 Canadian closed-end funds are initially identified with matched trading data and non-trading data.[11] Like most prior studies,

[10] The list of missing closed-end funds in *Fundata* is obtained by checking against closed-end fund report in www.globefund.com which provides and updates the list of all extant Canadian closed-end funds. We choose the funds which disclose NAV online for more than one year and the underlying assets value is over $100 million dollars. It is worth noting that the sample of missing funds in *Fundata* may be survivorship-biased since www.globefund.com only reports extant closed-end funds.

[11] Since *Fundata* doesn't report funds' trading identifier (ticker or CUSIP), the data from *Fundata* are matched with trading data in TSX-CFMRC via fund name. Various checks are employed to ensure the

the thesis excludes fixed-income funds[12] and country funds (or global funds)[13] and the final fund sample consists of 111 Canadian closed-end domestic equity funds.

The sample period starts from July 1999 and continues to the end of 2007 (totally 102 months) since there were less than 7 funds before July 1999 and the trading data after 2007 are unavailable at the time of thesis writing.

Appendix 1 lists basic information for "common shares" of each fund.[14]Among these 111 funds, 98 funds have redemption feature from their inceptions to the end of sample period and 3 of funds without redemption option at inceptions choose to introduce redemption feature after their first observations in the sample period.[15]This finding coincides with the fact that in recent years, redemption has become the norm in the Canadian closed-end fund industry[16]. This redemption feature is insisted by Canadian underwriters to include in the IPO deals and it thus makes majority of Canadian closed-end funds, technically, no more traditional closed-end funds. As for the mechanism of redemption, most of funds offering redemption feature in the sample allow fundholders to annually redeem funds at 100% NAV less any reasonable costs associated with the redemption, including brokerage costs, commission, and other costs incurred by funding such redemption. Some funds even allow fundholders to redeem monthly or quarterly with redemption fee, normally some percentage of NAV.

Table 1 reports simple annual and grand statistics for the number of sample closed-end funds each month and provides a statistical comparison of monthly

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accuracy and completeness of the matching and we discard the funds with ambiguous names to avoid mismatching.

[12] Many Canadian funds hold income trusts. Since income trusts are exchange traded securities similar to common stocks, the thesis treats funds holding income trusts as equity funds. We keep equity fund and balanced fund and delete the funds which invest primarily in bonds or preferred stocks.

[13] Discounts on country funds may reflect the change of domestic price of risk or the change of sentiment in foreign countries even if sentiment in Canada keeps constant.

[14] The Canadian closed-end funds in our sample take various organization structures and issue multiple securities. For brevity reason, we use conventional term "common shares" to denote shares for traditional investment corporation, capital shares for split-share corporation, units for investment trust, and L.P. unit for limited partnership.

[15] It is noteworthy that funds in the sample may introduce redemption since inceptions or sometime after inceptions and some funds may remove the redemption features and reinstate them at a later time. So it is inappropriate to simply classify a fund as redeemable funds or non-redeemable funds without reference to corresponding periods.

[16] The norm of redemption feature in Canadian closed-end funds industry is documented by various closed-end fund reports (e.g., closed-end funds report from Investor Economics (2006) or from www.globefund.com (2007)).

value-weighted return, median market capitalization, and equal-weighted turnover of sample closed-end funds with their counterparts of fund NAV or equity market benchmarks. The monotonous increase of annual mean of the number of sample closed-end funds over the sample period, from 7 funds in 1999 to nearly 91 funds in 2007, reflects the explosive growth of Canadian closed-end fund industry in the last ten years.[17] The results of statistical comparison show that the grand mean of monthly value-weighted average return of closed-end funds, 0.84%, is much higher than that of funds' NAV, 0.66%, mirroring that closed-end funds might be exposed to higher systematic risk than their underlying assets. There is also a pronounced discrepancy in grand mean of monthly equal-weighted turnover and median market capitalization between sample funds and Canadian equity market, which indicates that closed-end funds are illiquid and small relative to the whole equity market. Collectively, these simple statistics seem to suggest that other than potential sentiment risk, size and liquidity might also explain why closed-end fund is priced at discount, if any, at NAVs.

[Please insert table 1 about here.]

3.3 Discounts on Sample Funds

As the key variable in the thesis, the discount on closed-end funds is calculated as the ratio of difference between NAV and market price to NAV for funds' "common shares". NAV is reported as market value of underlying assets less any liabilities. For the funds issuing preferred shares, NAV of "common shares", so-called capital shares in Canadian fund industry, are reported as subtracting the fixed redemption price of preferred shares from NAV of the overall underlying portfolio the fund holds.[18]

The time interval of disclosed NAV and thus of discount varies across funds and

[17] The annual growth rate of closed-end funds in Canada since 1998 is over 30% (See closed-end funds report of Investor Economics, 2006) and, as of May, 2008, 239 closed-end funds are traded in the TSX (See www.globefund.com).

[18] Please note that this may lead to biases since the NAV of capital shares are reported as NAV of underlying portfolio less par value, rather than market value, of preferred shares. For subsequent statistical analysis, we also use subsample with split-share funds excluded and find nearly identical statistical results.

over time in our fund dataset, mainly weekly. To keep aligned with the monthly frequency of standard pricing factors we construct for Canadian stock market, we extract monthly series of discount for each fund by calculating fund discounts on the last trading day in TSX in each month.[19]

3.3.1 Monthly Discount on Individual Funds

Apart from basic information of closed-end funds, Appendix 1 reports simple statistics of discounts on "common share" for each fund. The funds without annual redemption appear to trade at larger discount. For instance, two funds which have 102 observations for the whole sample period, Canadian General Investments LTD. and Economic Investment Trust, are traded, on average, at 23.47% and 31.92% discount. In contrast, none of funds with annual redemption is traded in such a high level of discount.

3.3.2 Construction of Monthly Discount Indices

To eliminate various idiosyncratic effects on discount of individual funds, we aggregate discount across funds each month and thus construct monthly discount index. Like most of prior studies, the value-weighted average discount (*VWD*) is constructed monthly as follows:

$$VWD_t = \sum_{i=1}^{n_t} (w_{it} \times Discount_{it}) \qquad (1)$$

where $w_{it} = NAV_{it} / \sum_{k=1}^{n_t} NAV_{kt}$, $NAV_{it} = NAVPS_{it} \times Shares_{it}$, t = month-end, n_t = the

[19] This treatment is complicated by the fact that some funds don't disclose their NAV or that market prices of some funds are missing at the last monthly trading days. The proposed adjustment for these missing data points is to choose the last observation per month with both non-missing trading price and non-missing NAV on the condition that this observation is within one week from month end day. If this condition is not met, then choose first observation next month with non-missing price and non-missing NAV as long as this observation is within one week from last month end day. If neither condition is met, the thesis takes the average of two adjacent observations.

number of funds with available discount at the end of month t, $NAVPS_{it}$ is the net asset value per "common share" at the end of month t, and $Shares_{it}$ are the shares outstanding of "common shares" at the end of month t for fund i.

The average change in discounts on closed-end funds over time is proposed in the literature to capture the temporal fluctuation of small investor sentiment. In the thesis, we measure the value-weighted average change in discount across funds as follows:[20]

$$VW\Delta D_t = \sum_{i=1}^{n_t} \{ w_{it} \times (Discount_{it} - Discount_{it-1}) \} \quad (2)$$

Based on the above definitions, we calculate average discount and change in discount for various fund portfolios. In calculating any discount index, we make two major adjustments: 1) Following prior studies (e.g., Elton et al., 1998), we exclude discounts in the first 180 days (weekends are excluded) of fund's existence because evidence exists that during this period the discount on closed-end funds is affected by arbitrage and price-stabilizing actions of investment bankers and behaves differently from the discount of other closed-end funds.[21] 2) For any index at any month, if the number of component funds is less than 5, we set it as missing value to get around idiosyncratic effects on discount.

3.3.3 Summary Statistics for Discount Indices

Univariate statistics, including autocorrelations, and pairwise correlations for discount indices on closed-end fund are reported in panels A and B of table 2, respectively.

[Please insert table 2 about here.]

[20] We also construct equal-weighted discount indices and find out the change of weighting method doesn't materially change the statistical results.

[21] We also construct discount indices using surviving funds for purpose of eliminating the effect of fund termination on discount or change in discount. However, we find little difference in discount or change in discount and thus don't use the discount indices in the thesis.

The columns 2-4 in panel A report the number of data points and the mean (median) of the number of component funds for each discount index. As these three columns show, non-redeemable funds have much longer time period yet much fewer funds than redeemable funds, reflecting again the fact that the redeemable funds are relatively recent funds and in the past ten years, redeemable funds turn to dominate the Canadian closed-end fund industry.

The columns 5-7 in panel A present the mean, together with its t statistics, and the median of the monthly discount indices and provide clear evidence of the effect of the annual redemption feature on discount. In the case of non-redeemable funds, the grand mean (median) of monthly average discount is 17.03% (14.73%) whereas the counterparts for redeemable funds are only 4.05% (4.73%).[22] Figure 2 plots monthly discount indices in table 2 over the sample period. The figure shows the prominent discrepancy in discounts between non-redeemable funds and redeemable funds and the difference tends to diminish over time. In the last 3 years, the non-redeemable funds were traded, on average, at nearly 10% discount and the redeemable funds were traded, on average, at nearly 5% discount.

In panel A, the high autocorrelation coefficients of value-weighted discount on Canadian funds indicate that the discount has long memory and this finding is consistent with the empirical findings in the U.S. and U.K.. This long memory demonstrates a prominent difference between non-redeemable funds and redeemable funds. In effect, the value-weighted discount on non-redeemable funds has much higher autocorrelations coefficients than redeemable funds.

The value-weighted change in discounts shows low autocorrelations. In panel B, we observe that the correlation between the average change in discounts on redeemable funds and that on non-redeemable funds is not big (though significant at 5% level), suggesting that there might be different driving forces underlying the time-series fluctuations of discounts on these two fund groups.

[22] However, the grand mean of average discount for all sample funds is still over 10%. This may be attributed to the relatively larger size of non-redeemable funds and to the fact that in the first two years in our sample period, non-redeemable funds dominate in our sample funds, making the discount level of all funds tilt to that of non-redeemable funds.

To sum up, the summary statistics in table 2 demonstrate that the level of and change in discounts on traditional non-redeemable funds in Canada are consistent with those documented in the U.S. market. In contrast, the discount on redeemable funds in Canada exhibits clearly different level and behavior, supporting the notion that arbitrage facilitated by the redemption feature might exert an important influence on CEFD. However, it is still not clear whether this differential effect of discount can be attributable to the elimination of potential sentiment risk or to other rational factors and this issue is worth further investigation.

3.4 Standard Pricing Factors in the Canadian Stock Market

As Fama (1970) points out, any test of mispricing is a joint test of mispricing and appropriate pricing model. As such, for the asset pricing model employed in the subsequent analysis to validate or reject the role of sentiment, it is indispensible to include and control for all, if possible, standard pricing factors proposed in the financial literature. Though there is enduring debate in the financial literature regarding which factors should enter into the linear asset pricing model, it is widely accepted that apart from the market factor, three characteristics-based empirical factors (i.e., size, book-to-market, and momentum) have explanatory power on return of stocks in the U.S. and other international financial markets (see Fama and French, 1993; Jegadeesh and Titman, 2001).[23] There is also evidence to support these four factors in Canadian stock market (see Liew and Vassalou, 2000; Berkowitz and Qiu, 2001; L'Her et al., 2003). In view of this, we chose these four factors as standard pricing factors in the Canadian stock market and thus extracted monthly returns of the mimicking portfolios related to these factors over the period from July 1999 to December 2007.

3.4.1 Development of Mimicking Portfolios

Following prior studies, we define or calculate the firm characteristics as follows:

[23] Whether these firm characteristics represent the loadings (sensitivity) on underlying fundamental and systematic risks remains a controversial issue.

market value of common equity (*ME*), or firm size, is defined as the aggregate market value of all classes of common equities issued by a company; book value of common equity (*BE*) is calculated as the Compustat North America book value of stockholders' equity, plus balance-sheet deferred taxes and investment tax credit (if available), minus the book value of preferred stock;[24] momentum, or prior performance, is gauged by compounding return over prior six months with one month lag.[25] As table 3 shows, our sample consists of around 1074 Canadian common stocks with required characteristics at each month and thus provides a reliable and comprehensive dataset to construct mimicking portfolios.

[Please insert table 3 about here.]

Our procedure for developing the mimicking portfolios associated with *ME*, *BE/ME*, and momentum is based on three independent sorts, followed by an orthogonalization of *BE/ME* and momentum with *ME*.[26]

We construct portfolios which mimic the underlying risk factors in returns related to *ME* and *BE/ME* along the lines of Fama and French (1993). For each June of year *y*, we ranked all eligible common stocks in TSX by *ME* and by positive *BE/ME* independently to calculate a 50% breakpoint for *ME* and the 30% and 70% breakpoints for *BE/ME*.[27] The common shares above the 50% firm size breakpoint are designated B (Big) and the remaining 50% are denoted S (Small). Independently, the firms above the 70% *BE/ME* breakpoint are flagged H (High), the middle 40% are designated M (Medium), and the firms below the 30% *BE/ME* breakpoint are designated L (Low). Based on these attributes, the common shares in TSX are

[24] Many Canadian companies issue multiple classes of common shares, normally with different voting rights. Our definition of size and book-to-market implies that different classes of common shares of a company have the same size and book-to-market ratio.

[25] This definition implies that different classes of common shares for a company might have different momentum. Furthermore, one month lag is used to measure momentum because the bid-ask bounce can attenuate the continuation effect (see Jegadeesh and Titman, 1993, 1995; Moskowitz and Grinblatt, 1999; Jegadeesh and Titman, 2001).

[26] We also construct the three factors by orthogonalizing each other for the purpose of better disentangling effects of these factors and we find similar results.

[27] The companies which report their asset values as market value (e.g. ETFs, Closed-end funds, etc) are excluded because their book-to-market ratios are not available, or, if available, do not reflect the same information as those of ordinary companies do.

subsequently assigned into one of the six intersectional portfolios: S/L, S/M, S/H, B/L, B/M and B/H. Using these component common shares, monthly value-weighted returns of these six intersectional portfolios are calculated from July of year y to June of year y+1 and then the portfolios are rebalanced. As in Fama and French (1993), *BE/ME* of a company at June of year y is the ratio of *BE* at the end of fiscal year y-1 to *ME* at the end of calendar year y-1.

The momentum factor is constructed by means of the approach in Kenneth French's website. At the beginning of the month t, we identify the common shares in TSX with poor prior performance (Down) and with good prior performance (UP) based upon the breakpoints for the bottom 30% and top 30% of the ranked values of prior compounding return from month t-7 to month t-2. We also independently split the common shares in TSX into big and small *ME* groups using 50% breakpoint for *ME*. With these attributes, the common shares in TSX are subsequently assigned into one of the four intersectional portfolios: S/D, S/U, B/D, and B/U to calculate value-weighted returns at month t for these portfolios and the portfolios are rebalanced monthly.

With the monthly returns of these ten intersectional portfolios, the monthly returns of three mimicking portfolios for the underlying risk factors are calculated by the following formulas:[28]

$$SMB = \frac{(S/H - B/H) + (S/M - B/M) + (S/L - B/L)}{3} \tag{3}$$

$$HML = \frac{(S/H - S/L) + (B/H - B/L)}{2} \tag{4}$$

$$UMD = \frac{(S/U - S/D) + (B/U - B/D)}{2} \tag{5}$$

where SMB (small minus big) denotes the return of a zero-investment portfolio in which small size stocks are bought and big size stocks are shorted. HML (high minus low) is the return of a zero-investment portfolio in which stocks with high

[28] Appendix 2 lists monthly return of the 10 intersectional portfolios and 3 mimicking portfolios related to size, book-to-market, and momentum factor in Canada over July 1999 to December 2007.

book-to-market ratio are bought and stocks with low book-to-market are shorted. UMD (up minus down) represents the return of a zero-investment portfolio in which stocks with good prior performance are bought and stocks with poor prior performance are shorted.

3.4.2 Summary Statistics for Monthly Return of Standard Pricing Factors

Table 4 reports the summary statistics for monthly return of mimicking portfolios related to market, size, book-to-market, and momentum factor in Canadian stock market. Panel A presents the univariate statistics for return of these factors. The average monthly return premium related to momentum, 1.40%, is the largest premium observed in Canadian stock market in our sample period, which is followed by return premium of size, book-to-market, and market, whose figures are 1.09%, 0.61%, and 0.49% respectively. The magnitude of significance of these mean return premiums, measured by t-statistic, follows an analogous order, except that t-statistic of market factor is slightly larger than that of book-to-market factor. It is also clear from Panel A that all factors exhibit little autocorrelation over time. Panel B produces the pairwise correlations between these four factors. The correlation coefficients are low, which is aligned with the way mimicking portfolios are constructed. The largest correlation coefficient is -0.50 between market and book-to-market. However, these coefficients are all significant at the 90% confidence level. The above results are mainly in line with extant relevant studies in Canada (See Berkowitz and Qiu, 2001; L'Her et al., 2003) and thus the time-series returns we extract for these factors provide reliable inputs for the subsequent asset pricing model.[29]

[Please insert table 4 about here.]

[29] Compared to prior studies regarding pricing factors in Canadian stock market, we examine relatively shorter period and do not provide explicit test of explanatory power of these factors on stock return because testing of these standard factors is not our main focus.

CHAPTER 4

EMPIRICAL METHODOLOGIES AND RESULTS

Our empirical investigation for CEFD in Canada mainly involves standard Fama-MacBeth cross-sectional and GRS time-series regressions to examine whether it provides significant incremental explanatory power, after controlling other well-known characteristics or risk factors, in cross-sectional as well as time-series variation of stock return. Further, we also provide a validation of CEFD as sentiment index in Canadian context.

4.1 CEFD and Standard Pricing Factors

As the first preliminary analysis, this subchapter examines the relationship between our discount indices and the four standard pricing factors constructed in the preceding chapter. If discount indices are highly correlated to these pricing factors, its role in asset pricing may be obscured. For this purpose, we examine their pairwise correlation coefficients and the regression R^2 as reported in panels A and B of table 5 respectively. Panel A documents small but significant correlations with standard factors, except with momentum. However, the negligible adjusted R^2 (less than 10%) from the regression of discount indices on four factors in panel B indicates that collectively, the four factors account little for our discount indices. This evidence of low correlation between CEFD and standard pricing factors suggests that if we find evidence in subsequent analysis of CEFD as a pricing factor, CEFD might represent a new source of systematic risk and this risk might be sentiment risk as behaviouralists claim.

[Please insert table 5 about here.]

4.2 Portfolios Formed by Sorting on Factor Loading on CEFD

Before moving on to formal regression analyses, it is intuitive to study whether

portfolios with different sensitivity to our discount indices, potential sentiment proxies, exhibit significantly different average returns. A significant difference in the average returns would indicate that CEFD may be relevant for the pricing of equities.

For this purpose, at the beginning of each month, sample stocks are assigned into quintile or decile portfolios according to ranked CEFD beta (or potential sentiment beta) estimated from 60 month (at least 24 month) time-series rolling regression of excess returns on five-factor model (Fama and French 3 factors plus momentum plus CEFD). Subsequently, equal-weighted or value-weighted portfolio-level return, CEFD beta, and other characteristics are calculated each month and then their time-series averages are reported.

Based on above portfolio forming procedure, we first calculate CEFD using all sample funds and report corresponding results in panel A of table 6. In this panel, we do not observe strong evidence to support CEFD as a priced factor. Despite the difference in average return between two extreme groups (lowest CEFD beta and highest CEFD beta), as the Newey-West t-statistic in the last column shows, the differential average returns are not significant at 10% level. Besides, we fail to observe the apparently increasing pattern in average return as the CEFD beta increases. This result keeps unchanged regardless of quintile or decile portfolios we split stocks into and of equal-weighted or value-weighted return we use for portfolios.

Since the change in discount on redeemable closed-end funds is less likely to reflect change in sentiment than that on traditional non-redeemable funds, we calculate sentiment index again using non-redeemable funds in our sample and report the corresponding results in panel B of table 6. In panel B, we again fail to find significant differential average return between the two extreme groups and the increasing pattern in average return as the CEFD beta increases.

[Please insert table 6 about here.]

4.3 Fama-MacBeth Cross-Sectional Regressions

The finding in the preceding subchapter suggests that CEFD is unlikely to be a

priced factor in Canadian stock market. However, the portfolio analyses do not precisely account for other characteristics that may affect stock returns. Moreover, portfolio returns averaged across stocks may hide important aspects underlying the data at the individual level, thereby concealing the impact of CEFD. In this subchapter, we address these issues by performing Fama and MacBeth (1973) two pass cross-sectional regressions to formally examine if stock's exposure to CEFD has incremental explanatory power in the cross-sectional variation of average return in Canada, controlling for other well known determinants, including market, size, book-to-market, momentum, and liquidity.

Our tests are individual stock-based and characteristic-based. The use of firm-specific characteristics for size, book-to-market, momentum, and liquidity instead of using their factor loadings is meant to sidestep the error-in-variables problem caused by estimating factor loadings in the first pass time series regression. Since financial literature show that liquidity is an elusive concept that has a number of aspects that are captured by different measures, we adopt three popular liquidity measures for our test: relative bid-ask spread (Amihud and Mendelson, 1986), turnover ratio, and Amihud (2002) illiquidity measure. These controlling characteristics are measured each month and defined in our regression as follows:

Size: natural logarithm of *ME*, where *ME* is month-end firm-level market value which is defined as the aggregate market value of all classes of common shares issued by the firm.

B/M: natural logarithm of winsorized (at the 0.5th and 99.5th percentile) non-negative ratio of *BE* to *ME*, which is calculated along the line of Fama and French (1993).

MOM: the compounding return over past six months (the most recent month is excluded).

TURNOV: winsorized (at the 0.5th and 99.5th percentile) value of the average of monthly turnover over the past six months. Monthly turnover is calculated as monthly trading volume scaled by the average of shares outstanding at the beginning and the end of the month.

Amihud: The winsorized (at the 0.5th and 99.5th percentile) illiquidity measure of Amihud (2002). We estimate this measure each month as the average of daily |r|/DVOL over the past six months. Dollar volume is calculated as daily trading volume multiplied by the average of the opening and closing price.

BA Spread: The winsorized (at the 0.5th and 99.5th percentile) value of the average of daily relative bid ask spread (%) over the past six months. We estimate daily relative bid ask spread as spread between closing ask and closing bid scaled by the midpoint of closing ask and closing bid.

In the first pass of our regression, for each eligible Canadian common stock and each month, we run multivariate time series regression of the realized equity return in the past 60 months (with at least 24 months of data available) on five-factors (Fama-French three factors, momentum factor, and CEFD) to estimate the factor loadings related to market and CEFD factor. The CEFD factor is the NAV-weighted average change in discount on all sample closed-end domestic equity funds.[30]

In the second step, we run cross-sectional regression, month by month, of realized equity return on market beta and CEFD beta estimated earlier and on firm-specific characteristics. Finally, the time-series means (namely, average return of portfolios), together with their Newey-West adjusted t-statistics, of slopes from the monthly cross-sectional regressions are reported in panel A of table 7 and provide a standard test of whether CEFD beta is on average priced.

[Please insert table 7 about here.]

It is reasonable to observe in panel A that most of firm characteristics, especially book-to-market and momentum, exhibit significant time-series means of regression slopes. The signs of the time-series means for all firm characteristics are also consistent with the predictions of financial literature. In contrast, regardless of being used as sole independent variable or tested along with any other variables, CEFD beta

[30] Since the average change in discount on non-redeemable closed-end funds is more likely to reflect sentiment, we run Fama-MacBeth regression again using sentiment proxy calculated from this subsample and find similar regression results.

shows negligible and insignificant time-series average return. Specifically, the biggest average return for CEFD beta is less than 0.6% per annum and the biggest Newey-West adjusted t-statistics is only 0.57, suggesting that CEFD is not priced on average.

Since the factor loadings related to market and CEFD estimated in the first pass time-series regression for individual stock are subject to estimation error, along the lines of Fama and French (1992), we mitigate this problem by using portfolio factor loading as a factor loading proxy for individual stock in each portfolio. For this purpose, at the beginning of each month, sample Canadian stocks are assigned into 25 portfolios by ranked CEFD beta or market beta and then equal-weighted monthly returns on portfolios are calculated. Based on the full-sample post-ranking monthly return, portfolio CEFD beta or market beta are estimated using regression on the five-factor model and then are assigned to each stock in the portfolio. Using these post-ranking portfolio factor loadings for market and CEFD, we run Fama-MacBeth regression again and report the results in panel B of table 7. As the panel B shows, even if using post-ranking portfolio factor loading increases the magnitude of average return and its t-statistics, the average return of CEFD beta is still not significant from zero at 10% level.

4.4 CEFD and Size

One testable implication from the notion that small investors' sentiment, potentially proxied by average change in discounts on closed-end funds, represents a source of systematic risk is that this sentiment proxy should provide marginal explanatory power in return of securities which are also "habitats" for retail investors and thus are affected by the same sentiment. Like Lee et al. (1991) and Elton et al. (1998), we formally test this proposition in this subchapter by using size portfolios as testing assets. Size portfolios are widely used as testing assets because intuitively smaller stocks are more likely to be held by small investors and thus to be affected by the small investor sentiment as closed-end funds. If the sentiment hypothesis holds, as the size of stocks increases, marginal explanatory power of sentiment in their returns

should decrease.

To check if this pattern exists, we run time-series regressions of monthly excess returns of Canadian size-decile portfolios (investment companies themselves are excluded) on CEFD and the other standard pricing factors and summarize the corresponding results in tables 8 and 9.

Table 8 presents the coefficients (β), together with their Newey-West adjusted t-statistics (t), for CEFD from the ten time-series regressions. Our findings are largely counter to the implication of sentiment hypothesis. In panel A, we replicate the time-series regression of Lee et al. (1991) in which market premium is used as the only standard pricing factor. For the discount index based on non-redeemable funds, our results are directly comparable to those of Lee et al. and we cannot observe the pattern of coefficients on CEFD across size categories as in the case of their study. Small companies tend to have positive coefficient and large companies negative, which provides strong objection to the implication of sentiment hypothesis that portfolio affected by small investors' sentiment do well when investors become more optimistic (discount narrows in the case of closed-end funds) and poorly when investors become more pessimistic (discount widens in the case of closed-end funds). Furthermore, most of the regression coefficients are not significant at 5%, even for the stock group with smallest size. The regression results for the redeemable closed-end funds provide additional evidence against sentiment theory. Intuitively, the average change in discount on redeemable close-end fund is unlike to reflect sentiment. However, interestingly, their coefficients across size category exhibit the approximate pattern predicted by sentiment hypothesis. In panel B, we report the analogous results for general multifactor model (FF3+Momentum). As expected, after the addition of more well-known standard pricing factors, the goodness of fit, measured by adjusted R^2, greatly increase, especially for small stocks. Nevertheless, the regression results on CEFD keep unchanged and disprove the sentiment hypothesis.

[Please insert table 8 about here.]

Panel A in table 9 reports the intercepts (alpha) from the time-series regressions of the Canadian size-decile portfolios on different combinations of explanatory variables. We report these alphas for purpose of examining whether adding CEFD can significantly decrease the abnormal returns and the results in this panel again provide objection to sentiment story. The second column, labeled as 'Avg ret', reports the average return for the ten size portfolios and one differential (smallest-biggest) portfolio (in the bottom row). As the literature suggests, we find significant positive average return for the differential portfolio. It is also reasonable to observe that the addition of standard pricing factors, except our discount indices, gradually decreases abnormal return. Specifically, adding size and book-to-market factors greatly decreases the magnitude of the Market alpha on the differential portfolio from 4.38% per month to 2.98% per month and the significance (Newey-West t value) from 1.79 to 0.88. However, from the comparison of alphas of models without discount indices and models with discount indices added, it is clear that, for any given standard factor(s), adding discount indices into the time-series regression fails to give rise to notable decline of the magnitude and significance of the abnormal return, regardless of using non-redeemable closed-end funds or use all sample funds to calculate sentiment proxy.

Following Fama and French (1993), we provide a comparison of model fit by comparing the F-statistic based on Gibbons, Ross, and Shanken (GRS, 1989) for the Canadian size-decile portfolios. The GRS F-statistics are computed for the null hypothesis, 'H_0: the alphas for the Canadian size-decile portfolios are jointly zeros'. The GRS F-statistic is defined by the following formula:

$$(\frac{T}{N})(\frac{T-N-K}{T-K-1})(1+\bar{f}'\hat{\Omega}^{-1}\bar{f})^{-1}(\hat{\alpha}'\hat{\Sigma}^{-1}\hat{\alpha})$$

where N represents the number of assets to be estimated, T the number of time-series observations per asset, K the number of factors (excluding the intercept) in the model, $\bar{f}$ is a vector of sample means for factors, $\hat{\Omega}$ is the sample variance-covariance

matrix for factors, $\hat{\alpha}$ is a vector of intercept estimates, and $\hat{\Sigma}$ is the residual covariance matrix for simultaneous regressions. Under the null hypothesis, the above statistic follows an F-distribution with N and T-N-K degree of freedom.

The models we compare are FF3, FF3+VWΔD_all, FF3+VWΔD_nored, FF3+UMD, FF3+UMD+VWΔD_all, and FF3+UMD+VWΔD_nored. If the sentiment hypothesis on closed-end funds holds and thus the sentiment risk is systematic, the discount index, at least the discount index constructed on traditional non-redeemable funds, should enhance the model fit and thus we would observe decreased GRS F-statistics when adding it into standard pricing models. Panel B in table 9 report GRS F-statistic and corresponding ρ-value for these models and our results again lend no support to the implication of sentiment hypothesis. As we observe in the panel, regardless of using FF3 or FF3+UMD as base factors, the addition of discount index based on all sample funds induces negligible change of GRS F-statistic. More importantly, adding discount index based on non-redeemable funds, which is more likely to reflect sentiment, even produces larger F-statistic, which is opposite to the prediction of sentiment hypothesis.

In sum, consistent with the finding in Elton et al. (1998) in U.S., our investigation in the relationship between size and CEFD in Canadian context refutes the proposition that discount on closed-end funds can explain the return of smaller stocks due to the same small investor sentiment.

[Please insert table 9 about here.]

4.5. The Lead/Lag Correlation between CEFD and Stock Market

Qiu and Welch (2006) state that investor sentiment should not fall like manna from heaven. Actually, it is reasonable to conjecture that the common sentiment in noise traders should be influenced by prior return of overall stock market and might exert persistent influence on future stock return. Following this reasoning, for any desirable sentiment proxy, we should observe persistent correlation with stock market

return at different lags and leads. As such, this attribute of sentiment proxy provides a mild validation metric for our discount indices by checking their lead/lag correlation coefficients with the return of TSX market and of the size spread portfolio as in the studies of Neal and Wheatley (1988) and Qiu and Welch (2006) in U.S. context.

We report these correlation coefficients in table 10. In the table, the significant correlation coefficients on the left imply that the sentiment index predicts return whereas correlations on the right imply the opposite direction of influence. As the ρ-value in parentheses in the table shows, most of the correlation coefficients are not significant from zero at 5%. This empirical finding suggests that the change in discount on Canadian closed-end funds, either redeemable or non-redeemable funds, is not influenced by the lagged stock return or influence the future stock return. Like Qiu and Welch (2006), we argue that sentiment might not be the underlying driving force for the change in discount on Canadian closed-end fund.

[Please insert table 10 about here.]

4.6. Sentiment and Expected Returns of Closed-End Funds

Elton et al. (1998) disprove discount on U.S. closed-end funds as a proxy of systematic sentiment risk by their evidence that adding discount indices into standard asset pricing models fails to reduce the abnormal return (alpha) of closed-end funds. Following their study, in this subchapter, we estimate the alpha from time-series regressions of the excess return of individual sample Canadian closed-end funds on various factor models. If change in discount on closed-end funds represents a systematic risk as Lee et al. (1991) claim, we should observe the decrease in alpha because of the Lee at al. hypothesis that sentiment risk has a nonzero price and that closed-end funds, especially non-redeemable funds in our Canadian context, have a larger than average sensitivity to this source of risk.

The results of alphas for our sample funds are summarized in table 11 and our findings provide additional evidence against the sentiment hypothesis. We first investigate the alpha of excess return of all sample funds. It is shown from the table

that none of the alphas estimated from standard pricing models (FF3 plus momentum) is significant from zero at 5%, suggesting that we do not need to resort to the sentiment factor to explain the return of Canadian closed-end funds. [31] In addition, adding the discount indices, even the discount index on non-redeemable funds, produces little change of the average alphas. We further split sample funds into non-redeemable fund and redeemable funds (with no redemption fee) and then compare their alphas. Theoretically, compared to traditional closed-end funds, the latter funds are less likely to be exposed to sentiment risk. Therefore, if the sentiment hypothesis holds, including sentiment proxy, the discount on non-redeemable funds, into pricing model would significantly decrease the alphas for non-redeemable funds and this decrease would not occur for redeemable funds (with no redemption fee). However, our finding in table 11 show that the addition of discount indices on non-redeemable funds increase the average (median) of FF3 plus Momentum alphas for both non-redeemable funds and redeemable funds (with no redemption fee).

[Please insert table 11 about here.]

To sum up, consistent with the finding of Elton et al. (1998), our finding for closed-end funds per se suggests that discount on Canadian closed-end funds, both redeemable and non-redeemable funds, might be driven by some rational factors instead of sentiment.

4.7. Robustness Checks

In this section, we investigate that if our evidence against CEFDs as a priced factor in the Canadian stock market can survive a variety of robustness checks.

4.7.1 Fama-MacBeth Regressions Revisited

One of the potential problems inherent in the Fama-MacBeth regressions in the section 4.3 is that we directly use firm-characteristics rather than the factor loadings on

[31] The results of FF3 alphas for Canadian closed-end funds are similar to FF3 plus momentum alpha and thus not reported.

the underlying risk factors. To address the problem, we rerun the Fama-MacBeth regression on various factor loadings on risk factors.

Specifically, in the first pass of our regression, we estimate full-sample post-ranking portfolio factor loadings on risk factors, including market, size, book-to-market, momentum, and CEFDs, and then assign the post-ranking portfolio factor loadings to each stock in the portfolio. Based on these estimated factor loadings, in the second step, we rerun Fama-MacBeth regression and report the corresponding results in table 12.

It is clearly shown in table 12 that our main results remain unchanged even if we use factor loadings instead of characteristics for size, book-to-market, and momentum. Specifically, regardless of being used as sole independent variable or tested along with any other variables, factor loading on CEFD shows negligible and insignificant time-series average return.

[Please insert table 12 about here.]

4.7.2 CEFD and Turnover

Most of the relevant studies, including ours, investigate the relationship between the return of small-size stocks and the discount on closed-end fund on the grounds that like closed-end funds, small-size stocks are disproportionally held by individual investors who are more likely to trade on noise. However, firm size might be a noisy proxy of the degree of institutional investor ownership. Since the direct stock ownership information in Canada is unavailable to us, we use liquidity, measured by turnover, as an alternative proxy and provide a robustness check for the relationship of size and closed-end funds. We use illiquid stocks as the alternative testing asset because there is evidence showing that illiquid stocks are also mainly held by small investors and illiquidity implies that the potential mispricing cannot easily be arbitraged by more sophisticated investors.

As we investigate size-decile portfolios, we estimate the alphas from the

time-series regressions of excess return of Canadian value-weighted turnover-decile portfolios on various pricing models and report the results in table 13. For the turnover-decile, membership is determined by the average of monthly turnover over the past six months at the beginning of each month and the portfolios are rebalanced monthly.

In table 13, we observe that for the stock with the smallest turnover, adding discount indices into pricing model doesn't materially decrease the alphas. Actually, including discount indices of non-redeemable funds even increases the alphas. Since turnover is a mild proxy for liquidity and liquidity per se a mild measure of investor ownership, we argue that our finding on turnover-decile portfolios provides mild evidence against the sentiment hypothesis on closed-end funds.

[Please insert table 13 about here.]

4.7.3 GRS Tests Revisited

In subchapter 4.4, we run GRS tests for size-decile portfolios. In this subchapter, we extend the same GRS tests to book-to-market-decile, momentum-decile, and 10 industry portfolios and report the results in panel A, panel B, and panel C in table 14 for these three sets of portfolios respectively.

The table 14 produces the results similar to the results we obtained for size-decile portfolio. Again, using Fama-French three factors or Fama-French plus Momentum four factors as base pricing model, incorporating CEFD into the base pricing model fails to reduce the GRS F-statistics considerably as the sentiment hypothesis implies. This robust check again provides another evidence to reject the CEFD as a priced factor.

[Please insert table 14 about here.]

CHAPTER 5

CONCLUSION

Small investors' sentiment has been proposed in the literature by behaviouralists to explain the existence and behavior of discount on closed-end funds (CEFD). However, the empirical results to date of this sentiment hypothesis in U.S. and international financial markets are equivocal. Besides, most of empirical tests outside U.S. are not robust in the sense that they fail to well control other firm characteristics and risk factors that may explain stock return and to provide a formal cross-sectional test of the link between CEFD and stock return.

This thesis provides an out-of-sample test in Canada by empirically exploring the role of CEFD in asset pricing in cross-sectional and time-series frameworks and further providing a validation of CEFD as sentiment index. Our empirical results document differential behaviors in discounts between redeemable funds and non-redeemable funds. However, we don't find supportive evidence of CEFD as a priced factor. Specifically, the stocks with different exposures to CEFD fail to provide significantly different average return. Nor does CEFD provide significant incremental explanatory power, after controlling other well-known firm characteristics and risk factors, in cross-sectional as well as time-series variation of stock return. This evidence, together with the findings from our direct test of CEFD as sentiment index, suggests that CEFD, even the discount on traditional non-redeemable closed-end funds, is unlikely to be driven by elusive sentiment in Canada.

Finally, this research can be extended in several directions. First, other than discount on closed-end fund, a number of proxies have been proposed in the literature to capture the abstract sentiment.[32] As such, theoretically, the relation between those alternative sentiment proxies and CEFD provides another validation metric of CEFD as a sentiment proxy. We do not employ this validation metric in the thesis because of

[32] See Bandopadhyaya (2006), Qiu and Welch (2006), and Baker and Wurgler (2007) for comprehensive surveys of potential sentiment proxies through the chain of a complicated process in which investor sentiment affects asset prices.

data availability. Yet, it does suggest a direction of future research to improve our study. Second, due to our data constraint for Canadian closed-end funds, our testing period is relatively short (maximum 101 months for discount indices). This might pose serious problem for our empirical test since the average return may not converge to expected return in less than 10 year period. Besides, the number of sample non-redeemable Canadian funds is less than 10, which raises a concern on if the aggregation of individual discount in this sub-fund-group can eliminate idiosyncratic effects on discount. To sum up, it is important to, in the future research, obtain broader and longer period fund data to improve our tests.

REFERENCES

Abraham A., D. Elan, and A.J. Marcus, 1993, "Does sentiment explain closed-end fund discounts? Evidence from bond funds," *Financial Review*, 28, 607-616.

Amihud, Y., 2002, "Illiquidity and stock returns: Cross-section and time-series effects," *Journal of Financial Markets,* 5, 31-56.

Amihud, Y. and H. Mendelson, 1986, "Asset pricing and the bid-ask spread," *Journal of Financial Economics*, 17, 223-249.

Baker, M. and J. Wurgler, 2006, "Investor sentiment and the cross-section of stock returns," *Journal of Finance*, 4, 1645-1680.

Baker, M. and J. Wurgler, 2007, "Investor sentiment in the stock market," *Journal of Economic Perspectives*, 21,129-151.

Bandopadhyaya, A., 2006, "Measures of investor sentiment: Who wins the horse race?" *Working Paper*, University of Massachusetts Boston.

Berkowitz, M.K. and J. Qiu, 2001, "Common risk factors in explaining Canadian equity returns," *Working Paper,* University of Toronto.

Black, F., 1985, "Noise," *Journal of Finance*, 41, 529-543.

Bodurtha, J., E. Kim and C. Lee, 1993, "Closed-end country funds and US market sentiment," *Review of Financial Studies*, 8, 879-918.

Brauer, G.A., 1984, "Open-ending closed-end funds," *Journal of Financial Economics*, 13, 491-507.

Brauer, G.A., 1988, "Closed-end fund shares' abnormal returns and the information content of discounts and premiums," *Journal of Finance,* 43,113-127.

Brauer, G.A., 1993, "Investor sentiment and the closed-end fund puzzle: A 7 percent solution," *Journal of Financial Services Research*, 7, 199-216.

Brickley, J.A., S. Manaster, and J. Schallheim, 1991, "The tax-timing option and the discounts on closed-end investment companies," *Journal of Business*, 64, 287-312.

Carhart, M., 1997, "On persistence in mutual fund performance," *Journal of Finance*, 52, 57-82.

Chen, N-F, R. Kan, and M. Miller, 1993, "Are the discounts on closed-end funds a

sentiment index?" *Journal of Finance*, 48, 795-800.

Chen, G-M, O. Rui, and Y-X. Xu, 2004, "Understanding the closed-end fund puzzle from the Chinese experience," *Working Paper*, University of Texas at Dallas.

Chopra, N., C.M.C. Lee, A. Shleifer, and R.H. Thaler, 1993, "Yes, discounts on closed-end funds are a sentiment index," *Journal of Finance*, 48, 801-808.

Delong, J.B., A. Shleifer, L.H. Summers, and R.J. Waldmann, 1990, "Noise trader risk in financial markets," *Journal of Political Economy*, 98, 703-738.

Dimson, E. and C. Minio-Kozerski, 1999a, "The closed-end fund discount and performance persistence," *Working Paper*, London Business School.

Dimson, E. and C. Minio-Kozerski, 1999b, "A factor model of the closed-end fund discount," *Working Paper*, London Business School.

Dimson, E. and C. Minio-Kozerski, 1999c, "Closed-end funds: A survey," *Financial Markets Institutions and Instruments*, 9, 1-41.

Doukas, J.A. and N.T. Milonas, 2004, "Investor sentiment and the closed-end fund puzzle: Out-of-sample evidence," *European Financial Management,* 10, 235-266.

Elton, J.E., M.J. Gruber, and J.A. Busse, 1998, "Do investors care about sentiment?" *Journal of Bus*iness, 71, 477-500.

Fama, E.F., 1970, "Efficient capital markets: A review of theory and empirical work," *Journal of Finance,* 25, 383-417.

Fama, E.F. and K.R. French, 1992, "The cross-section of expected stock returns," *Journal of Finance*, 47, 427-465.

Fama, E.F., and K.R. French, 1993, "Common risk factors in the returns on stocks and bonds," *Journal of Financial Economics,* 33, 3-56.

Fama, E.F. and J.D. MacBeth, 1973, "Risk, return and equilibrium: Empirical tests," *Journal of Political Economy*, 81, 607-636.

Flynn, S.M., 2008, "Noise-trading, costly arbitrage, and asset prices: Evidence from US closed-end funds," *Forthcoming*, Journal of Financial Markets.

Gemmill, G. and D.C. Thomas, 2002, "Noise trading, costly arbitrage, and asset prices: Evidence from closed-end funds," *Journal of Finance*, 6, 2571-2594.

Gibbons, M.R., S.A., Ross, and J. Shanken, 1989, "A test of the efficiency of a given portfolio," *Econometrica*, 57, 1121-1152.

Hughen, J.C., 2000, "Essays on closed-end funds: Discounts, noise traders, and arbitrage," *Ph.D. thesis,* University of Missouri-Columbia.

Jegadeesh, N., and S. Titman, 1993, "Returns to buying winners and selling losers: Implications for stock market efficiency," *Journal of Finance*, 48, 65-91.

Jegadeesh, N., and S. Titman, 1995, "Short horizon return reversals and the bid-ask spread," *Journal of Financial Intermediation*, 4, 116-132.

Jegadeesh, N., and S. Titman, 2001, "Profitability of momentum strategies: An evaluation of alternative explanations", *Journal of Finance,* 56, 699-720.

Kim, C-S., 1994, "Investor tax-trading opportunities and discounts on closed-end mutual funds," *Journal of Financial Research*, 17, 65-75.

L'Her, J-F., T. Masmoudi, and J-M. Suret, 2004, "Evidence to support the four-factor pricing model from the Canadian stock market," *Journal of International Financial Markets, Institutions and Money*, 14, 313-328.

Lee, M.C., A. Shleifer, and R.H. Thaler, 1990, "Anomalies: Closed-end mutual funds," *Journal of Economic Perspectives*, 4, 153-164.

Lee, M.C., A. Shleifer, and R.H. Thaler, 1991, "Investment sentiment and the closed-end fund puzzle," *Journal of Finance*, 46, 76-110.

Liew, J. and M. Vassalou, 2000, "Can book-to-market, size and momentum be risk factors that predict economic growth?" *Journal of Financial Economics*, 57, 221-245.

Malkiel, B.G., 1977, "The valuation of closed-end investment company shares," *Journal of Finance*, 32, 847-859.

Malkiel, B.G., 1995, "The structure of closed-end fund discounts revisited," *Journal of Portfolio Management*, 21, 32-38.

Moskowitz, T.J. and M. Grinblatt, 1999, "Do industries explain momentum," *Journal of Finance*, 54, 1249-1290.

Neal, R. and S.M. Wheatley, 1998, "Do measures of investors' sentiment predict returns?" *Journal of Financial and Quantitative Analysis*, 33, 523-547.

Peavy, J.W., 1990, "Returns on initial public offerings of closed-end funds," *Review of Financial Studies*, 3, 695-708.

Pontiff, J., 1995, "Closed-end fund premia and returns implications for financial market equilibrium," *Journal of Financial Economics*, 37, 341-370.

Pontiff, J., 1996, "Costly arbitrage: Evidence from closed-end funds," *Quarterly Journal of Economics*, 111, 1135-1151.

Pontiff, J., 1997, "Excess volatility and closed-end funds," *American Economic Review*, 87, 155-169.

Qiu, L. and I. Welch, 2006, "Investor sentiment measures," *Working Paper*, NBER.

Ross, S., 2005, *Neoclassical finance*, Princeton University Press, Princeton, N.J.

Seyhun, H.N. and D.J. Skinner, 1994, "How do taxes affect investors' stock market realizations? Evidence from tax-return panel data," *Journal of Business*, 67, 231-262.

Shleifer, A. and R.W. Vishny, 1997, "The limits of arbitrage," *Journal of Finance*, 52, 35-55.

Swaminathan, B., 1996, "Time-varying expected small firm returns and closed-end fund discounts," *Review of Financial Studies*, 9, 845-887.

Zhang, T., J. Li, and P. Malone, 2004, "Closed-end fund discounts in Chinese stock markets," *Chinese Economy,* 37, 17-38.

Table 1: Basic Characteristics of Canadian Closed-End Domestic Equity Funds

This table reports annual and grand descriptive statistics for the basic monthly characteristics of a sample of Canadian closed-end domestic equity funds and their equity market benchmarks. These characteristics are (1) N, the number of closed-end domestic equity funds with non-missing shares outstanding at month end, (2) Monthly value-weighted average return (in %) for fund shares, for fund NAV, and for the market (all domestic common equities in the TSX), (3) Monthly equal-weighted average turnover ratio (in %) for fund shares and the market. The monthly turnover ratio is calculated as the ratio of transaction volume each month to the average of shares outstanding at the beginning and the end of the month. (4) Monthly median of size (market capitalization in $millions) for fund shares and the market. The fund sample includes 111 funds over the period July 1999 to December 2007, for total of 102 months.

Period	Statistic	N	Monthly Value-Weighted Return (%)			Monthly Equal-Weighted Turnover (%)		Monthly Median Market Capitalization ($millions)	
			Fund Shares	Fund NAV	Market	Fund Shares	Market	Fund Shares	Market
1999	Mean	7.00	1.11	0.98	3.49	2.18	5.05	44.0246	63.3119
	Std.	0.00	5.67	4.08	4.72	0.72	0.63	2.5079	1.8271
2000	Mean	8.33	0.77	0.06	0.18	2.20	5.53	48.9383	65.5839
	Std.	1.56	2.51	5.69	6.75	0.47	1.68	7.4144	3.6620
2001	Mean	13.50	1.13	-0.08	-0.89	2.70	5.28	60.6377	61.0752
	Std.	1.09	3.10	2.70	5.67	0.53	2.21	4.0062	4.2049
2002	Mean	20.08	-0.53	-0.11	-0.82	2.51	15.20	73.2926	68.7693
	Std.	3.34	1.30	1.79	3.56	0.36	7.14	3.4069	5.3781
2003	Mean	35.08	1.66	1.74	2.12	2.83	22.07	82.5937	81.7731
	Std.	5.68	1.81	2.31	2.51	0.54	14.63	8.2620	15.9100
2004	Mean	54.92	1.83	1.72	1.11	3.48	5.18	107.5382	118.6481
	Std.	6.53	3.10	3.08	2.69	0.44	1.05	6.5876	4.3954
2005	Mean	76.17	1.59	1.68	1.74	3.69	4.92	106.2975	132.1773
	Std.	3.79	4.76	4.96	3.67	0.81	0.66	4.3238	4.8392
2006	Mean	92.42	-0.05	0.07	0.94	3.54	5.16	91.8516	143.6095
	Std.	4.17	4.47	3.71	3.41	1.52	0.98	8.8000	5.9097
2007	Mean	90.58	0.22	0.06	0.55	3.56	6.19	79.5611	132.9482
	Std.	2.15	3.66	3.58	2.83	0.83	0.45	4.8855	10.5344
1999-2007	Min.	7.00	-12.01	-10.30	-11.80	1.39	3.16	38.7639	53.4149
	Max	96.00	10.56	10.23	11.78	8.01	62.87	119.6669	154.4460
	Mean	46.42	0.84	0.66	0.79	3.02	8.48	79.1439	98.3812
	Std.	33.19	3.38	3.65	4.18	0.93	8.06	21.5634	33.5782

Table 2: Summary Statistics for Monthly NAV-Weighted Discount Indices on a Sample Canadian Closed-End Domestic Equity Funds

This table reports summary statistics for various monthly discount indices (in %) on Canadian closed-end domestic equity funds in our sample. The discount index is constructed by the following procedure: monthly discount on individual funds is first computed as the ratio of difference between NAV and market price to NAV at each month end and then NAV-weighted average discount, or change in discount, across funds is calculated to form discount index. The discount indices we report are as follows: VWD_all, VWD_nored, VWD_red, and VWD_red_nofee are average discount across all sample funds, funds without annual redemption, funds with annual redemption, redeemable funds with no redemption fee, respectively. Accordingly, VWΔD_all, VWΔD_nored, VWΔD_red, and VWΔD_red_nofee are average change in discounts of corresponding fund portfolios. In calculating each discount index at each month, we exclude discounts in the first 180 days of fund's existence and require at least 5 component funds. Panel A reports univariate statistics for the indices. The statistics reported include: No.: Number of month; Avg. (Med.) Funds: The mean (median) of the month-by-month number of component funds; Mean (t(mean)): mean (its t-statistic) of the monthly discount indices; Med, Std, CV, Min, Max, Skew, Kurt, ρ_1, ρ_3, ρ_6, and ρ_{12}: median, standard deviation, coefficient of variation, minimum, maximum, skewness, kurtosis, and autocorrelation of order 1, 3, 6, and 12 for each index, respectively. Panel B presents the *Pearson* correlation matrix of discount indices. Correlation coefficient significantly different from zero at significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively. The overall fund sample includes 111 funds and spans from July 1999 to December 2007 (102 months).

Panel A: Univariate Statistics of Discount Indices

Index	No. Obs	Avg. Funds	Med. Funds	Mean	t(mean)	Med	Std.	CV	Min	Max	Skew	Kurt	ρ_1	ρ_3	ρ_6	ρ_{12}
VWD_all	102	39.69	28	13.94	15.51	10.18	9.08	0.65	0.18	35.18	1.04	-0.26	0.97	0.92	0.83	0.59
VWD_nored	88	7.44	8	17.03	21.95	14.73	7.28	0.43	8.36	37.23	0.94	-0.11	0.93	0.85	0.73	0.53
VWD_red	75	32.25	20	4.05	13.47	4.73	2.61	0.64	-7.41	6.87	-2.58	7.44	0.73	0.19	-0.21	0.09
VWD_red_nofee	65	31.19	20	4.2	22.36	4.41	1.51	0.36	-3.9	6.77	-2.51	11.81	0.52	0.01	-0.08	0.03
VWΔD_all	101	39.84	28	0.11	0.79	0.03	1.45	12.74	-4.05	4.55	0.37	1.35	0.01	-0.14	0.04	-0.12
VWΔD_nored	87	7.41	8	-0.09	-0.6	-0.01	1.44	-15.65	-3.34	3.79	0.42	0.12	-0.08	-0.13	0.07	0.03
VWΔD_red	75	32.44	20	0.2	1.03	0.04	1.68	8.45	-6.15	6.28	0.53	5.13	-0.06	0.02	-0.07	-0.04
VWΔD_red_nofee	65	31.07	20	0.06	0.31	-0.04	1.48	26.12	-6.4	5.21	-0.38	6.8	-0.17	-0.11	0.01	-0.05

Panel B: Pearson Correlation Matrix of Discount Indices

Index	VWD_all	VWD_nored	VWD_red	VWD_red_nofee	VWΔD_all	VWΔD_nored	VWΔD_red	VWΔD_red_nofee
VWD_all	1.00							
VWD_nored	0.96***	1.00						
VWD_red	-0.20*	-0.42***	1.00					
VWD_red_nofee	0.28**	-0.06	0.99***	1.00				
VWΔD_all	0.13	-0.03	0.31***	0.41***	1.00			
VWΔD_nored	-0.06	-0.05	0.23**	0.10	0.74***	1.00		
VWΔD_red	0.24**	0.20*	0.21*	0.47***	0.90***	0.27**	1.00	
VWΔD_red_nofee	0.29**	0.14	0.50***	0.48***	0.93***	0.42***	1.00***	1.00

Figure 2: The Time-Series of Discount Indices on Canadian Closed-End Funds

This figure plots the time-series of the monthly discount indices (in %) on Canadian closed-end domestic equity fund in table 2 from July 1999 to December 2007, a total of 102 months. The series plotted are NAV-weighted average discount of all sample funds (VWD_all), NAV-weighted average discount of funds without annual redemption (VWD_nored), and NAV-weighted average discount of funds with annual redemption (VWD_red). In calculating each discount index at each month, we exclude discounts in the first 180 days of fund's existence and require at least 5 component funds.

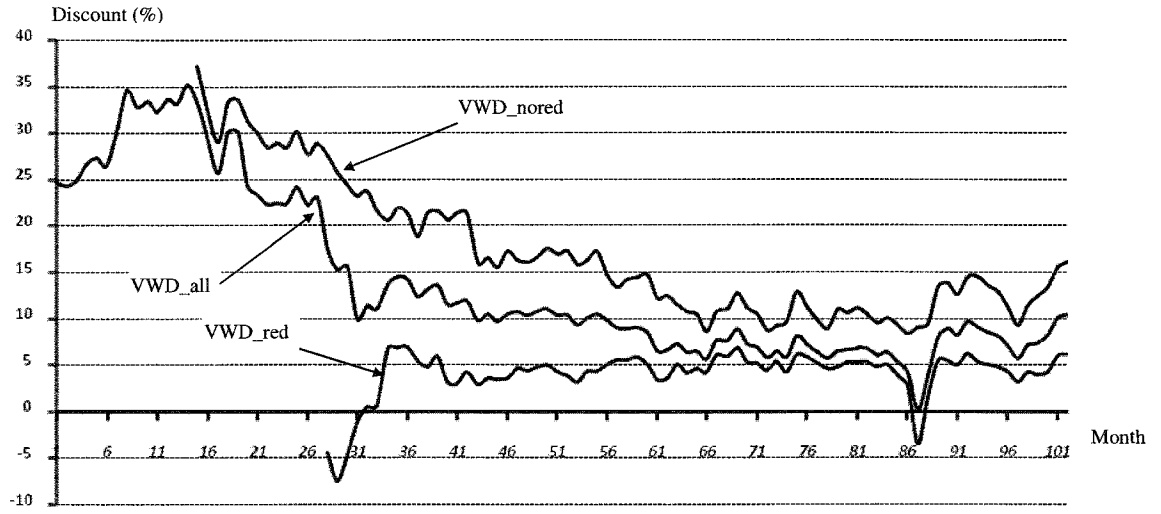

Table 3: The Number of Sample Stocks in Canadian Stock Market

The table reports the annual and grand mean and median for the month-by-month number of stocks in our initial stock sample in Canada used in calculating various firm characteristics, in constructing Fama-French three factors and momentum factor, and in subsequent empirical tests. For inclusion in our stock sample, a Canadian common stock must have both trading data in CFMRC and firm-level accounting data in Compustat North America. Investment companies, such as closed-end fund, ETF, and similar mare discarded. The sample period starts from August 1999 to December 2007, a total of 101 months. It is chosen to coincide with the time period of discount indices we construct on sample Canadian closed-end domestic equity funds.

Year	N_month	Mean	Median
1999	5	1046.8	1039
2000	12	1081.8	1081.5
2001	12	1044.7	1048
2002	12	1021.8	1022
2003	12	1026.4	1023.5
2004	12	1057.2	1058
2005	12	1108.6	1107.5
2006	12	1157.8	1158
2007	12	1109.5	1110.5
1999-2007	101	1074.5	1066

Table 4: Summary Statistics for Monthly Returns of the Mimicking Portfolios Related to Market, Size, Book-to-Market, and Momentum Factor in Canadian Stock Market

The table reports summary statistics on the monthly returns (in %) of the mimicking portfolios we form for market (MKT-R_f), size (SMB), book-to-market (HML), and momentum (UMD) factors in Canadian stock market. Market (MKT) is proxied by all domestic common equities in TSX. Risk-free return (R_f) is measured by one-month Canadian T-bill rate. Size (*ME*) is defined as the aggregate market capitalization of all classes of common equities issued by a Canadian company. Book value of common equity (*BE*) is calculated as the Compustat North America book value of stockholders' equity, plus balance-sheet deferred taxes and investment tax credit (if available), minus the book value of preferred stock. Momentum is measured by the compounding return over the prior 6 months (the most recent month is excluded). Based on these definitions, the mimicking portfolios related to SMB (Small minus Big) and HML (High minus Low) for Canada are formed along the line of Fama & French (1993) and the mimicking portfolios for UMD (Up minus Down) are developed using the methodology in French's website and in line with Carhart (1997). Panel A reports the univariate statistics on monthly returns of the four factors. Mean (t (mean)) denotes the mean (its t-statistic) for the monthly returns. ρ_1, ρ_3, and ρ_6 are the autocorrelation coefficients of order 1, 3, and 6, respectively. Panel B presents the Pearson correlation matrix of these factors and p-values in parentheses for the test of the null hypothesis of zero correlation. The sample period span from July 1999 to December 2007 and it is chosen to coincide with the time period of discount indices we construct on Canadian closed-end domestic equity funds.

Panel A: Univariate Statistics for Four Factors in Canadian Stock Market

	MKT- R_f	SMB	HML	UMD
Mean	0.49%	1.09%	0.61%	1.40%
t (mean)	1.18	2.03	1.11	2.14
Std. Deviation	4.19%	5.43%	5.57%	6.59%
Maximum	11.38%	33%	15.40%	26.00%
Minimum	-12.23%	-16.90%	-20.40%	-21.60%
ρ_1	0.14	0.25	0.31	0.03
ρ_3	-0.06	-0.03	0.14	0.14
ρ_6	0.11	-0.07	0.10	0.00

Panel B: *Pearson* Correlation Matrix for Four Factors in Canadian Stock Market

	MKT- R_f	SMB	HML	UMD
MKT- R_f	1.00			
SMB	0.26 (0.01)	1.00		
HML	-0.50 (0.00)	-0.43 (0.00)	1.00	
UMD	-0.17 (0.08)	0.16 (0.11)	0.25 (0.01)	1.00

Table 5: Relationship between CEFD and the Standard Pricing Factors in Canadian Stock Market

The table reports the relationship between our discount indices (VWΔD_all, VWΔD_nored, and VWΔD_red) and four standard pricing factors (Market, Size, Book-to-Market, and Momentum) in Canadian stock market. VWΔD_all, VWΔD_nored, and VWΔD_red are NAV-weighted average change in discount across all Canadian closed-end domestic equity funds in our sample, funds without annual redemption, and funds with annual redemption, respectively. When constructing these discount indices, we exclude discounts in the first 180 days of fund's existence and require at least 5 component funds at each month. For the four standard pricing factors in Canadian stock market, Size (SMB) and Book-to-market (HML) are constructed following Fama & French (1993) and Momentum (UMD) is extracted using the methodology in French's website and in line with Carhart (1997). Panel A reports pairwise *Pearson* correlation coefficients with *p*-values in parentheses, between CEFDs and the four factors. Panel B presents the R-square and adjusted R-square from the time-series regressions of our CEFDs on the four standard pricing factors. The sample periods are August 1999 to December 2007, October 2000 to December 2007, and October 2001 to December 2007 for VWΔD_all, VWΔD_nored, and VWΔD_red, respectively.

Panel A: Pairwise *Pearson* Correlation Matrix between CEFD and Four Factors

	MKT- R_f	SMB	HML	UMD
VWΔD_all	0.32 (0.00)	0.22 (0.03)	-0.21 (0.03)	0.04 (0.66)
VWΔD_nored	0.29 (0.00)	0.17 (0.10)	-0.28 (0.01)	0.02 (0.81)
VWΔD_red	0.21 (0.04)	-0.14 (0.17)	0.06 (0.53)	0.04 (0.67)

Panel B: Regressions of CEFD on Four Factors in Canadian Stock Market

	R-Square	Adj R-Square
VWΔD_all	0.1266	0.0902
VWΔD_nored	0.1172	0.0804
VWΔD_red	0.1109	0.0739

Table 6: Average Returns of Portfolios Formed by Sorting on the Factor Loading on CEFD in Canadian Stock Market

The table reports the average monthly returns (in %) and other key properties of quintile and decile portfolios formed by sorting on the factor loading on CEFD in Canadian stock market. The CEFD is calculated by the NAV-weighted average change in discount on Canadian closed-end domestic equity funds. We calculated CEFD using all funds in our sample and non-redeemable funds separately and report corresponding results in panel A and panel B respectively. In calculating average change in discount, we exclude discounts in the first 180 days of fund's existence and require at least 5 component funds. The portfolio construction periods in panel A and B are 2001.08-2007.12 and 2002.10-2007.12 respectively. The portfolios are formed and their properties are then calculated and reported by the following procedure: at the beginning of each month, individual Canadian common stocks are assigned into portfolios according to their CEFD beta estimated from 60 month (at least 24 month) time-series rolling regression of excess returns on five-factor model (Fama & French 3 factors plus momentum plus CEFD). Subsequently, equal-weighted or value-weighted portfolio-level return, CEFD beta, and other characteristics are calculated each month and their time-series averages are reported. We report the following properties or statistics: EW_ret: the time-series average of equal-weighted portfolio return; Avg. Size: the average of equal-weighted portfolio size; Avg. B/M: the time-series average of equal-weighted portfolio book-to-market ratio, which is calculated following Fama & French (1993). Avg. MOM: the time-series average of equal-weighted portfolio compounding return over prior 6 months (the most recent month is excluded). Avg. No.: the time-series average of the number of component securities in portfolios. High-Low: the portfolio in which stocks with highest CEFD beta are bought and stocks with lowest CEFD beta are shorted; t-Value: Newey-West adjusted t-statistics for the average return of the High-Low portfolio.

Panel A: Portfolios Sorted by the Factor Loading on Average Change in Discount on All Sample Closed-End Funds												
	Low	2	3	4	5	6	7	8	9	High	High-Low	t-Value
EW_ret	1.71	1.66	1.23	1.26	2.28						0.57	0.87
β_{CEFD}	-2.92	-0.98	-0.19	0.66	3.39							
VW_ret	0.82	1.17	1.02	1.13	0.98						0.16	0.35
β_{CEFD}	-2.26	-0.93	-0.18	0.64	2.35							
Avg. Size	949.09	1840.40	2367.35	2493.05	715.56							
Avg. B/M	1.06	1.47	1.73	1.61	1.06							
Avg. MOM	13.95	8.79	8.38	7.92	10.75							
Avg. No.	148.10	152.82	152.38	152.31	149.53							
EW_ret	2.00	1.44	1.67	1.66	1.24	1.21	1.23	1.29	1.76	2.80	0.80	0.66
β_{CEFD}	-3.99	-1.85	-1.19	-0.77	-0.37	-0.01	0.39	0.93	1.82	4.94		
VW_ret	0.40	1.01	1.43	1.03	0.84	1.18	1.19	1.00	1.13	0.58	0.18	0.24
β_{CEFD}	-3.28	-1.81	-1.19	-0.76	-0.36	-0.01	0.40	0.88	1.74	3.90		
Avg. Size	569.24	1318.70	1572.26	2107.73	2314.98	2418.56	2487.31	2498.85	1037.26	393.47		
Avg. B/M	0.97	1.14	1.35	1.59	1.80	1.67	1.44	1.78	1.08	1.04		
Avg. MOM	17.08	11.00	8.85	8.74	8.27	8.45	7.28	8.54	8.92	12.60		
Avg. No.	72.66	75.44	76.40	76.42	75.95	76.43	76.47	75.84	75.12	74.42		

Table 6. (Continued)

Panel B: Portfolios Sorted by the Factor Loading on Average Change in Discount on Non-Redeemable Closed-End Funds												
	Low	2	3	4	5	6	7	8	9	High	High-Low	t-Value
EW_ret	1.62	1.56	1.93	1.82	2.79						1.17	1.54
β_{CEFD}	-2.78	-0.88	-0.16	0.65	2.92							
VW_ret	1.30	1.32	1.65	1.38	1.26						-0.04	-0.08
β_{CEFD}	-2.00	-0.85	-0.13	0.57	2.35							
Avg. Size	740.75	2272.86	2927.88	2156.22	702.49							
Avg. B/M	0.96	0.93	1.64	1.50	1.42							
Avg. MOM	9.97	7.43	9.24	9.57	13.43							
Avg. No.	144.11	155.70	158.33	153.79	147.81							
EW_ret	1.78	1.47	1.87	1.26	2.21	1.66	1.47	2.16	2.05	3.57	1.79	1.18
β_{CEFD}	-3.86	-1.70	-1.08	-0.68	-0.32	0.01	0.37	0.92	1.78	4.06		
VW_ret	1.21	1.42	1.20	1.38	1.71	1.61	1.19	1.72	1.69	0.70	-0.51	-0.52
β_{CEFD}	-3.14	-1.63	-1.06	-0.67	-0.31	0.01	0.34	0.91	1.71	3.47		
Avg. Size	379.99	1068.47	2113.97	2427.46	2657.99	3198.02	2400.07	1917.55	926.26	478.17		
Avg. B/M	0.88	1.03	0.95	0.91	1.47	1.81	1.85	1.15	1.58	1.27		
Avg. MOM	14.68	5.65	7.13	7.69	9.02	9.42	8.73	10.36	12.40	14.38		
Avg. No.	68.17	75.94	75.75	79.95	77.87	80.46	76.73	77.06	74.17	73.63		

Table 7: Results of Monthly Fama-MacBeth Cross-Sectional Regression on Beta of CEFD and on Other Controlling Variables in Canadian Stock Market

This table summarizes results of the monthly Fama-MacBeth (1973) cross-sectional regression of excess return (in %) on CEFD beta, controlling for other variables hypothesized to explain average return, for Canadian stocks over 77 months (2001.08-2007.12). The CEFD is calculated as the NAV-weighted average change in discount on Canadian closed-end domestic equity funds. In calculating average change in discount, we exclude discounts in the first 180 days of fund's existence and require at least 5 component funds. The controlling explanatory variables in Fama-MacBeth regression include market beta, size, book-to-market, momentum, and three measures of liquidity (turnover, relative bid-ask spread as in Amihud & Mendelson (1986), and Amihud (2002)). We estimate market beta and CEFD beta for individual stocks through two approaches and report the corresponding regression results in panel A and B respectively. In the first approach, we directly estimate market beta and CEFD beta for individual stocks using 60 month (at least 24 month) rolling regression of excess returns of individual stock on five-factor model in Canada (Fama & French 3 factor plus momentum plus CEFD). In the second approach, we follow Fama & French (1992) to mitigate the error-in-variable problem inherent in estimating betas for individual stocks, namely, use portfolio beta as a beta proxy for each stock within the portfolio. The portfolio betas are estimated as follows: At the beginning of each month, Canadian stocks are assigned into 25 portfolios by ranked CEFD beta or market beta and then equal-weighted monthly returns on portfolios are calculated. Based on the full-sample post-ranking monthly return, portfolio CEFD beta or market beta are estimated using regression on the five-factor model and then are assigned to each stock in the portfolio. The definitions of explanatory variables in panel A are as follows: β_{MKT_w}: Winsorized (at the 0.5th and 99.5th percentile) market beta for individual Canadian stock; β_{CEFD_w}: Winsorized (at the 0.5th and 99.5th percentile) CEFD beta for individual Canadian stock; Size: natural logarithm of ME, where ME is month-end firm-level market value which is defined as the aggregate market value of all classes of common shares issued by the firm. B/M: natural logarithm of winsorized (at the 0.5th and 99.5th percentile) non-negative ratio of BE to ME, which is calculated along the line of Fama & French (1993); Mom: the compounding return over past six months (the most recent month is excluded); Turnover: winsorized (at the 0.5th and 99.5th percentile) value of the average of monthly turnover over the past six months. Monthly turnover is calculated as monthly trading volume scaled by the average of shares outstanding at the beginning and the end of the month; Amihud: The winsorized (at the 0.5th and 99.5th percentile) illiquidity measure of Amihud (2002). We estimate this measure each month as the average of daily $|r|/DVOL$ over the past six months. Dollar volume is calculated as daily trading volume multiplied by the average of the opening and closing price; B-A Spread: The winsorized (at the 0.5th and 99.5th percentile) value of the average of daily relative bid ask spread (%) over the past six months. We estimate daily relative bid ask spread as spread between closing ask and closing bid scaled by the midpoint of closing ask and closing bid. The values in the first row for each explanatory variable are the time series averages of coefficients obtained by the month-by-month cross-sectional regression and the second row for each explanatory variable reports corresponding Newey-West adjusted (GMM) t-statistics. Coefficient significantly different from zero at significance level of 1%, 5%, and 10% are denoted by ***, **, and *, respectively. Avg. Adj R^2 is time-series average of adjusted R-squared for cross-sectional regression and Avg. Nb. Obs is time-series average of the number of firms used in cross-sectional regression. In panel B, β_{MKT_Port} and β_{CEFD_Port} aree post-ranking portfolio betas for market and CEFD respectively and the other variables or statistics are the same as in panel A.

Panel A: With Market and CEFD betas of Individual Stocks												
Explanat. Variables	Sole Explanatory Variable					Multi Explanatory Variables						
Intercept	0.983*	2.037	1.225*	0.909	1.073*	0.982**	1.957*	1.837*	1.957*	2.048*	1.345	0.413
	(1.95)	(1.63)	(1.94)	(1.43)	(1.72)	(2.00)	(1.83)	(1.74)	(1.84)	(1.94)	(1.23)	(0.47)
β_{MKT_w}	0.090					0.102	0.027	0.064	0.029	0.051	0.061	0.005
	(0.37)					(0.36)	(0.1)	(0.25)	(0.11)	(0.21)	(0.23)	(0.02)
Size		-0.184					-0.172	-0.131	-0.176	-0.174	-0.094	0.018
		(-1.43)					(-1.46)	(-1.18)	(-1.6)	(-1.54)	(-0.86)	(0.2)
B/M			0.458*					0.402*	0.332	0.326	0.325	0.328
			(1.98)					(1.77)	(1.53)	(1.54)	(1.52)	(1.56)
Mom				0.011**					0.014***	0.014***	0.014***	0.014***
				(2.41)					(3.45)	(3.45)	(3.43)	(3.5)
Turnover										-0.022		
										(-0.56)		
Amihud											0.000	
											(1.66)	
B-A Spread												0.192**
												(2.39)
β_{CEFD_w}					-0.001	0.020	-0.004	0.024	0.045	0.043	0.032	0.042
					(-0.02)	(0.24)	(-0.05)	(0.31)	(0.59)	(0.57)	(0.42)	(0.55)
Avg. Adj. R^2	0.008	0.010	0.006	0.013	0.005	0.015	0.024	0.029	0.040	0.046	0.048	0.045
Avg. No. Obs	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42
Panel B: With Post-Ranking Portfolio Market and CEFD betas as Beta Proxy for Individual Stocks												
Explanat. Variables	Sole Explanatory Variable					Multi Explanatory Variables						
Intercept	0.983*	2.037	1.225*	0.909	1.135*	1.386**	2.358**	2.327**	2.472**	2.566**	1.763	0.985
	(1.95)	(1.63)	(1.94)	(1.43)	(1.86)	(2.45)	(2.09)	(2.09)	(2.2)	(2.3)	(1.62)	(1.13)
β_{MKT_Port}	0.090					-0.240	-0.270	-0.287	-0.351	-0.346	-0.182	-0.347
	(0.37)					(-0.49)	(-0.56)	(-0.59)	(-0.72)	(-0.72)	(-0.43)	(-0.72)
Size		-0.184					-0.178	-0.146	-0.185	-0.189	-0.112	-0.001
		(-1.43)					(-1.44)	(-1.24)	(-1.61)	(-1.56)	(-0.94)	(-0.01)
B/M			0.458*					0.360	0.308	0.302	0.298	0.307
			(1.98)					(1.59)	(1.4)	(1.41)	(1.37)	(1.43)
Mom				0.011**					0.012***	0.012***	0.012***	0.012***
				(2.41)					(3.09)	(3.12)	(3.1)	(3.15)
Turnover										-0.013		
										(-0.31)		
Amihud											0.000	
											(1.66)	
B-A Spread												0.180**
												(2.28)
β_{CEFD_Port}					0.253	0.266	0.125	0.187	0.214	0.226	0.183	0.198
					(0.74)	(0.77)	(0.42)	(0.63)	(0.73)	(0.8)	(0.63)	(0.69)
Avg. Adj. R^2	0.008	0.010	0.006	0.013	0.004	0.009	0.018	0.024	0.034	0.041	0.042	0.039
Avg. No. Obs.	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42	649.42

Table 8: Slope Coefficients on CEFD from Time-Series Regression of Returns of Canadian Size-Decile Portfolios on CEFD and Other Controlling Variables

The table summarizes the results of time-series regression of monthly value-weighted return of Canadian size-decile portfolios against CEFD and other controlling variables over 101 months (August 1999 to December 2007). For the size-decile, membership in each decile is determined by firm size at the beginning of each month and investment companies are excluded. The CEFD is calculated by the NAV-weighted average change in discount on Canadian closed-end domestic equity funds. For comparison, we construct three discount indices using all closed-end funds in our sample, non-redeemable funds, and redeemable funds respectively. In calculating average change in discount, we exclude discounts in the first 180 days of fund's existence and require at least 5 component funds. The variables in the table are defined as follows: The 2-factor model refers to excess return of value-weighted Canadian stock market index and one of the three discount indices: NAV-weighted average change in discount on all closed-end funds in the sample (VWΔD_all), on closed-end funds with annual redemption feature (VWΔD_red), and on closed-end funds without annual redemption feature (VWΔD_nored). The 5-factor model augments the 2-factor model by adding 3 factors: Size, Book-to-Market, and Momentum. For the regression results, β is the estimated regression coefficient for one of the three discount indices, *t* is the corresponding t-statistic, and Adj.R^2 is the adjusted R^2 for the regression.

Pricing Model	2-Factor Model									5-Factor Model								
	VWΔD_all			VWΔD_red			VWΔD_nored			VWΔD_all			VWΔD_red			VWΔD_nored		
Decile Portfolios	β	t	Adj. R^2	β	t	Adj. R^2	β	t	Adj. R^2	β	t	Adj. R^2	β	t	Adj. R^2	β	t	Adj. R^2
Smallest	2.68	1.37	0.08	-1.47	-1.17	0.07	3.33	1.83	0.09	2.05	1.07	0.15	-0.51	-0.41	0.15	3.06	1.73	0.17
2	0.76	1.31	0.28	-0.31	-0.83	0.27	0.27	0.50	0.26	0.17	0.46	0.70	0.16	0.65	0.70	0.05	0.15	0.70
3	-0.03	-0.07	0.42	-0.20	-0.82	0.42	-0.40	-1.15	0.43	-0.36	-1.85	0.85	0.07	0.53	0.84	-0.43	-2.36	0.85
4	0.01	0.04	0.44	0.01	0.06	0.44	-0.22	-0.73	0.44	-0.17	-0.82	0.79	0.13	0.99	0.79	-0.11	-0.57	0.79
5	0.42	1.20	0.44	-0.36	-1.62	0.45	0.13	0.39	0.43	-0.01	-0.09	0.89	0.00	-0.04	0.89	-0.08	-0.56	0.89
6	0.19	0.72	0.51	-0.12	-0.74	0.51	-0.03	-0.11	0.51	-0.02	-0.13	0.84	0.01	0.14	0.84	-0.01	-0.08	0.84
7	0.07	0.27	0.60	-0.43	-2.70	0.62	0.05	0.20	0.60	-0.18	-1.04	0.82	-0.23	-2.07	0.83	-0.05	-0.32	0.82
8	0.27	1.21	0.61	-0.14	-0.99	0.61	0.21	1.00	0.61	0.16	0.85	0.74	-0.07	-0.55	0.74	0.24	1.41	0.74
9	-0.04	-0.23	0.62	0.08	0.64	0.62	-0.23	-1.27	0.62	-0.03	-0.17	0.76	0.03	0.34	0.76	-0.07	-0.51	0.76
Largest	-0.04	-0.64	0.95	0.11	2.53	0.95	-0.07	-1.11	0.95	-0.01	-0.10	0.96	0.09	2.36	0.96	-0.07	-1.24	0.96

Table 9: Intercepts (Alphas) from Time-Series Regressions of Return of Canadian Size-Decile Portfolios on CEFD and Other Controlling Factors

The table reports the intercepts (in %) estimated from the time-series regressions of value-weighted return of Canadian size-decile portfolios on various factor models and also the results of GRS-test for these intercepts over 101 months (August 1999 to December 2007). For the size-decile, membership is determined by firm size at the beginning of each month and investment companies are excluded. The notations of various factor models are defined as follows: MKT: CAPM one-factor model; FF3: Fama-French three-factor model (MKT, SMB, and HML); FF3+MOM: Fama-French plus Momentum (four-factor model); MKT+CEFD: MKT plus CEFD (two-factor model); FF3+CEFD: Fama-French plus CEFD (four-factor model); FF3+MOM+CEFD: Fama-French plus momentum plus CEFD (five-factor model). In terms of factors, MKT is proxied by the excess return of value-weighted portfolio of all Canadian stocks. The monthly returns on SMB and HML in Canada are constructed along the line of Fama & French (1993) and the returns on MOM (or UMD) in Canada are extracted using methodology on French website. CEFDs are calculated as NAV-weighted average change in discount on all sample closed-end funds (VWΔD_all) or on non-redeemable closed-end funds (VWΔD_nored). In calculating average change in discount, we exclude fixed-income funds and discounts in the first 180 days of fund's existence and require at least 5 component funds. Panel A reports the intercepts estimated from time-series regressions, together with their Newey-West t-statistics (in parentheses), for each portfolio. Intercept significantly different from zero at significance levels of 1%, 5%, and 10% are denoted by ***, **, and *, respectively. Panel B reports the GRS-test result for the null hypothesis, 'H_0: the alphas for the Canadian size-decile portfolios are jointly zeros', for different pricing models. The *F*-statistic and the corresponding p-value are computed based on Gibbons, Ross, and Shanken (1989).

Table 9. (Continued)

Panel A: Alphas for Canadian Size-Decile Portfolios

Decile Portfolios		Without CEFD			With CEFD					
					Using all Closed-End Funds			Using Non-Redeemable Closed-End Funds		
	Avg ret	MKT	FF3	FF3+MOM	MKT+CEFD	FF3+CEFD	FF3+MOM+CEFD	MKT+CEFD	FF3+CEFD	FF3+MOM+CEFD
Smallest	5.24*	4.32*	3.05	3.48	4.16*	2.99	3.45	4.42	4.14	4.64
	(1.89)	(1.76)	(0.9)	(0.9)	(1.76)	(0.9)	(0.9)	(1.59)	(0.97)	(0.97)
2	2.52**	1.94**	0.44	0.47	1.89**	0.44	0.47	1.75*	0.44	0.38
	(2.21)	(2.12)	(0.87)	(0.92)	(2.13)	(0.86)	(0.92)	(1.97)	(0.78)	(0.66)
3	1.29	0.77	-0.46	-0.35	0.78	-0.44	-0.34	0.67	-0.48*	-0.45
	(1.66)	(1.32)	(-1.66)	(-1.36)	(1.34)	(-1.65)	(-1.35)	(1.13)	(-1.74)	(-1.66)
4	1.03	0.56	-0.55**	-0.44*	0.56	-0.54**	-0.43*	0.83	-0.30	-0.32
	(1.47)	(1.04)	(-2.03)	(-1.76)	(1.04)	(-2.00)	(-1.74)	(1.48)	(-1.41)	(-1.48)
5	1.31*	0.81	-0.10	-0.10	0.79	-0.10	-0.10	0.76	-0.07	-0.09
	(1.88)	(1.6)	(-0.55)	(-0.52)	(1.56)	(-0.54)	(-0.52)	(1.65)	(-0.38)	(-0.5)
6	0.68	0.25	-0.61***	-0.56***	0.24	-0.61***	-0.56***	0.41	-0.36*	-0.38*
	(1.23)	(0.62)	(-2.67)	(-2.66)	(0.59)	(-2.64)	(-2.64)	(1.03)	(-1.81)	(-1.76)
7	0.88	0.37	-0.23	-0.20	0.37	-0.22	-0.19	0.50	0.05	0.01
	(1.53)	(1.01)	(-0.81)	(-0.71)	(0.99)	(-0.8)	(-0.7)	(1.42)	(0.21)	(0.06)
8	0.97**	0.52*	-0.01	0.03	0.51*	-0.02	0.03	0.64**	0.16	0.13
	(2.08)	(1.92)	(-0.07)	(0.14)	(1.82)	(-0.1)	(0.13)	(2.16)	(0.83)	(0.69)
9	0.86**	0.46	-0.03	0.05	0.47	-0.02	0.05	0.57*	0.08	0.05
	(1.99)	(1.43)	(-0.11)	(0.24)	(1.45)	(-0.11)	(0.25)	(1.86)	(0.44)	(0.32)
Biggest	0.43	-0.07	0.07	0.07	-0.06	0.07	0.07	0.00	0.12	0.13
	(0.95)	(-0.8)	(0.75)	(0.66)	(-0.78)	(0.75)	(0.66)	(0.06)	(1.58)	(1.63)
1-10	4.81*	4.38*	2.98	3.41	4.22*	2.92	3.38	4.42	4.02	4.51
	(1.81)	(1.79)	(0.88)	(0.88)	(1.8)	(0.88)	(0.88)	(1.6)	(0.95)	(0.94)

Panel B: GRS Test for Canadian Size-Decile Portfolios

	FF3		FF3+VWΔD_All		FF3+VWΔD_nored		FF3+MOM		FF3+MOM+VWΔD_All		FF3+MOM+VWΔD_nored	
Null Hypothesis (H_0)	F-statistic	p-value	F-statistic	p-value	F-statistic	p-value	F-statistic	p-value	F-statistic	p-value	F-statistic	p-value
Alphas for size-decile portfolios are jointly zeros	1.690	0.094	1.687	0.096	1.844	0.068	1.571	0.129	1.571	0.129	1.877	0.062

Table 10: Lead/Lag Correlation between CEFD and Stock Returns

The table reports the lead/Lag (up to 5 leads or lags) *Pearson* correlation coefficients (with corresponding p-values in parentheses) between the monthly discount indices and the monthly return on one of two stock portfolios. The first column denotes discount indices, the variables we lead or lag. The discount indices are defined as follows: NAV-weighted average change in discount on all sample closed-end funds (VWΔD_all), on non-redeemable closed-end funds (VWΔD_nored), and on redeemable closed-end funds (VWΔD_red). The two stock portfolios are value-weighted portfolio of all Canadian stocks in TSX and size spread (smallest-biggest) portfolio and their correlations with discount indices are reported in Panel A and Panel B respectively. The sample period is the past 101 months (August 1999 to December 2007).

Panel A: TSX Market Return											
Lead/Lag Variables	-5	-4	-3	-2	-1	0	1	2	3	4	5
VWΔD_all	0.16(0.11)	0.20(0.05)	-.22(0.03)	-.12(0.24)	0.03(0.73)	0.32(0.00)	0.12(0.22)	0.17(0.08)	-.02(0.88)	0.10(0.34)	-.08(0.46)
VWΔD_nored	0.17(0.13)	0.29(0.01)	-.05(0.65)	-.16(0.14)	-.01(0.94)	0.23(0.03)	0.01(0.90)	-.02(0.86)	-.08(0.44)	0.01(0.94)	0.03(0.80)
VWΔD_red	-.12(0.34)	-.08(0.52)	-.32(0.01)	-.03(0.77)	-.10(0.39)	0.06(0.60)	0.16(0.17)	0.14(0.24)	0.09(0.46)	0.05(0.67)	-.18(0.12)
Panel B: Return of Size Spread (Smallest-Biggest) Portfolio											
Lead/Lag Variables	-5	-4	-3	-2	-1	0	1	2	3	4	5
VWΔD_all	-.04(0.68)	0.01(0.94)	-.08(0.44)	-.17(0.10)	0.16(0.11)	0.17(0.08)	0.14(0.17)	0.08(0.43)	-.00(0.97)	0.01(0.91)	-.03(0.81)
VWΔD_nored	-.02(0.85)	-.05(0.67)	-.12(0.26)	-.14(0.22)	0.16(0.13)	0.09(0.41)	0.07(0.49)	0.09(0.43)	0.08(0.47)	0.15(0.17)	0.02(0.87)
VWΔD_red	-.04(0.72)	0.01(0.92)	-.06(0.60)	-.10(0.40)	0.16(0.18)	0.02(0.86)	0.02(0.85)	0.09(0.45)	0.00(0.98)	0.10(0.40)	-.23(0.04)
			(sentiment predicts return)					**(return predicts sentiment)**			

Table 11: Intercepts (Alphas) from Time-Series Regressions of Return of Individual Canadian Closed-End Funds on CEFD and Other Controlling Factors

The table summarizes the intercepts (in %) estimated from the time-series regressions of the excess return of individual sample Canadian closed-end funds on various factor models over 101 months (August 1999 to December 2007). The notations of various factor models are defined as follows: MKT: CAPM one-factor model; FF3: Fama-French three-factor model (MKT, SMB, and HML); FF3+MOM: Fama-French plus Momentum (UMD) four-factor model; MKT+CEFD: MKT plus CEFD two-factor model; FF3+CEFD: Fama-French plus CEFD four-factor model; FF3+MOM+CEFD: Fama-French plus momentum plus CEFD five-factor model. CEFDs are calculated by NAV-weighted average change in discount on all sample closed-end funds (VWΔD_all), on non-redeemable closed-end funds (VWΔD_nored), or redeemable funds (VWΔD_red). For regressions of individual funds, we report result for three fund groups separately: individual funds in our grand sample (All), individual non-redeemable funds (Nored-redeemable), and individual redeemable funds with no redemption fee (Redeemable (no fee)). For each fund group, we report the following statistics: the average, the median, and the standard deviation of alphas estimated (avg., median, and std respectively); the percentage of significant alphas at 10%, 5%, and 1% respectively. In time-series regression for individual funds, we require fund to have more than 50 observations.

CEFs		Pricing Models							
				VWΔD_all		VWΔD_nored		VWΔD_red	
	Alpha	MKT	FF3+MOM	MKT+CEFD	FF3+MOM+CEFD	MKT+CEFD	FF3+MOM+CEFD	MKT+CEFD	FF3+MOM+CEFD
All (37 Funds)	avg.	0.37	0.13	0.36	0.14	0.36	0.13	0.29	0.11
	median	0.32	0.10	0.26	0.11	0.29	0.08	0.17	0.09
	std	0.76	0.48	0.77	0.45	0.81	0.48	0.75	0.47
	% sig. (10%)	27.03	10.81	29.73	10.81	32.43	8.11	18.92	8.11
	% sig. (5%)	18.92	0.00	18.92	5.41	18.92	2.70	16.22	2.70
	% sig. (1%)	2.70	0.00	5.41	0.00	13.51	0.00	5.41	0.00
Non-redeemable (9 Funds)	avg.	0.66	0.35	0.64	0.36	0.79	0.45	0.54	0.40
	Median	0.82	0.29	0.85	0.30	0.90	0.36	0.74	0.33
	std	0.73	0.55	0.78	0.52	0.88	0.66	0.68	0.57
	% sig. (10%)	55.56	22.22	55.56	22.22	55.56	22.22	44.44	22.22
	% sig. (5%)	44.44	11.11	55.56	11.11	55.56	22.22	44.44	0.00
	% sig. (1%)	11.11	11.11	11.11	11.11	44.44	11.11	11.11	0.00
Redeemable (no fee) (24 Funds)	avg.	0.19	0.02	0.17	0.03	0.17	0.04	0.21	0.04
	Median	0.1	0.02	0.03	0.03	0.07	0.05	0.07	0.08
	std	0.75	0.49	0.73	0.46	0.76	0.46	0.71	0.44
	% sig. (10%)	8.33	4.17	12.5	4.17	20.83	4.17	4.17	4.17
	% sig. (5%)	4.17	0.00	4.17	4.17	4.17	0.00	4.17	4.17
	% sig. (1%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 12: Results of Monthly Fama-MacBeth Cross-Sectional Regression on Factor Loadings on Various Risk Factors

This table summarizes results of the monthly Fama-MacBeth (1973) regression of excess return (in %) on factor loading on CEFD, controlling for other variables hypothesized to explain average return, for Canadian stocks over 77 months (2001.08-2007.12). The CEFD is calculated as the NAV-weighted average change in discount on Canadian closed-end domestic equity funds. The controlling explanatory variables in regression include factor loading on market, SMB, HML, and UMD, and three measures of liquidity (turnover, relative bid-ask spread, and Amihud (2002)). The factor loadings for individual stocks are proxied by the factor loading of post-ranking portfolios. The portfolio betas are estimated as follows: At the beginning of each month, Canadian stocks are assigned into 25 portfolios by ranked factor loadings and then equal-weighted monthly returns on portfolios are calculated. Based on the full-sample post-ranking monthly return, portfolio factor loading are estimated using regression on the five-factor model and then are assigned to each stock in the portfolio. The definitions of explanatory variables are as follows: β_{MKT_w}: Winsorized market beta; β_{SMB_w}: Winsorized SMB beta; β_{HML_w}: Winsorized HML beta; β_{UMD_w}: Winsorized UMD beta; β_{CEFD_w}: Winsorized CEFD beta; Turnover: winsorized value of the average of monthly turnover over the past six months; Amihud: winsorized illiquidity measure of Amihud (2002); B-A Spread: The winsorized value of the average of daily relative bid ask spread (%) over the past six months. The values in the first row for each explanatory variable are the time series averages of coefficients obtained by the month-by-month cross-sectional regression and the second row for each explanatory variable reports corresponding Newey-West adjusted t-statistics. Coefficient significantly different from zero at significance level of 1%, 5%, and 10% are denoted by ***, **, and *, respectively. Avg. Adj R^2 is time-series average of adjusted R-squared for cross-sectional regression. Avg. AIC, BIC, SBC are time-series average of the three information criteria respectively.

FM Test with Betas of Posting Ranking Portfolios as Proxies for Individual Stocks' Betas															
Expla.	Sole Explanatory Variable								Multi Explanatory Variables						
Intercept	0.956*	0.785*	1.120*	1.434*	1.507*	1.073*	0.541	1.216*	0.963*	0.650	0.673	0.875*	1.055*	0.886*	0.637
	(1.87)	(1.83)	(1.75)	(2.39)	(2.25)	(1.72)	(1.13)	(1.92)	(1.93)	(1.33)	(1.38)	(1.93)	(2.05)	(1.93)	(1.47)
β_{MKT_w}	0.252								0.249	0.147	0.060	0.047	0.097	0.046	-0.032
	(0.59)								(0.58)	(0.4)	(0.16)	(0.12)	(0.26)	(0.12)	(-0.09)
β_{SMB_w}		0.686								0.679	0.652	0.694	0.693	0.503	0.212
		(1.12)								(1.21)	(1.15)	(1.23)	(1.23)	(0.91)	(0.46)
β_{HML_w}			0.643								0.565	0.573	0.520	0.511	0.518
			(1.43)								(1.19)	(1.23)	(1.18)	(1.13)	(1.17)
β_{UMD_w}				1.717*								1.669	1.428	1.769*	1.799*
				(1.69)								(1.65)	(1.46)	(1.74)	(1.80)
Turnover					-0.064								-0.057		
					(-1.37)								(-1.33)		
Amihud						0.000*								0.000*	
						(2.01)								(1.93)	
B-A Spread							0.194*								0.196*
							(2.08)								(2.27)
β_{CEFD_w}								-0.012	-0.010	-0.134	-0.107	-0.096	-0.100	-0.142	-0.264
								(-0.03)	(-0.03)	(-0.47)	(-0.37)	(-0.33)	(-0.34)	(-0.50)	(-0.94)
Avg. Adj R^2	0.004	0.010	0.005	0.002	0.008	0.009	0.015	0.004	0.007	0.015	0.020	0.022	0.029	0.031	0.035
Avg. AIC	4148.82	4144.4	4148.1	4149.9	4145.7	4144.8	4140.5	4148.9	4147.1	4142.3	4139.6	4138.9	4135.0	4133.3	4130.0
Avg. BIC	4150.84	4146.4	4150.1	4152.0	4147.7	4146.8	4142.5	4150.9	4149.1	4144.4	4141.6	4141.0	4137.1	4135.5	4132.2
Avg. SBC	4158.05	4153.6	4157.3	4159.2	4154.9	4154.0	4149.7	4158.1	4160.9	4160.8	4162.6	4166.6	4167.2	4165.6	4162.3
Avg. No obs	745.94	745.94	745.94	745.94	745.94	745.94	745.94	745.94	745.94	745.94	745.94	745.94	745.94	745.94	745.94

Table 13: Intercepts (Alphas) from Time-Series Regressions of Return of Canadian Turnover-Decile Portfolios on CEFD and Other Controlling Factors

The table reports the intercepts (in %) estimated from the time-series regressions of excess return of Canadian value-weighted turnover-decile portfolios on various factor models over 101 months (August 1999 to December 2007). For the turnover-decile, membership is determined by the average of monthly turnover over the past six months at the beginning of each month and investment companies are excluded. The notations of various factor models are defined as follows: MKT: CAPM one-factor model; FF3: Fama-French three-factor model (MKT, SMB, and HML); FF3+Mom: Fama-French plus Momentum (UMD) four-factor model; MKT+CEFD: MKT plus CEFD two-factor model; FF3+CEFD:Fama-French plus CEFD four-factor model; FF3+MOM+CEFD: Fama-French plus momentum plus CEFD five-factor model. CEFD is calculated as NAV-weighted average change in discount on all sample closed-end funds (VWΔD_all) or on non-redeemable closed-end funds (VWΔD_nored). In calculating average change in discount, we exclude fixed-income funds and discounts in the first 180 days of fund's existence and require at least 5 component funds. For each decile portfolio, we report the intercepts estimated from time-series regressions, together with their Newey-West t-statistics (in parentheses). Intercept significantly different from zero at significance level of 1%, 5%, and 10% are denoted by ***, **, and *, respectively.

Decile Portfolios	Without CEFD				With CEFD					
					Using all Closed-End Funds			Using non-redeemable Closed-End Funds		
	Avg ret	MKT	FF3	FF3+MOM	MKT+CEFD	FF3+CEFD	FF3+MOM+CEFD	MKT+CEFD	FF3+CEFD	FF3+MOM+CEFD
Smallest	0.22	-0.24	-0.18	-0.04	-0.23	-0.18	-0.04	0.00	-0.11	0.01
	(0.33)	(-0.44)	(-0.34)	(-0.08)	(-0.43)	(-0.34)	(-0.08)	(0.00)	(-0.22)	(0.03)
2	1.06**	0.73*	0.76*	0.86**	0.74*	0.75*	0.85**	0.59*	0.61	0.59
	(2.20)	(1.91)	(1.94)	(2.25)	(1.95)	(1.96)	(2.27)	(1.71)	(1.6)	(1.58)
3	0.59*	0.38	0.09	0.10	0.37	0.08	0.10	0.32	-0.01	-0.04
	(1.90)	(1.25)	(0.33)	(0.36)	(1.18)	(0.30)	(0.35)	(1.17)	(-0.04)	(-0.17)
4	0.77	0.46	0.23	0.28	0.44	0.22	0.27	0.35	0.14	0.10
	(1.60)	(1.13)	(0.60)	(0.69)	(1.09)	(0.56)	(0.68)	(1.06)	(0.4)	(0.31)
5	0.92**	0.68**	0.35	0.34	0.67**	0.34	0.34	0.70***	0.26	0.20
	(2.51)	(2.50)	(1.51)	(1.36)	(2.46)	(1.48)	(1.36)	(2.73)	(1.06)	(0.86)
6	0.93**	0.67*	0.33	0.29	0.67*	0.33	0.29	0.55*	0.21	0.08
	(2.19)	(1.83)	(0.94)	(0.73)	(1.83)	(0.94)	(0.73)	(1.69)	(0.6)	(0.26)
7	1.22*	0.72*	0.69	0.64	0.73*	0.70	0.64	0.47*	0.29	0.30
	(1.75)	(1.70)	(1.58)	(1.64)	(1.69)	(1.56)	(1.61)	(1.87)	(1.17)	(1.17)
8	0.95*	0.46	0.51*	0.57*	0.45	0.51*	0.56*	0.27	0.21	0.22
	(1.82)	(1.57)	(1.77)	(1.79)	(1.54)	(1.76)	(1.81)	(1.62)	(1.02)	(1.06)
9	0.16	-0.52	-0.50	-0.55	-0.50	-0.49	-0.54	-0.20	-0.07	-0.11
	(0.22)	(-1.27)	(-1.24)	(-1.26)	(-1.23)	(-1.21)	(-1.27)	(-0.68)	(-0.23)	(-0.38)
Biggest	0.36	-0.27	-0.57	-0.56	-0.30	-0.58	-0.57	0.14	0.00	-0.02
	(0.60)	(-0.57)	(-1.12)	(-1.14)	(-0.59)	(-1.11)	(-1.12)	(0.34)	(0.01)	(-0.05)

Table 14: GRS Test of Canadian Book-to-Market-Decile, Momentum-Decile, and Industry Portfolios

The table reports the results of GRS-test for the null hypothesis, 'H_0: the alphas for the testing assets are jointly zeros', for different pricing models and for different sets of testing assets. The *F*-statistic and the corresponding p-value are computed based on Gibbons, Ross, and Shanken (1989). We run GRS test for 10 book-to-market portfolios, 10 momentum portfolios, and 10 industry portfolios separately and report the corresponding results in panel A, panel B, and panel C respectively. The notations of various pricing models are defined as follows: FF3: Fama-French three-factor model (MKT, SMB, and HML); FF3+UMD: Fama-French plus Momentum four-factor model; FF3+VWΔD_All: Fama-French plus CEFD four-factor model in which CEFD are calculated as NAV-weighted average change in discount on all sample closed-end funds; FF3+VWΔD_nored: Fama-French plus CEFD four-factor model in which CEFD are calculated as NAV-weighted average change in discount on all sample non-redeemable closed-end funds; FF3+UMD+VWΔD_All: Fama-French plus momentum plus CEFD five-factor model in which CEFD are calculated as NAV-weighted average change in discount on all sample closed-end funds; FF3+UMD+VWΔD_nored: Fama-French plus momentum plus CEFD five-factor model in which CEFD are calculated as NAV-weighted average change in discount on all sample non-redeemable closed-end funds.

Panel A: GRS Test for 10 B/M Portfolios												
Null Hypothesis (H_0)	FF3		FF3+VWΔD_All		FF3+VWΔD_nored		FF3 +UMD		FF3+UMD+VWΔD_All		FF3+UMD+VWΔD_nored	
	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value
Alphas for portfolios are jointly zero	1.239	0.278	1.241	0.277	1.465	0.170	1.195	0.306	1.196	0.305	1.339	0.226
Panel B: GRS Test for 10 Momentum Portfolios												
Null Hypothesis (H_0)	FF3		FF3+VWΔD_All		FF3+VWΔD_nored		FF3 +UMD		FF3+UMD+VWΔD_All		FF3+UMD+VWΔD_nored	
	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value
Alphas for portfolios are jointly zero	1.952	0.049	1.923	0.053	1.117	0.361	2.018	0.041	1.997	0.043	1.163	0.330
Panel C: GRS Test for 10 Industry Portfolios												
Null Hypothesis (H_0)	FF3		FF3+VWΔD_All		FF3+VWΔD_nored		FF3 +UMD		FF3+UMD+VWΔD_All		FF3+UMD+VWΔD_nored	
	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value	F-statistic	ρ-value
Alphas for portfolios are jointly zero	1.778	0.076	1.782	0.076	1.734	0.089	1.838	0.065	1.836	0.066	1.605	0.122

Appendix 1: Listing and Simple Statistics for Sample Canadian Closed-End Domestic Equity Funds

This appendix reports basic information on closed-end funds in the sample and simple statistics for the monthly discount (%) on these funds. Ticker (with usage) and Name are the most recent ticker and name while the funds were still listed in TSX. Activation is the activation date for each fund. FO is the month of the first available data for the fund. Redemption is a descriptive variable indicating the information on the redemption feature ("Y" denotes that the fund has annual redemption since its inception. "N" denotes that there is no inherent redemption for the fund since its inception. "N/Y" denotes that the fund has no redemption at inception and changes the redemption feature after its first observation in the sample). No is the number of non-missing monthly discounts for each fund. Mean, Median, and Stdev. are the mean, median and standard deviation of monthly discount for each fund. The discount (%) is estimated as the ratio of the difference between NAV and the fund share price to NAV. The sample includes 111 funds over the period from July 1999 to December 2007, totally 102 months.

Ticker	Name	Activation	FO	Redemption	No	Mean	Median	Stdev.
BBB.UN0	SAGE INCOME FUND TRUST UNITS	1997-10-28	1999-7	N	69	5.00	4.90	3.24
CGI0	CANADIAN GENERAL INVESTMENTS LTD.	1930-01-15	1999-7	N	102	23.47	26.24	9.05
CTD.UN0	CITADEL DIVERSIFIED INVESTMT TRUST	1997-09-16	2003-1	N	60	7.79	7.11	4.82
CHF.UN1	CITADEL HYTES FUND	2001-04-11	2003-1	N	60	5.54	4.74	3.70
EIT.UN0	ENERVEST DIVERSIFIED INCOME TRUST	1997-08-05	2006-12	N	13	14.22	13.90	3.40
EVT0	ECONOMIC INVESTMENT TRUST CAPTIAL SHARE	1975-01-02	1999-7	N	102	31.92	33.24	7.04
SDT.UN0	SENTRY SELECT DIVERSIFIED INCOME TRUST	1997-02-27	2000-11	N	86	5.48	4.69	4.83
SKG.UN0	SKYLON GROWTH & INCOME TRUST TRANSFER UNITS	2004-02-18	2004-6	N	43	6.82	7.14	2.58
SRC.UN0	CITADEL SERIES S-1 INCOME FUND	2003-06-12	2003-6	N	55	4.31	4.52	4.38
THD0	THIRD CDN. GENERAL INVESTMENT TRUST LTD.	1928-02-03	2000-10	N	87	18.40	17.97	5.64
MID.UN0	MINT INCOME FUND TRUST UNITS	1997-03-13	1999-7	N/Y (Annual redemption at 100% NAV introduced on 2004-05-25)	102	5.05	4.67	3.65
TRF.UN0	FIRST ASSET ENERGY & RESOURCE FUND L.P. UNITS	1996-10-29	2000-9	N/Y (From 2002 Feb to 2006 Oct, monthly redemption with 2% fee. Annual redemption with 2% fee reintroduced on 2007-07-30)	88	12.79	7.33	10.14

Ticker	Name	Activation	FO	Redemption	No	Mean	Median	Stdev.
TXL.UN0	FIRST ASSET ENERGY&RESOURCE INCM&GROWTH LP UN	1997-12-22	2001-3	N/Y (Introduce monthly redemption with 2% fee at 2002-01-23 and remove the redemption feature at 2006-10-01)	64	9.48	6.00	9.74
ADC1	AIC DIVERSIFIED CANADA CAPITAL	1999-06-30	1999-7	Y (Redeem monthly with fee as 5% NAV)	102	15.75	16.43	5.68
HIT.UN0	YIELD MANAGEMENT GROUP HIGH INC TRUST UNITS	1997-11-13	1999-7	Y (Redeem quarterly with fee as 6.75% NAV and then declining by 0.75% each year)	36	8.25	8.93	3.16
SEF.UN0	STRATEGIC ENERGY FUND TRUST UNITS	2002-05-08	2005-7	Y (Redeem annually with fee as 5% NAV and only allow to redeem up to 2.5% of outstanding units)	30	10.04	9.73	5.62
SFG.UN0	SENTRY SELECT FOCUSED GRO & INCM TR TRNSFR UN	2002-01-24	2002-2	Y (Redeem annually with fee as 4% NAV)	71	6.16	6.85	3.34
SFO.UN0	SENTRY SELECT 40 SPLIT INCOME TR CAPITAL UN	2007-01-05	2007-2	Y (Redeem as 100% NAV after two year period and then convert to open-end fund)	11	6.33	4.34	6.28
TSF.UN0	SENTRY SELECT TOTAL STRATEGY FUND TRNSFR UN	2006-08-25	2006-10	Y (Redeem annually at 100% NAV but starts in Feb 2008)	15	7.31	7.75	2.72
UST.UN0	UTILITY SPLIT TRUST CAPITAL UNITS	2006-11-16	2006-11	Y (Redeem annually at 100% NAV but starts in 2008)	14	7.31	8.52	6.06
AAI.UN1	ACUITY ALL CAP & INCOME	2004-05-17	2004-5	Y (Redeem annually at 100% NAV)	44	3.85	4.68	3.40
ABK.A0	ALLBANC SPLIT CORP. CAPTIAL SHARE	1998-02-25	2006-2	Y (Redeem annually at 100% NAV)	23	1.98	2.36	1.65
AEU.UN0	ACTIVENERGY INCOME FUND UNITS	2004-11-16	2004-11	Y (Redeem annually at 100% NAV)	38	3.42	3.76	3.47
AFU.UN0	ACUITY FOCUSED TOTAL RETURN TRUST UNITS	2005-01-28	2005-2	Y (Redeem annually at 100% NAV)	35	2.84	4.40	4.15
AFZ.UN0	ALBERTA FOCUSED INCOME & GROWTH FUND UNITS	2006-03-30	2006-4	Y (Redeem annually at 100% NAV)	19	0.95	4.35	5.91
AIG.UN0	ACUITY GROWTH & INCOME TRUST UNITS	2003-12-17	2003-12	Y (Redeem annually at 100% NAV)	49	4.01	4.09	2.56
ALB0	ALLBANC SPLIT CORP. 2 CAPTIAL SHARE	2006-02-09	2006-2	Y (Redeem annually at 100% NAV)	23	0.86	0.90	1.52
AOG.UN0	BROMPTON ADVANTAGED OIL & GAS INCOME FUND	2005-03-17	2005-3	Y (Redeem annually at 100% NAV)	34	0.72	2.42	4.80
ASI.UN0	ALLIANCE SPLIT INCOME TRUST CAPITAL UNITS	2004-04-15	2004-5	Y (Redeem annually at 100% NAV)	44	9.98	10.07	3.40
BAE.UN0	BG ADVANTAGED EQUAL WEIGHTED INCOME FUND UNIT	2003-10-15	2003-10	Y (Redeem annually at 100% NAV)	37	1.90	2.23	3.19
BAI.UN0	BG ADVANTAGED S&P/TSX INCOME TRUST INDEX UNIT	2003-05-14	2003-5	Y (Redeem annually at 100% NAV)	42	1.95	2.63	3.53

Ticker	Name	Activation	FO	Redemption	No	Mean	Median	Stdev.
BDA.UN0	FIRST AST/BLACKROCK NTH AMERICAN DIV ACHVR UN	2005-11-30	2005-11	Y (Redeem annually at 100% NAV)	26	3.47	3.96	3.83
BDS.UN0	BG INCOME + GROWTH SPLIT TRUST CAPITAL UNITS	2004-04-16	2004-4	Y (Redeem annually at 100% NAV)	31	8.19	9.32	4.84
BGU.UN0	MAVRIX BALANCED INCOME & GROWTH TR TRANSFR UN	2004-11-26	2004-11	Y (Redeem annually at 100% NAV)	23	4.40	5.11	3.84
BIG.A0	BIG 8 SPLIT INC. CL 'A' CAPITAL SHARES	2003-09-02	2004-4	Y (Redeem annually at 100% NAV)	45	1.44	1.28	1.57
BMT0	BMONT SPLIT CORP. CAPITAL SHARE	2004-05-08	2006-2	Y (Redeem annually at 100% NAV)	23	1.97	2.01	1.50
BSC0	BNS SPLIT CORP. 2 CAPITAL SHARE	2005-09-22	2006-2	Y (Redeem annually at 100% NAV)	23	0.88	0.73	1.39
BSI.UN0	BRASCAN SOUNDVEST DIVERS INCME FUND TRANSF UN	2003-11-19	2003-12	Y (Redeem annually at 100% NAV)	37	1.79	3.38	5.06
BSR.UN0	BROMPTON STABLE INCOME FUND	2002-12-09	2002-12	Y (Redeem annually at 100% NAV)	61	2.89	4.02	4.05
BST.UN0	BRASCAN SOUNDVEST TOTAL RETURN FUND TRNSFR UN	2004-10-15	2004-10	Y (Redeem annually at 100% NAV)	34	4.59	5.11	3.93
BTH.UN0	BG TOP 100 EQUAL WEIGHTED INCM FND TRANSFR UN	2004-11-17	2004-11	Y (Redeem annually at 100% NAV)	24	2.30	3.11	3.51
BXN0	B SPLIT 2 CORP. CAPTIAL SHARE	2000-05-01	2006-2	Y (Redeem annually at 100% NAV)	23	2.73	3.28	2.27
CBT.UN0	CRITERION BUSINESS TRUST TA FUND TRANSFR UNIT	2004-12-23	2004-12	Y (Redeem annually at 100% NAV)	27	3.78	3.39	3.83
CDW.UN0	CANADIAN WIRELESS TRUST	2006-10-19	2006-10	Y (Redeem annually at 100% NAV)	15	4.77	5.24	3.21
CIT.UN0	SCITI TRUST 2	2003-10-29	2006-2	Y (Redeem annually at 100% NAV)	23	4.36	4.82	2.20
CMZ.UN0	COMPASS INCOME FUND UNITS	2002-03-27	2002-4	Y (Redeem annually at 100% NAV)	69	2.64	3.34	3.04
CNM.UN0	CANADIAN INCOME MANAGEMENT TRUST UNITS	2006-03-30	2006-3	Y (Redeem annually at 100% NAV)	21	4.19	9.93	28.34
COI.UN0	COMMERCIAL & INDUSTRIAL SEC INCM TR TRNSFR UN	2002-06-25	2002-6	Y (Redeem annually at 100% NAV)	67	3.43	3.80	3.59
CPF.UN0	CITADEL PREMIUM INCOME	2006-07-20	2006-8	Y (Redeem annually at 100% NAV)	17	5.29	5.33	1.65
CSR.UN1	CITADEL STABLE S-1 INCOME FUND	2005-02-15	2005-2	Y (Redeem annually at 100% NAV)	35	0.32	4.63	19.10
DIF.UN1	CLARINGTON DIVERSIFIED INCM+GROW FND TRNSF	2004-11-01	2004-11	Y (Redeem annually at 100% NAV)	38	3.08	3.91	3.85
DTF.UN0	DIVERSITRUST INCOME FUND TRUST UNITS	2002-11-28	2002-11	Y (Redeem annually at 100% NAV)	62	3.74	4.25	2.73
DTN.UN0	DIVERSITRUST ENERGY INCOME FND TR TRANSFER UN	2004-12-17	2004-12	Y (Redeem annually at 100% NAV)	37	2.78	2.91	4.06
DTP.UN0	DIVERSITRUST INCOME+ FUND TRANSFER TR UNITS	2004-02-18	2004-2	Y (Redeem annually at 100% NAV)	47	3.79	4.25	2.97

Ticker	Name	Activation	FO	Redemption	No	Mean	Median	Stdev.
DTS.UN0	DIVERSITRUST STABLE INCOME FUND TRANSFR UNITS	2003-09-26	2003-9	Y (Redeem annually at 100% NAV)	52	4.14	4.56	2.58
DTT.UN0	DIVERSIFIED INCOME TRUST 2 UNITS	2002-10-30	2002-11	Y (Redeem annually at 100% NAV)	62	3.25	3.44	3.63
DYI.UN0	DIVERSIYIELD INCOME FUND TRANSFER TRUST UNITS	2005-07-19	2005-7	Y (Redeem annually at 100% NAV)	30	4.00	4.66	3.09
ES1	ENERGY SPLIT CORP. INC. CAPITAL SHARE	2003-09-18	2006-2	Y (Redeem annually at 100% NAV)	23	-13.09	-11.80	17.29
ESF.UN0	MIDDLEFIELD EQUAL SECTOR INCM FUND TRNSFR UN	2005-10-18	2005-10	Y (Redeem annually at 100% NAV)	27	4.23	4.69	2.57
EWI.UN0	BROMPTON EQUAL WEIGHT INCOME FUND	2003-07-16	2003-7	Y (Redeem annually at 100% NAV)	54	3.80	3.83	2.61
EWP.UN0	FIRST ASSET PIPES & POWER INCM FUND TRNSFR UN	2005-02-15	2005-2	Y (Redeem annually at 100% NAV)	35	2.14	3.02	3.52
FAF.UN0	FIRST ASSET OPPORTUNITY FUND TRUST UNITS	1999-07-12	1999-7	Y (Redeem annually at 100% NAV)	101	0.40	3.15	10.29
FBS.A0	5BANC SPLIT INC. CL 'A' CAPITAL SHARES	2001-12-19	2004-5	Y (Redeem annually at 100% NAV)	31	2.01	1.99	1.84
FBS.B0	5BANC SPLIT INC. CL 'B' CAPITAL SHARES	2006-11-28	2006-12	Y (Redeem annually at 100% NAV)	13	1.86	2.59	3.62
FCF.UN0	FAIRCOURT SPLIT FIVE TRUST UNITS	2003-08-15	2003-8	Y (Redeem annually at 100% NAV)	42	5.31	6.09	4.87
FCI.UN0	FAIRCOURT INCOME SPLIT TRUST UNITS	2003-02-28	2003-2	Y (Redeem annually at 100% NAV)	48	4.56	5.93	5.02
FCN.UN0	FAIRCOURT SPLIT SEVEN TRUST UNITS	2004-03-16	2004-3	Y (Redeem annually at 100% NAV)	35	5.68	6.83	4.88
FCS.UN0	FAIRCOURT SPLIT TRUST UNITS	2006-03-16	2006-3	Y (Redeem annually at 100% NAV)	22	7.05	7.87	5.26
FIF.UN0	FOCUSED 40 INCOME FUND TRANSFERABLE UNITS	2005-03-16	2005-3	Y (Redeem annually at 100% NAV)	34	4.81	5.91	5.02
FIG.UN0	FAIRCOURT INCOME & GROWTH SPLIT TRUST UNITS	2004-11-17	2004-11	Y (Redeem annually at 100% NAV)	38	6.37	7.37	4.70
FPF.UN0	FRONT STREET PERFORMANCE FUND 2 TRNSFR UN	2004-09-28	2004-10	Y (Redeem annually at 100% NAV)	39	4.61	4.72	3.08
FSP.UN0	FRONT STREET PERFORMANCE FUND TRANSFER UNITS	2002-05-14	2002-6	Y (Redeem annually at 100% NAV)	51	3.65	3.56	3.65
IDT.UN0	INDEXPLUS 2 INCOME FUND TRANSFERABLE UNITS	2003-10-30	2003-12	Y (Redeem annually at 100% NAV)	29	1.96	2.40	2.56
IDX.UN0	INDEXPLUS INCOME FUND UNITS	2003-07-29	2003-9	Y (Redeem annually at 100% NAV)	52	3.55	4.24	2.57
LBS0	LIFE & BANC SPLIT CORPORATION-A CAPITAL	2006-10-17	2006-10	Y (Redeem annually at 100% NAV)	15	6.42	7.99	4.09
MMP.UN0	PRECIOUS METALS AND MINING TRUST TRANSFER UN	2006-05-29	2006-7	Y (Redeem annually at 100% NAV)	18	2.83	4.46	7.57
MTZ.UN0	MATRIX INCOME FUND UNITS	2005-01-28	2005-2	Y (Redeem annually at 100% NAV)	28	2.91	3.37	3.66
MXT.UN1	MSP MAXXUM TRUST TRANSFERABLE UNITS	2004-12-17	2004-12	Y (Redeem annually at 100% NAV)	37	3.14	3.24	2.69

Ticker	Name	Activation	FO	Redemption	No	Mean	Median	Stdev.
MXZ.UN0	MAXIN INCOME FUND TRANSFERABLE UNITS	2003-03-28	2003-4	Y (Redeem annually at 100% NAV)	54	3.56	3.72	2.27
NBF0	NB SPLIT CORP. CLASS 'A' CAPITAL	2007-01-30	2007-2	Y (Redeem annually at 100% NAV)	9	-3.08	-4.46	7.82
NEW.A0	NEWGROWTH CORP. CAPITAL SHARE	1998-04-03	2006-2	Y (Redeem annually at 100% NAV)	23	1.25	1.23	0.83
OGF.UN0	BROMPTON EQUAL WEIGHT OIL & GAS INCOME FUND	2004-10-07	2004-10	Y (Redeem annually at 100% NAV)	39	1.49	1.90	4.13
OSF.UN0	OIL SANDS SECTOR FUND TRANSFERABLE UNITS	2006-03-15	2006-3	Y (Redeem annually at 100% NAV)	22	4.77	5.19	3.21
OSM.UN0	OIL SANDS & ENERGY MEGA-PROJECTS TR TRNSFR UN	2006-03-29	2006-5	Y (Redeem annually at 100% NAV)	20	6.46	6.64	3.47
OST.UN0	SENTRYSELECT OIL SANDS SPLIT TRUST CAPITAL SH	2003-07-03	2003-7	Y (Redeem annually at 100% NAV)	54	23.64	17.83	17.48
PAY0	HIGH INCM PRINCIPAL & YLD SEC. CORP. EQUITY	2002-02-27	2002-3	Y (Redeem annually at 100% NAV)	70	7.40	7.48	10.28
PAZ.UN0	PATHFINDER INCOME FUND TRANSFERABLE UNITS	2002-09-25	2002-10	Y (Redeem annually at 100% NAV)	60	3.17	3.63	3.27
PFA.UN0	FA POWER FUND TRUST UNITS	2000-05-31	2000-6	Y (Redeem annually at 100% NAV)	91	3.23	4.79	9.16
PGT.UN0	FIRST ASSET POWERGEN FUND TRUST UNITS	2001-05-10	2001-5	Y (Redeem annually at 100% NAV)	80	4.96	4.51	6.52
PRG.UN0	PRO-VEST GROWTH & INCOME FUND TRANSFER UNITS	2004-02-11	2004-2	Y (Redeem annually at 100% NAV)	47	4.17	4.47	2.29
PVN.UN0	PREMIER VALUE INCOME TRUST TRANSFERABLE UNITS	2005-02-13	2005-9	Y (Redeem annually at 100% NAV)	28	4.80	4.53	2.13
RBS1	R SPLIT 3 CORP. CAPITAL SHARE	2007-05-04	2007-4	Y (Redeem annually at 100% NAV)	9	-8.88	-8.58	6.99
RIT.UN0	FIRST ASSET REIT INCOME FUND TRANSFER UN	2004-10-28	2004-11	Y (Redeem annually at 100% NAV)	38	3.52	3.88	2.65
SCI.UN0	SCITI ROCS TRUST	2005-05-18	2006-2	Y (Redeem annually at 100% NAV)	23	3.26	3.88	2.98
SDE.UN0	SELECT 50 S-1 INCOME TRUST 2 TRANSFR UNITS	2003-11-21	2003-11	Y (Redeem annually at 100% NAV)	50	3.38	3.73	3.58
SDF.UN0	SIGNATURE DIVERSIFIED VALUE TRUST SER 2012 UN	2002-10-30	2002-11	Y (Redeem annually at 100% NAV)	62	3.00	4.40	4.08
SG.UN1	STONE TOTAL RETURN UNIT TRUST UNITS	2005-02-02	2005-4	Y (Redeem annually at 100% NAV)	33	5.74	6.19	4.75
SIN.UN0	SCITI TRUST	2003-04-24	2006-2	Y (Redeem annually at 100% NAV)	23	4.07	4.37	2.09
SIT.UN0	SENTRY SELECT BLUE-CHIP INCOME TRUST UNITS	2002-08-07	2002-8	Y (Redeem annually at 100% NAV)	65	4.69	5.18	1.46
SON.UN0	SELECT 50 S-1 INCOME TRUST TRANSFERABLE UNITS	2003-08-21	2003-8	Y (Redeem annually at 100% NAV)	53	3.32	3.79	3.44

Ticker	Name	Activation	FO	Redemption	No	Mean	Median	Stdev.
SOT.UN0	SPLIT REIT OPPORTUNITY TRUST CAPITAL UNITS	2006-06-20	2006-6	Y (Redeem annually at 100% NAV)	19	9.58	10.07	5.07
SSJ.UN0	SENTRY SELECT COMMODITIES INCM TR TRANSFER UN	2005-07-31	2005-8	Y (Redeem annually at 100% NAV)	29	5.77	6.01	3.41
STW.UN0	STRATA INCOME FUND CAPITAL UNITS	2004-01-29	2004-2	Y (Redeem annually at 100% NAV)	47	6.94	8.43	5.47
STZ.UN0	STARS INCOME FUND UNITS	2001-11-27	2001-12	Y (Redeem annually at 100% NAV)	73	2.81	3.55	2.94
TO.UN0	TAX OPTIMIZED RETURN ORIENTED ROC SEC TRUST	2003-09-03	2003-10	Y (Redeem annually at 100% NAV)	51	4.32	4.34	4.09
TT.UN0	TREMONT CAPITAL OPPORTUNITY TRUST TRANSFR UN	2003-04-17	2003-4	Y (Redeem annually at 100% NAV)	49	2.20	3.50	4.42
UF.UN0	URANIUM FOCUSED ENERGY FUND UNITS	2007-03-20	2007-3	Y (Redeem annually at 100% NAV)	10	1.43	-0.38	4.58
VE.UN0	VECTOR ENERGY FUND TRUST UNITS	2005-03-30	2005-4	Y (Redeem annually at 100% NAV)	13	3.18	5.03	6.06
VIP.UN0	BROMPTON VIP INCOME	2002-02-19	2002-5	Y (Redeem annually at 100% NAV)	68	2.97	4.04	4.01
YP.UN0	YIELDPLUS INCOME FUND UNITS	2004-08-30	2004-9	Y (Redeem annually at 100% NAV)	40	4.52	4.86	2.66
YTU.UN0	YEARS TRUST UNITS	2001-02-13	2001-2	Y (Redeem annually at 100% NAV)	58	1.14	3.81	5.95

Appendix 2: Monthly Returns of Mimicking Portfolios Related to Size, Book-to-Market, and Momentum in Canada

This appendix reports the monthly return (%) of the mimicking portfolios for size, book-to-market, and momentum factor and of the corresponding ten intersectional portfolios in Canada from July 1999 to December 2007. S/H is the value-weighted return of the portfolio whose component stocks are the stocks with small size and high book-to-market ratio. B/H is the value-weighted return of the portfolio whose component stocks are the stocks with big size and high book-to-market ratio. S/M is the value-weighted return of the portfolio whose component stocks are the stocks with small size and medium book-to-market ratio. B/M is the value-weighted return of the portfolio whose component stocks are the stocks with big size and medium book-to-market ratio. S/L is the value-weighted return of the portfolio whose component stocks are the stock with small size and low book-to-market ratio. B/L is the value-weighted return of the portfolio whose component stocks are the stocks with big size and low book-to-market ratio. S/D is the value-weighted return of the portfolio whose component stocks are the stocks with small size and poor prior performance. S/U is the value-weighted return of the portfolio whose component stocks are the stocks with small size and good prior performance. B/D is the value-weighted return of the portfolio whose component stocks are the stocks with big size and poor prior performance. B/U is the value-weighted return of the portfolio whose component stocks are the stocks with big size and good prior performance. SMB (small minus big) denotes the monthly return of a zero-investment portfolio in which small size stocks are bought and big size stocks are shorted. HML (high minus low) is the monthly return of a zero-investment portfolio in which stocks with high book-to-market ratio are bought and stocks with low book-to-market are shorted. UMD (up minus down) represents the monthly return of a zero-investment portfolio in which stocks with good prior performance are bought and stocks with poor prior performance are shorted.

Year	Month	S/H	B/H	S/M	B/M	S/L	B/L	S/D	S/U	B/D	B/U	SMB	HML	UMD
1999	7	-2.9	1.8	5.2	1.1	18.4	-3.5	8.1	1.1	-0.8	1.8	7.1	-8.0	-2.2
1999	8	3.0	3.1	2.8	0.8	20.1	-0.4	-0.5	2.9	-0.3	-0.5	7.5	-6.8	1.6
1999	9	12.0	-2.1	5.9	-2.8	-2.1	-0.6	5.0	5.5	-6.5	5.0	7.1	6.3	6.0
1999	10	-7.1	-7.3	-4.3	-1.3	1.6	9.6	-5.1	-6.0	6.0	-0.3	-3.6	-12.8	-3.6
1999	11	-6.1	-3.6	5.4	-2.1	21.6	4.9	-4.1	3.8	-3.2	1.8	7.2	-18.0	6.4
1999	12	7.6	6.7	14.1	5.1	25.5	13.0	13.1	15.3	7.2	17.4	7.4	-12.0	6.2
2000	1	3.4	-1.3	12.9	-2.9	19.8	-1.1	12.8	6.8	-4.9	5.3	13.8	-8.3	2.1
2000	2	27.2	0.4	21.0	-2.5	58.5	9.8	26.0	26.1	5.5	12.2	33.0	-20.4	3.4
2000	3	-1.1	-0.7	-5.5	5.6	-18.3	4.0	4.0	3.8	1.2	-0.1	-11.3	6.2	-0.8
2000	4	-6.3	5.9	-14.8	5.2	-20.7	-2.2	-1.9	-14.2	9.3	-8.6	-16.9	11.3	-15.0
2000	5	-10.6	3.1	-5.6	5.0	-11.4	-17.2	1.4	-10.8	4.2	-26.8	-6.2	10.5	-21.6
2000	6	5.8	0.0	6.7	-1.2	6.4	8.2	0.3	3.1	-3.2	14.2	4.0	-4.4	10.1
2000	7	-5.8	1.5	-2.9	0.4	-4.7	3.4	-2.7	-4.7	-1.2	-0.6	-6.2	-1.5	-0.7
2000	8	6.1	6.5	3.3	4.2	9.0	9.7	3.5	13.0	8.8	7.4	-0.7	-3.1	4.1
2000	9	1.3	-2.4	2.5	-0.4	-7.6	-10.6	-1.2	2.4	-5.7	3.0	3.2	8.5	6.1
2000	10	-4.4	-6.2	-3.9	1.0	-10.5	-9.4	-13.1	-1.9	0.1	0.8	-1.4	4.6	5.9
2000	11	-7.3	-4.0	-9.3	-3.7	-12.4	-12.8	-18.8	-4.7	-15.0	-4.3	-2.8	6.9	12.4
2000	12	1.8	3.6	1.8	8.5	-8.4	-3.2	-3.9	2.9	-1.1	7.6	-4.5	8.5	7.8
2001	1	10.8	0.9	4.5	1.9	17.5	7.3	22.9	9.5	18.1	-1.3	7.6	-6.6	-16.4
2001	2	2.1	-0.1	3.9	1.9	-10.2	-18.6	-9.6	-1.1	-43.5	0.0	4.2	15.4	26.0

Year	Month	S/H	B/H	S/M	B/M	S/L	B/L	S/D	S/U	B/D	B/U	SMB	HML	UMD
2001	3	-3.1	1.5	3.4	-1.2	-5.8	-8.7	-10.0	-3.1	-19.4	-1.9	1.0	6.4	12.2
2001	4	9.8	6.0	6.7	3.0	3.8	5.9	10.5	7.4	12.3	2.3	1.8	3.0	-6.6
2001	5	9.6	4.8	8.8	3.2	10.1	0.2	11.8	9.0	-5.8	3.3	6.8	2.0	3.1
2001	6	-2.2	-3.9	-2.7	-3.0	-4.6	-3.7	-8.2	-4.6	-17.9	-5.0	0.4	1.1	8.2
2001	7	-3.3	0.2	-4.8	-0.4	-8.8	-0.5	-8.4	-7.1	-6.2	-1.1	-5.4	3.1	3.2
2001	8	-0.5	-1.6	-1.1	-1.9	-11.6	-5.4	-10.6	-2.6	-13.9	-4.3	-1.5	7.5	8.7
2001	9	-5.1	-8.8	-15.8	-8.4	-17.1	-7.9	-18.9	-7.4	-14.5	-7.1	-4.3	5.5	9.5
2001	10	0.4	1.8	7.0	3.4	6.0	0.8	4.4	6.1	16.5	-0.6	2.5	-2.3	-7.7
2001	11	2.1	5.7	3.1	7.5	8.4	8.3	13.1	5.1	20.4	4.5	-2.6	-4.4	-12.0
2001	12	7.8	6.5	11.0	3.5	6.4	4.0	6.7	6.7	2.9	4.0	3.8	1.9	0.5
2002	1	18.4	5.0	4.6	1.9	11.9	-2.5	11.1	6.4	-3.8	-1.4	10.2	7.0	-1.2
2002	2	12.8	3.8	1.5	3.1	3.3	-1.5	-1.8	0.5	-6.5	3.5	4.0	7.4	6.1
2002	3	8.8	7.6	8.1	7.3	8.9	2.1	10.2	6.7	3.9	5.7	2.9	2.7	-0.9
2002	4	7.8	-0.3	1.2	0.9	-2.0	-3.1	-4.6	6.6	-4.6	-3.1	3.2	6.3	6.3
2002	5	15.5	7.6	4.8	0.8	1.6	-2.1	-1.2	13.9	-1.7	0.2	5.2	11.8	8.5
2002	6	-6.0	-6.8	-2.4	-6.3	-6.0	-6.9	-10.9	-7.5	-12.4	-9.8	1.9	0.0	3.0
2002	7	-8.4	-10.1	-9.9	-7.0	-10.2	-7.4	-9.4	-16.5	-8.5	-9.5	-1.3	-0.4	-4.0
2002	8	-1.1	-1.6	1.9	2.2	-4.9	-0.7	-2.2	3.7	-3.4	6.4	-1.3	1.4	7.9
2002	9	-2.7	-6.4	-5.6	-5.9	-6.7	-6.8	-13.6	-3.2	-14.4	-2.4	1.4	2.2	11.2
2002	10	-0.6	0.0	2.2	-2.7	2.8	2.1	10.7	-4.6	18.0	-2.6	1.7	-2.7	-17.9
2002	11	-1.1	5.4	4.0	4.8	14.2	5.1	10.3	0.1	18.5	0.4	0.6	-7.5	-14.1
2002	12	14.3	1.3	8.4	1.0	-1.8	0.6	6.0	14.0	-10.7	3.7	6.0	8.4	11.2
2003	1	7.6	-0.1	2.1	-1.2	-1.2	-0.1	6.3	-0.4	-2.9	-0.3	3.3	4.4	-2.0
2003	2	1.3	-4.7	2.4	-1.2	-1.7	0.5	-4.0	0.0	-4.1	0.1	2.5	-1.1	4.1
2003	3	-3.1	-6.7	-8.1	-2.9	-5.8	-2.1	-9.2	-6.3	-3.4	-3.5	-1.7	-0.9	1.5
2003	4	-0.5	3.6	-3.3	3.3	4.1	4.2	6.2	-0.4	4.9	3.8	-3.6	-2.6	-3.8
2003	5	2.3	4.5	3.4	2.4	17.0	4.6	7.7	6.4	4.0	5.8	3.7	-7.4	0.2
2003	6	5.6	4.6	1.1	2.3	7.1	2.1	2.5	4.7	4.3	3.0	1.6	0.5	0.5
2003	7	5.5	6.8	5.6	3.9	10.1	3.2	9.9	6.4	8.1	1.8	2.4	-0.5	-4.9
2003	8	11.2	4.8	8.6	3.7	17.3	3.2	12.5	12.8	7.2	3.0	8.4	-2.2	-2.0
2003	9	5.8	-0.5	4.7	-1.6	6.0	0.2	5.1	9.8	-3.9	-1.7	6.1	-0.4	3.5
2003	10	12.1	5.1	4.9	4.0	7.2	5.1	3.1	11.7	2.1	8.3	3.3	2.4	7.4
2003	11	5.7	1.5	7.6	1.7	5.5	0.9	3.2	5.2	0.2	1.3	4.9	0.4	1.6
2003	12	6.9	11.0	1.3	8.6	-2.0	3.6	5.9	3.6	5.7	5.4	-5.7	8.1	-1.3
2004	1	9.1	0.2	7.3	0.1	4.5	5.8	6.6	7.9	1.1	-1.0	5.0	-0.5	-0.4
2004	2	7.7	4.8	5.5	6.4	4.9	2.7	1.2	1.7	1.5	5.7	1.4	2.5	2.3
2004	3	1.3	-3.3	-0.4	-1.1	-4.2	-2.0	-1.5	-2.3	-1.6	-7.9	1.0	2.1	-3.6
2004	4	-9.1	-2.6	-4.5	-0.8	-10.6	-8.4	-2.7	-4.0	-2.3	-10.9	-4.1	3.6	-5.0
2004	5	-1.1	0.6	-3.6	0.5	-1.7	1.3	-2.6	-2.5	1.3	0.6	-2.9	0.0	-0.3
2004	6	1.4	2.5	1.0	2.3	-1.9	0.8	-1.8	1.2	2.2	2.3	-1.7	2.5	1.5
2004	7	-1.3	0.6	-2.8	1.3	-4.7	-3.5	-5.5	-4.0	-5.9	-0.1	-2.4	3.7	3.7
2004	8	-2.0	-2.6	0.6	-0.8	-1.4	-1.1	-2.8	-1.6	-0.5	-2.4	0.6	-1.1	-0.4
2004	9	6.1	3.5	4.8	3.6	4.9	4.1	8.7	3.2	2.5	6.3	1.5	0.4	-0.9
2004	10	-1.3	0.0	3.7	1.9	-2.5	3.1	-2.4	1.5	2.5	2.1	-1.7	-1.0	1.7
2004	11	9.4	5.1	5.9	2.2	5.6	2.0	4.5	7.6	-0.3	3.9	3.9	3.5	3.6
2004	12	3.4	3.9	5.2	3.0	6.5	2.1	5.0	6.2	2.3	3.3	2.0	-0.6	1.1
2005	1	4.5	1.2	-1.2	-0.5	-3.5	-0.2	-2.8	1.2	-2.3	2.1	-0.2	4.7	4.2

Year	Month	S/H	B/H	S/M	B/M	S/L	B/L	S/D	S/U	B/D	B/U	SMB	HML	UMD
2005	2	10.8	7.2	7.3	5.7	7.1	3.2	3.7	10.5	0.9	9.6	3.0	3.8	7.8
2005	3	4.2	-2.7	-3.2	-1.1	-5.5	-1.6	-5.4	-2.0	-5.5	-2.5	0.3	4.3	3.2
2005	4	-7.6	-3.5	-5.2	-1.5	-6.6	-2.2	-4.6	-6.1	-4.1	-4.7	-4.1	-1.2	-1.1
2005	5	3.0	7.7	2.6	1.7	3.3	1.9	2.2	3.2	5.2	4.2	-0.8	2.7	0.0
2005	6	8.1	7.2	1.3	3.2	0.4	2.8	-1.5	3.7	0.5	6.3	-1.1	6.1	5.5
2005	7	1.1	6.8	4.8	6.1	6.0	3.7	2.6	6.6	3.6	6.2	-1.6	-0.9	3.3
2005	8	2.0	3.1	-0.5	2.4	-2.2	2.8	-6.1	3.3	-1.5	6.8	-3.0	2.3	8.9
2005	9	0.1	-1.1	3.7	4.4	2.5	3.5	3.1	3.0	2.3	4.3	-0.1	-3.5	1.0
2005	10	-5.3	-8.3	-8.3	-5.9	-3.4	-7.1	-6.7	-6.8	-3.8	-8.8	1.5	-1.5	-2.6
2005	11	2.9	5.0	3.7	5.3	6.9	3.5	-1.7	6.8	5.1	4.8	-0.1	-1.2	4.1
2005	12	7.3	5.8	7.6	3.4	8.7	5.4	6.8	6.2	2.6	6.7	3.0	-0.5	1.7
2006	1	9.4	10.4	12.3	6.0	13.2	5.2	11.4	5.7	3.6	9.4	4.5	0.7	0.0
2006	2	2.1	-3.0	0.2	-1.4	1.6	-3.1	0.6	-1.1	0.7	-5.1	3.8	0.3	-3.8
2006	3	6.5	4.0	4.4	3.7	4.6	4.7	2.1	8.0	3.0	6.6	1.0	0.6	4.8
2006	4	-0.4	3.0	5.2	0.8	7.4	0.6	0.6	3.2	-0.1	3.5	2.6	-2.7	3.1
2006	5	-3.4	-4.1	-3.7	-1.9	5.9	-5.5	-5.5	-6.6	-2.6	-4.9	3.4	-4.0	-1.7
2006	6	0.0	-0.4	-3.5	-0.9	-3.7	-0.9	-4.3	-3.6	-0.8	-0.6	-1.6	2.1	0.4
2006	7	0.2	3.9	1.3	1.5	0.6	2.0	0.7	3.3	1.9	2.9	-1.7	0.8	1.9
2006	8	2.3	0.2	-0.5	1.8	2.3	2.6	-2.2	4.4	5.0	-0.5	-0.1	-1.2	0.5
2006	9	-0.1	-0.6	-2.8	-2.3	-1.6	-2.7	-6.1	-0.3	-6.1	-3.9	0.4	1.8	4.0
2006	10	3.1	4.9	2.6	4.4	6.0	6.5	4.5	4.7	5.2	5.0	-1.4	-2.2	0.0
2006	11	-2.6	1.3	2.9	2.4	4.8	5.6	-2.0	-0.6	3.8	3.1	-1.4	-5.9	0.4
2006	12	6.5	3.1	2.1	0.6	6.4	2.2	2.9	6.9	1.0	1.9	3.0	0.5	2.5
2007	1	7.4	4.2	3.4	1.2	-0.8	0.4	1.2	2.5	0.1	1.5	1.4	6.0	1.4
2007	2	1.9	1.5	2.9	0.0	4.8	1.0	-0.8	1.8	0.9	1.7	2.4	-1.2	1.7
2007	3	0.1	2.7	0.6	1.4	2.5	0.2	-1.7	-1.1	-0.3	0.4	-0.4	0.1	0.6
2007	4	6.1	3.4	6.9	2.7	8.4	1.1	5.7	4.9	3.5	2.4	4.7	0.0	-1.0
2007	5	3.7	1.0	0.0	5.1	-0.2	4.4	0.4	1.3	4.2	6.6	-2.3	0.2	1.6
2007	6	3.1	-0.4	1.0	-1.0	-1.7	-0.7	-2.6	2.2	-1.4	-0.7	1.5	2.5	2.7
2007	7	-1.8	-2.4	-0.8	0.7	-2.4	-0.5	-3.4	0.4	1.6	1.8	-0.9	-0.7	2.0
2007	8	-9.0	-3.1	-9.9	-2.7	-15.1	-1.3	-13.3	-8.8	-5.2	-2.5	-9.0	2.1	3.6
2007	9	-0.5	1.9	0.7	2.9	5.1	4.2	26.7	5.0	3.0	3.4	-1.2	-3.9	-10.7
2007	10	0.3	1.4	0.3	2.7	2.2	5.7	-1.0	3.0	4.2	4.9	-2.3	-3.1	2.3
2007	11	-9.0	-7.1	-9.4	-6.5	-12.7	-6.1	-14.8	-7.3	-11.9	-5.6	-3.8	1.3	6.9
2007	12	0.7	0.8	-0.4	1.2	-1.4	1.4	0.8	3.6	0.4	2.0	-1.5	0.7	2.2