Northern Exposure: How Canadian Small Stock Investments Can Benefit Investors

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Abstract

We investigate the extent to which investors can benefit from investing in small market capitalization Canadian stocks. Using monthly data from 1950 to 2009, we show that the size effect has not lessened over the decades in Canada, despite earlier evidence to the contrary in the U.S. We show that with their low correlation to large stocks, Canadian small stocks represent a unique asset class, and as such a U.S. investor who included a portion of Canadian small stocks would have had a much better return-to-risk reward than from including stocks from nine developed equity markets. Based on daily trading volume, we examine and discuss important investabilty issues overlooked in most similar studies. Finally, we corroborate U.S. findings that highlight the importance of returns in January in explaining the bulk of the size effect and examine the size effect in a variety of economic conditions and crises.

JEL Codes: G11, G12, G14

Keywords: small stocks, anomalies, investments, portfolios, market efficiency

1. Introduction

Since Markowitz's (1952) seminal research touting the benefits of stock diversification, investors have searched for the optimal return-to-risk mix in their portfolio. Solnik (1974) made the convincing argument that diversification should occur beyond domestic borders. Another major breakthrough in portfolio management occurred in the early 1980s that focused attention on the size or market capitalization of stocks in one's portfolio. Banz (1981) and Reinganum (1981) uncovered a size effect in the U.S. and other researchers have uncovered similar effects in other countries. Specifically, researchers have found that a portfolio of small stocks has outperformed a portfolio of large stocks in many countries. The return differential between small and large stocks has gained prominence since Fama and French's (1992, 1993) seminal work that characterized the differential as the SMB (small minus big) factor in their three-factor asset pricing model.

This study examines the potential benefits of combining both international diversification and a tilt toward small stocks and makes two important contributions to the literature. First, we show that investors can benefit from international diversification by adding to their global portfolio not only a broad index of equities from other countries, but also by adding a portfolio of small stocks. By focusing on the substantial benefits of diversification into Canadian small stocks, a market that is viewed as highly-integrated with the U.S. market, we make the case that U.S. investors can benefit even further by investing in small stocks in other countries that are less well-integrated with the U.S. market. To highlight the differences, U.S. and Canadian markets are among the most highly-correlated among the ten developed countries we investigate, with a

correlation of 0.752, but the overall U.S. market returns and Canadian small stock returns have a much lower correlation of only 0.213.

Second, we directly tackle the often-overlooked issue of investability. While most previous studies of small stocks implicitly assume that trading is costless and positions can be entered into and exited from immediately, we quantify the impact on such hypothetical returns by incorporating more realistic assumptions. We investigate investing in small stocks by simulated returns based on actual daily trading volume. We include transaction costs, place limits on the maximum ownership of a firm's stock, and cap trading at a fraction of a particular day's actual trading volume in order to minimize any price impact that a large trade might have. We show that such adjusted returns are much lower than raw returns, but we preserve the key message that investing in small Canadian stocks can still provide substantial diversification benefits.

Kilbert and Subramanian (2010) document the increased opportunity set by including small stocks in an international portfolio. They also argue that small stocks tend to be under-researched and neglected, with an average of six analysts covering their small capitalization firms globally versus sixteen for mid-cap and large-cap stocks, which can lead to an undervaluation and hence investment opportunity. The risk-reward characteristics of small and large equities are not the same, so their diversification impact would not be the same and thus investors could benefit from adding each separately to their portfolio. In the spirit of Eun, Huang, and Lai (2008), we investigate the extent to which investors can benefit from investing in small market capitalization stocks, but with a particular emphasis on Canada. We consider Canada since it is one of the most accessible markets to U.S. investors and the most highly-integrated, and has attracted significant

attention globally as a country that emerged from the 2008-2009 financial crisis relatively unscathed.

Our analysis extends that of Eun et al. in several dimensions. First, at the heart of our study is the most extensive study of the Canadian size effect. Specifically, our period of study is much longer than Eun et al., we consider a much larger sample of stocks, and we examine the impact on the differences in returns for small firms related to seasonality, and changing economic conditions.[1] Our data set includes all firms listed in Canada over the period from 1950 to 2009. To ensure the robustness of our results, we also perform several checks for the size effect by using different sorting months and different rebalancing periods. We show that, surprisingly, the size effect has not lessened over the decades since 1950 and these results are robust to, though not insensitive to, changes in the time of rebalancing and the holding period between rebalancing. Examining the timing of the returns for our size sorted portfolios, we also corroborate U.S. findings that highlight the importance of returns in January in explaining the bulk of the size effect.

Second, from an investment perspective, we examine return and risk trade-offs. We measure risk using estimated betas as well as standard deviation and Sharpe ratios. We also compare the statistical characteristics of the size effect in Canada to that from the U.S. and investigate the correlation between the two. Beyond the U.S., we examine the value added from including Canadian small stocks in an international portfolio. To the extent that Canadian small firm stock returns do not move in lock-step with stock returns in other markets, there are return-to-risk benefits for international investors to including Canadian small stocks in their portfolios. We

[1]Their study uses the Datastream database (see their footnote 8 which describes many of the issues with the database) and focuses on the 1980 to 1999 period.

therefore document the benefits not only for U.S. investors but also for a wide variety of international investors to considering the addition of Canadian small firm stocks to a global investment portfolio.

Third, we consider the investability of a strategy that focuses on small stocks. At a high level of analysis we apply a filter to screen out stocks with low turnover. In a more detailed analysis we examine a subset of daily returns and trading volume and simulate a variety of investment levels (i.e., $10 million to $50 million), that incorporate trading costs, that are constrained to have minority stakes in firms (i.e., up to a maximum 30% ownership position), and most importantly are constrained by the actual trading volume on a given period when investing and rebalancing occurs (i.e., up to 30% of a day's actual trading volume, continuing on to subsequent days until a position is filled). While the simulated returns are lower than unconstrained returns, the returns are still attractive. Our analysis provides a framework for other studies that examine similar types of investment strategies.

The paper proceeds as follows. In section 2 we provide some background related to existing small stock studies in general as well as in a Canadian context. Section 3 describes the data and methodology. Section 4 presents our results. Section 5 provides our conclusions.

2. Background and Overview

Banz (1981) and Reinganum (1981) are the first to uncover a size effect with NYSE and AMEX firms, with portfolios of small market capitalization stocks outperforming portfolios of large market capitalization stocks. Keim (1983) and Roll (1983) find that much of the size effect is

concentrated in the month of January. Fama and French (1992, 1993) focus on the size portfolio return difference to create their well-known SMB factor.[2] They interpret SMB as a risk factor that can explain much of the cross-sectional difference in stock returns. However Schwert (2003) asserts that much of the size effect had disappeared by the early 2000s.[3]

A number of early studies uncovered a size effect in Canada as well. The typical Canadian study has either relied on the entire universe of Toronto Stock Exchange (TSX) listed firms, as encompassed in the Canadian Financial Markets Research Center (CFMRC)[4] database, or a much smaller sample of Canadian firms as found in Datastream International (with data only since the 1980s) and Computstat (that suffers from a survivorship bias). In each case, the previous studies have generally attempted to replicate U.S. studies and have not had a focus of their design being to capture some of the nuances of the Canadian marketplace which also characterize many other developed but smaller global equity markets: low liquidity relative to U.S. markets, smaller float due to many firms with major block holdings, prevalence of dual class shares, and unique structures such as income trusts. All of these factors can pose a challenge in terms of developing an investable strategy in Canadian small stocks and comparing the returns from Canadian and US strategies, especially for small firms.

[2] Specifically, they construct 6 portfolios (at the end of each June,) as the intersections of 2 portfolios formed on size (market equity, ME) and 3 portfolios formed on the ratio of book equity to market equity (BE/ME). The size breakpoint for year t is the median NYSE market equity at the end of June of year t. BE/ME for June of year t is the book equity for the last fiscal year end in t-1 divided by ME for December of t-1. The BE/ME breakpoints are the 30th and 70th NYSE percentiles. The portfolios for July of year t to June of t+1 include all NYSE, AMEX, and NASDAQ stocks for which they have market equity data for December of t-1 and June of t, and positive book equity data for t-1. SMB (Small Minus Big) is the average return on the three small portfolios minus the average return on the three big portfolios: SMB = 1/3 (Small Value + Small Neutral + Small Growth) - 1/3 (Big Value + Big Neutral + Big Growth).

[3] A comparison between the smallest and largest decile portfolio returns in the U.S. between 1981 and 2000 (based on data from Ken French's website) confirms that there is no size effect during that period.

[4]Formerly known as the TSE/University of Western Ontario database.

In a Canadian context, Berges, McConnell, and Schlarbaum (1984) uncover a size effect, particularly in January as well. Hatch and White (1988) provide a thorough investigation of the stock return characteristics from 1950 to 1987 using the newly created Toronto Stock Exchange/ University of Western Ontario database. As part of their investigation they compare the return on a portfolio of stocks of firms above and below the median in size and provide a more extensive confirmation of the size effect. Foerster and Porter (1993) examine returns for portfolios divided into size quintiles and find a size effect even after adjusting for market risk.[5] Elfakhani, Lockwood, and Zaher (1998) examine the period of 1975 to 1992 to determine whether factors other than size drive returns in the Canadian market, in the spirit of the Fama-French studies. Similarly, L'Her, Masmoudi, and Suret (2004) provide a more extensive and comprehensive update from 1960 to 2001.

Beside the previous studies which have focused exclusively on Canada, a number of studies take the perspective of a U.S. investor and consider (among other aspects) the size effect in various countries, including Canada. In most cases the data used are not from CFMRC and thus are not as comprehensive, and are prone to survivorship bias based on the study design (i.e., including book value of equity data from Compustat). These studies include Arshanapalli, Coggin, and Doukas (1998), Bauman, Conover, and Miller (1998), Liew and Vassalou (2000), Griffin (2002), Switzer (2007), and Eun, Huang, and Lai (2008).

Despite the relatively small size of the Canadian equity market relative to the U.S. market, a rigorous and up-to-date study of Canadian small stocks is important for a number of reasons. First, studying the Canadian market will allow a nice complement to the standard U.S. studies by

[5]Athanassakos and Foerster (2000) summarize the results of other early Canadian studies.

investigating the role of factors such as liquidity in the returns to holding different asset classes. Passive investment strategies that replicate an overall value-weighted market index such as the S&P/TSX Index (and its predecessor the TSE 300 Index) can be skewed by the performance of a small number of large, liquid stocks concentrated in a narrow sector such as financials or resources, or even by a single stock as was the case with Nortel which represented over 30% of the index in 2000, thus neglecting a large number of potentially attractive investments. Second, international investors (in particular, Americans) are increasingly recognizing the importance of diversification and are looking for new opportunities outside of the U.S. Exposure to the Canadian market allows for a degree of international diversification without the information asymmetry which can influence the attractiveness of diversification for investors – Canada has similar regulatory and institutional features to the U.S. Canadian small stocks are also an asset class not as readily available as the large cross-listed firms or firms included in Canadian ETFs, but the small stocks are still easily accessed by interested U.S. investors. Third, even in a Canadian context, small stocks can provide diversification benefits as part of an overall portfolio that offers superior return-to-risk.

3. Data and Methodology

Our data are from the CFMRC database, which covers an extensive 60 year period from 1950 to 2009. We perform an initial screening, by eliminating securities issued by mutual fund companies, preferred shares, exchangeable shares, warrants, and instalment receipts to ensure we have a sample of common stocks. We eliminate stocks with no data on price, return, or shares outstanding. For dual class shares – a common occurrence in a Canadian context – the market

values for the different classes are combined and the prices and returns we study are based on the class with the largest market capitalization.[6]

3.1 Canadian Small Stock Analysis

In our initial analysis, sorts on market capitalization take place once per year, as of the end of December. In subsequent analyses we examine the impact of sorts as of different month-ends, rebalancing semi-annually in either March/September or June/December, and rebalancing quarterly in March, June, September, and December. We require the stock to have traded on either the day of the sorting or the previous trading day to ensure we do not have stale prices. We calculate both equal-weighted returns as well as value-weighted returns based on the sorting date weights.

Unlike previous small Canadian stock studies of which we are aware, we also consider the trading volume, which has limited availability in the database since 1963 and complete coverage since 1973. Liquidity is a particularly important consideration from an investment perspective since, as shown by Kho et al. (2009), a large proportion of shares worldwide are held by insiders and thus not available to outside investors. For example, in their sample of Canadian firms available in the Worldscope database as of 1994, approximately one-third of all firms had closely held shares and for those with such inside ownership the ownership position was over 30%.

[6]Eun et al. (2008) report an average sample size for their Canadian stocks of 938 stocks for the period 1980 to 1999. Over the same period, with our sample and using a more extensive database, the average is 543. We conjecture that Eun et al. did not account for dual class shares, and may not have accounted for all of the non-common stocks. Conversely, L'Her at al. (2004) report an average sample size of 520 firms during the 1990s using the same database as us (although it is not clear how they screened or accounted for dual class shares), which corresponds to our average sample size of 627 over the same period. That difference in sample sizes may be attributable to their additional screen that requires the availability of accounting data (e.g., book value of equity).

We examine differences in the size effect in January versus other months, as uncovered by Keim (1983). To investigate other potential explanations for the size effect, we also examine the size effect during economic expansions and contractions; during periods of market stress (e.g., the financial crisis of 2007-2009, October 1987 and the Asian crisis in July 1997); and during monetary loosening and tightening environments as captured by declining or increasing interest rates. Consistent with L'Her et al. (2004), we define a loose (tight) monetary environment as one in which the current Bank Rate is below (above) the 12-month moving average. We compare the magnitude of the Canadian size effect with the U.S. size effect over similar periods.

3.2 Canadian Small Stocks as a Unique Asset Class

Next, we examine how a diversified balanced Canadian portfolio might have performed under various scenarios with and without a small stock component. We treat Canadian small stocks as a unique asset class in the same manner that Petrella, (2005) treats European small stocks as a unique asset class. To determine how these portfolios compare to other existing asset classes, we examine the correlation of a wide range of global markets with Canadian stocks in general and small stocks in particular. Specifically, we use the Datastream market indices (total returns converted to U.S. dollars) for the large developed stock markets examined by Eun et al. (2008), i.e., Australia, Canada, France, Germany, Hong Kong, Italy, Japan, Netherlands, U.K. and U.S.

4. Results

4.1 Overall Results

We begin by investigating returns across various size-based portfolios over the entire 1950 to 2009 sample period. Summary statistics are presented in Table 1. We present information for

each of ten decile portfolios (P1, the smallest stocks, through P10, the largest stocks), as well as portfolios comprised of the smallest 30% and 50%, S30 and S50, respectively, and the biggest 30% and 50%, B30 and B50, respectively.

In Panel A we document equal-weighted monthly returns as well as average portfolio size and number of stocks. We immediately recognize the size effect with the mean (median) monthly return for the smallest decile portfolio P1 as 3.21% (1.69%) or 46.10% (22.28%) annualized, compared with the largest decile portfolio P10 as 0.88% (1.05%) or 11.09% (13.35%) annualized. The difference of the mean (median) monthly return is 2.33% (0.64%) or 31.87% (7.96%) annualized. Not surprisingly, P1 returns are much more volatile than P10 returns, with a monthly standard deviation of 10.29% compared to 4.60%. Minimum monthly returns for all portfolios occurred in October 1987 while maximum returns occurred in a variety of months. Mean returns are monotonic across the first seven decile portfolios and volatility measures are monotonic across all portfolios. The overall average size of stocks within each portfolio ranges from $1.83 million for P1 to $2.24 billion for P10. The difference in monthly returns between the S30 and B30 portfolios is still substantial: 2.74% versus 0.94%, or 1.80%, which equates to an annualized difference of 23.88%. Even the difference in monthly returns between the S50 and B50 portfolios is large: 2.09% versus 0.94%, or 1.15%, which equates to an annualized difference of 14.71%. Thus with our updated sample, the Canadian size effect is substantial regardless of the measurement method.

The Sharpe ratio[7] indicates the potential benefit of concentrating a portfolio on small stocks in terms of return-to-risk tradeoffs. Even with a standard deviation of the smallest decile portfolio stocks, P1, more than twice that of the largest decile portfolio stocks, P10, the Sharpe ratio for P1 is three times as great as that for P10 and more than four times as great as some of the other portfolios.

Panel B reports results based on value-weighted returns and also indicates average trading volume, average price, and beta. Results for value-weighted portfolios are similar to the equal-weighted although a slightly smaller order of magnitude. Not surprisingly the smaller market capitalization stocks tend to be lower priced stocks, with P1 average prices of $2.23 per share compared with P10 average prices of $39.43. Average prices across portfolios increase monotonically. Average monthly trading volume (since 1963) per stock within each portfolio ranges from 700,000 shares for P1 stocks to 6.3 million shares for P10 stocks. Average betas within the small stock portfolio, P1, are 1.14, while those in the largest portfolio, P10, are 0.99.

In unreported results we perform robustness checks on the various sorting and rebalancing alternatives. For annual rebalancing, there is some variation on the magnitude of the size effect (i.e., the return difference on small versus big portfolios), with the December sort providing the greatest differential, followed by September, then January. On average, semi-annual rebalancing is more attractive than annual – particularly rebalancing in June and December – and on average quarterly rebalancing is more attractive than semi-annual, but transaction costs related to

[7]Based on an average Treasury bill return over the period of 0.46% per month or 5.68% annually as reported in the CFMRC database.

portfolio turnover might mitigate the differences. For the remainder of the paper, results are reported based on annual sorting in December.

4.2 Results by Decade

To determine how the results change over our sample period, the portfolio returns by decade are reported in Table 2 along with significance tests comparing small versus big portfolios. Overall, for both equal-weighted returns, Panel A, and value-weighted returns, Panel B, the return differences are significant comparing the extreme decile portfolios (P1 and P10), the smallest and largest 30% (S30 and B30), and below and above median (S50 and B50). Interestingly, the size effect is robust across time with a positive monthly mean return (based on P1-P10 differences) ranging from 0.88% to 5.13% (based on equal-weighted results) and is significantly different in four of six decades. The size effect is actually the strongest in the last two decades of the study. The significance of the results is similar for portfolios in the top and bottom 30%, although, not surprisingly, not as strong based on the top and bottom 50%.

4.3 Results by Month

To investigate the role of the calendar effect found in previous studies, the size effect results categorized by month are reported in Table 3 with Panel A indicating equal-weighted results and Panel B value-weighted results. Consistent with Keim's (1983) study of U.S. stocks, the size effect is most pronounced in January. The average monthly return difference (based on equal-weighted results for the P1 and P10 small and big portfolios) is over 10%. As in other studies, the turn-of-the-year appears to have a lingering impact on the size effect as the next most prominent month is February. The difference in returns is predominately only significant in the

months of January, February, April, May, and September. Even excluding January and examining the months of February through December collectively, we still find a significant size effect. Interestingly, the size effect is smallest and insignificant in the last three months of the calendar year and is actually reversed in December.

4.4 Economic Factors and Crises

We investigate the relationship between the size effect and economic conditions to evaluate the possibility that the size effect is capturing the difference in how small and large firms' equity values respond to economic conditions, and thus the size effect may be a proxy for a type of economic risk factor, in the tradition of the Fama-French factors. In prior research, Switzer (2010) finds that Canadian small stocks outperform large stocks in the year subsequent to an economic trough, but small stock underperform relative to large stocks in the year prior to the business cycle peak.

Table 4 examines the magnitude of the size effect during different economic conditions. Panel A investigates the size effect during economic expansions and panel B investigates the size effect during recessions. The recession dates prior to 2008 are from Atta-Mensah and Tkacz (1998) and the 2008-2009 recession date is based on announced quarterly real GDP changes. The magnitude of the size effect, as captured by the P1-P10 return difference, is actually slightly larger during recessions than expansions, but given the increased volatility of returns in recessions the difference is only statistically significant during expansions. As well, given the relatively short duration of some expansions and recessions, many of the individual periods do not show significant differences. It is well-known that the stock market is a leading indicator of the

business cycles, and studies have shown that the stock market tends to peak approximately six months prior to a peak in the overall economy, and tends to start rebounding approximately six months prior to the trough in the economy, which may be a driver behind some of the insignificant results.

Panel C investigates the size effect during loose versus tight monetary policy regimes as determined by the level of the bank rate relative to its twelve-month moving average. We expect periods characterized by loose monetary policy to result in an increase in equity prices due to an increase in funds available for investment and an apparent decrease in the risk premium. Loose monetary policy is defined as periods when the current bank rate is below the twelve-month average while tight monetary policy is when the current bank rate is above the average. While the size effect, as captured by the P1-P10 return difference, is significant during both loose and tight monetary policy regimes, the magnitude is approximately twice as large during loose monetary regimes.

We also investigate the size effect during periods of market turmoil. Specifically, we examine the performance of small versus large stocks during the October 1987 stock market crash, during the Asian crisis of July 1997, and during the more recent financial crisis from July to December 2008. In the month of October 1987, small stocks (P1) underperformed large stocks (P10) by 28.03%. In July 1997, small stocks underperformed by 14.05%. During the more recent financial crisis in the last half of 2008, small stocks underperformed by a cumulative amount of 31.30%. Yet in the following six months from January to June of 2009, small stocks outperformed large stocks by 58.00%. These results are consistent with the general notion that small stocks have

higher betas than large stocks, but the return differences during and subsequent to major events such as the recent financial crisis suggest that during those periods small stocks are much more sensitive than traditional risk measures would dictate.

4.5 Canada – U.S. Comparison

We compare the Canadian size effect with that in the U.S. The Canada-U.S. comparison is interesting because while Canada and the U.S. are among the most integrated and highly correlated markets worldwide, it may be the case that the relative nature of the size effect is different between the two countries. We begin our analysis by comparing the overall Canadian market returns (as measured by the CFMRC value-weighted index) with the U.S. market returns (as measured by the CRSP value-weighted index, derived from data on Ken French's website). Over the 1950 to 2009 period, the average monthly return on the Canadian market is 0.92% compared with the U.S. average monthly return of 0.94%. The correlation of the returns is 0.805 and the return series are not significantly different. These results are not surprising given the closeness of the two markets.

Results for the size portfolios are presented in Table 5. We examine returns by decile portfolios (P1 is the smallest and P10 the largest) and by other cut-offs including the smallest/biggest 30% and the smallest/biggest 50%. For the U.S. market, our proxy for the smallest/biggest 50% is the Fama-French's SMB factor (see footnote 2 for more details). All of the U.S. data are from Ken French's website http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/. The size effect in Canada is much more pronounced than in the U.S. Interestingly the average monthly returns for the largest size deciles in each country are almost identical: 0.90% in Canada and 0.89% in the

U.S., while the Canadian P10 return volatility is slightly higher at 4.70% versus 4.15% in the U.S. The return differences are not significant for P3 through P10. However, both the P1 and P2 returns are significantly different across the two countries, with a monthly difference of 1.99% for P1 and 0.60% for P2. The result is a much more pronounced size effect in Canada as captured by the P1-P10 monthly return difference of 2.27% versus 0.28% in the U.S. Even as captured by S30 minus B30, the monthly return difference in Canada is 0.79% versus 0.28% in the U.S., and as captured by S50 minus B50, 0.33% in Canada versus 0.18% in the U.S. (as captured by the well-known Fama-French variable, SMB),

4.6 Investment Opportunities

In this section we investigate the impact on return and risk from a portfolio perspective of including Canadian small stocks. Table 6 and Figure 1 examine the impact from a Canadian perspective. We compare returns and return-to-risk measures on a variety of portfolios, from 100% equity to the inclusion of a portion of dedicated small stocks, as captured by our P1 or smallest decile portfolio. The Canadian index is represented by the CFMRC value-weighted index for all domestic common equities. The bond index is from the CFMRC database and is derived from the long term government bond rate series from Cansim (series B14013) which includes the average yield on a portfolio of 10+ year government of Canada bonds. The Sharpe ratio is measured as annualized portfolio returns in excess of Treasury bill returns divided by annualized standard deviation of returns.

In the overall 1950-2009 period, despite the large volatility of the small stock portfolio, given the offsetting strong returns, a 10% allocation of small stocks to a balanced portfolio has a

considerable return-to-risk impact. For example, a standard balanced portfolio with 50% in a stock index and 50% bond index has a Sharpe ratio of 0.394. When 10% of the stock allocation is reallocated to small stocks, the Sharpe ratio increases by over 70% to 0.670. For a portfolio with 60% in a stock index and 40% bond index, the Sharpe ratio is 0.398. However reallocating 10% of the stock allocation to small stocks increases the Sharpe ratio by a still substantial 64% to 0.651. The results are not sensitive to the period under study. In the first sub-period, 1950-1979, the 50%-50% stock-bond portfolio has a Sharpe ratio of 0.392 which increases by 54% to 0.605 with the 10% substitution of small stocks for larger stocks. The 60%-40% stock-bond portfolio has a Sharpe ratio of 0.440 which increases by 44% to 0.632 with the 10% substitution of small stocks for larger stocks. In the second sub-period, 1980-2009, the 50%-50% stock-bond portfolio has a Sharpe ratio of 0.401 which increases by 83% to 0.735 with the 10% substitution of small stocks for larger stocks. The 60%-40% stock-bond portfolio has a Sharpe ratio of 0.368 which increases by 112% to 0.780 with the 10% substitution of small stocks for larger stocks. Thus even a modest reallocation among equities to include more small stocks can provide a substantial return-to-risk increase.

Since diversification is one of the key reasons to consider the addition of new assets, we estimate the correlation between our different value-weighted size portfolios and the value-weighted CFMRC index. The correlations for each of the size sorted portfolios relative to the overall market decreases monotonically from 0.96 with the largest decile portfolio, P10, to 0.42 for the smallest decile portfolio, P1. To confirm the robustness of this result, we also estimate the mean-variance efficient frontier using the entire portfolio of Canadian equities and our bond index and compare this to the case in which we also include the small size portfolio. Consistent with the

previous results, we find an improvement in the mean-variance efficient (MVE) frontier by adding the small stock portfolio to our set of available assets and a significant weighting for the small stock portfolio in the resulting mean variance efficient portfolio.

The value of considering a small stock portfolio from a Canadian context is clear based on the previous analysis, so we examine the impact of adding Canadian small stocks to the portfolio of an international investor. Taking the perspective of a U.S.-based investor, we examine the impact of global diversification on their overall portfolio. Panel A of Table 7 shows the correlation of stock returns in U.S. dollars among the ten developed markets as studied in Eun et al. (2008). Based on available data from Datastream, the sample covers the 1973-2009 period. The two highest correlations are between Germany and the Netherlands (0.792) followed by Canada and the U.S. (0.752). The two lowest correlations are Hong Kong and Italy (0.290) followed by Hong Kong and Japan (0.310). We also include Canadian small stocks (value-weighted portfolio P1 converted to U.S. dollars), which has a correlation with the overall Canadian Datastream total return index of just 0.372. Despite the large correlation between the overall Canadian market and the U.S. market, the correlation between the small size Canadian portfolio and the U.S. market is only 0.213, which is substantially lower than the correlation between U.S. market returns and any of the other developed market country returns.

Using simple strategies to increase the diversification of a global portfolio, we find significant improvements in the reward-risk trade-off for U.S. investors. Results are presented in Panel B of Table 7 and Figure 2. We begin by examining risk and return to a U.S. investor who invests exclusively in U.S. stocks. The annualized return is 11.29% and the annualized standard

deviation of returns is 15.99%. Based on an annualized average one-month Treasury bill return (from Ken French's website) of 5.78%, the resulting Sharpe ratio is 0.345. By mixing a 90% U.S. equity investment with a 10% weight in Canadian stocks, we find a slight improvement in the Sharpe Ratio to 0.355. By mixing a 90% U.S. equity investment with a 10% weight equally distributed across the other nine developed markets, we find a further slight improvement in the Sharpe Ratio to 0370. When we replace the 10% international component with 10% from the Canadian small stock portfolio (converted to U.S. dollars), we find a much more substantial improvement in the Sharpe Ratio to 0.596.

We also consider a more balanced approach by forming a portfolio equally-weighted across the ten developed markets. As expected, the Sharpe Ratio improves from the 100% U.S. equity measure of 0.345 to 0.480, but interestingly this is less of an improvement than with the 10% allocation to small Canadian stocks. Finally, if we allow for an equal weighting across the ten markets and include Canadian small stocks as well, we see a further improvement in the Sharpe ratio to 0.678, or almost double relative to the U.S.-only portfolio. Once again, for robustness we examine the correlations and the impact of adding this asset class to the mean variance frontier. We find that its inclusion in the set of assets to calculate the mean variance efficient frontier leads to an improvement in the frontier and a positive weighting in the calculation of the mean variance efficient portfolio.

4.7 Investability

Our previous analysis follows the standard academic practice of assuming that investors can buy and sell the necessary stocks to rebalance their portfolio on the day they do the rebalancing, at

zero cost relative to the closing stock prices on the day of rebalancing. This may be a reasonable assumption for the largest firms in our portfolios where it may be possible to buy or sell large positions with limited or no market impact but this is not likely to be the case for smaller firms. Since one of the major goals of our analysis is to determine the value of investing in small cap stocks, investability and realizable returns are significant concerns in our analysis. In our sample, the average trading volume (in number of shares) of the smallest portfolio is about one-tenth that of the largest portfolio, so there is a potentially significant impact of a lack of investability and associated costs in these firms. To address this issue we perform a series of tests incorporating different constraints faced by investors to simulate what would happen during the actual implementation of an investment strategy focusing on smaller cap stocks.

We consider two different approaches to examine the possible impact of the investability of the smallest size portfolios. First, we examine the impact on the smallest size portfolio of filters related to the number of shares (as a percentage of the entire float) which trade in a given year. We consider three filters of 10%, 30%, and 50%. For example, if in December of one year the total trading volume in the past twelve months is less than 10% of the float, then that firm is deleted from any portfolio considerations for the subsequent year and the size portfolios are sorted on the remaining "investable" stocks. Results are presented in Table 8. For each of the filters, we find that the small size portfolio continues to outperform larger size portfolios by a wide margin. With the 10% filter we find that the smallest size portfolio has an average monthly return of 2.87% (40.40% annualized) which is slightly lower than the unconstrained return of 3.17% (45.43% annualized) and the largest portfolio has an average monthly return of 0.88% (11.02% annualized) which is slightly lower than the average return for the unconstrained portfolio of 0.90% (11.35% annualized). As we move to the more restrictive turnover filters we

continue to find the average return for the smallest return decreasing, to 2.59% per month (35.87% annualized) for the smallest size portfolio and 0.81% per month (10.02% annualized) for the largest size portfolio based on the 50% filter. The significant block holdings in the Canadian market result in the average turnover in the Canadian market being lower than in the U.S. but more similar to those in many other countries, leaving the 50% turnover filter as a very restrictive investability criteria in the Canadian context. Thus even with these constraints, the size effect in Canada remains robust.

Second, we perform simulations based on the CFMRC daily database counterpart of the CFMRC monthly database considered in the previous analysis. Our daily data consist of the closing stock price, number of shares outstanding, the daily trading volume and the average size of trades on each day. Due to data limitations we are restricted to the period from 1995 to 2009. The stocks are sorted into deciles based on their market capitalization at the end of December of each year and these data are used to create value-weighted portfolios for each decile. We focus on portfolios consisting of the smallest decile (P1), the two smallest deciles (P1 and P2) and the three smallest deciles (P1, P2, and P3). For comparison purposes, the average monthly compound total return on the S&P/TSX Canadian market index was 0.79% over the 1995 to 2009 period, or 9.96% on an annualized basis and the average T-bill yield (Cansim series v12176 and v121778) was 3.62%.

In the first stage of our analysis, we investigate the impact of some of the most basic costs and constraints faced by actual portfolio managers. We incorporate a flat commission rate of $100 per trade and we allow the investment managers to buy (and sell) up to 100% of the trading

volume that had occurred on the rebalancing day and continue to transact up to 100% of the daily trading volume each day until the required position for the portfolio is attained. There are no other constraints applied to the acquiring or disposing of shares due to the rebalancing of the portfolios. This is done assuming initial investments in the portfolios in 1995 of $10 million, $30 million, or $50 million.

The results in Panel A of Table 9 are for this relatively unrestricted investment strategy where we present average monthly compound returns and standard deviations. We first consider a comparison of different portfolios with a given initial investment (i.e., within the rows of Panel A). Consistent with our previous findings, the returns are best for portfolios focusing on the smallest stocks (i.e., P1), with subsequent declies in returns for P1/P2 and then P1/P2/P3. For example, for the initial investment of $10 million, the average monthly return for the P1 portfolio is 5.56%, for the P1/P2 portfolio is 3.06%, and for the P1/P2/P3 portfolio is1.88%. Given the high standard deviation of the P1 portfolio returns, the highest Sharpe ratio (not reported) in all cases is for the P1/P2 portfolio. As we increase the amount of the initial investment (i.e., within the columns), not surprisingly we find that returns decrease as the size of the investment increases. Larger initial investments require more time and effort to attain investments at the desired proportions, so the returns tend to be smaller as investors try to invest more money, especially when focusing on the smallest decile, P1, where the time and cost to obtain the necessary investments would be more significant due to the lower liquidity of their shares. As expected, changes in returns tend to be less dramatic for the P1/P2 portfolio as well as the P1/P2/P3 portfolio.

Taking the analysis a step further, in Panel B of Table 9 we incorporate additional constraints faced by investors. We continue to assume a flat commission rate on each trade but we now restrict the maximum ownership position a manager may take on any stock to be 30%. This constraint is to prevent investors from outright owning firms in this decile. We also allow for trading of only up to 10%, 20%, or 30% of the actual volume on the rebalancing day or the volume on the subsequent days until the desired position has been obtained. This constraint is added to prevent the implementation of this trading strategy from moving the market for these stocks substantially and thus mitigating any price impact effects.

We find that the returns, once again, generally decrease as the size of the initial investment increases (i.e., comparisons within the columns of Panel B for a given level of trading volume) for the P1 and P2/P2 portfolios, but there is no pattern for the P1/P2/P3 portfolio. We find that an increase in the percentage of the daily trading volume that the investor can utilize (i.e., within the columns for a given level of initial investment) increases the returns. This suggests that the ability to more quickly get into and out of the desired positions improves the returns from the strategy. The trade-off is that these larger trades could move the market, an effect that is generally assumed to be a non-issue in most studies yet could potentially play a significant role in the actual implementation of such trading strategies.

Overall our analysis shows that there continues to be a small firm premium that can be realized by investing in the smallest firms even when we consider different types of constraints faced by portfolio managers. However, from a return-to-risk perspective as captured by Sharpe ratios, the P1/P2 portfolio is superior. Though Canadian small cap firms would likely be considered

microcap firms in markets such as the United Kingdom and the United States, we find clear evidence of excess returns that can be realized by investors. Standard academic analysis of the returns from investing in different types of portfolios using monthly price and return data generally assume that all of the required positions can be obtained on the day of rebalancing with no market impact. Our results show that this overstates the actual returns available to such trading strategies, but the size of this overstatement depends on several factors (i.e., size of the initial position and how the rebalancing transactions are performed). Nevertheless, even after incorporating realistic constraints with respect to the investability of these trading strategies, we continue to find that investors can generate significant returns by focusing on smaller capitalization stocks. The focus, however, needs to recognize the potential trade-offs with respect to both returns (i.e., the smallest cap stocks have the highest unconstrained returns) and transaction costs/investability (i.e., the larger cap stocks are more liquid and thus cheaper and easier to incorporate into a portfolio).

5. Summary and Conclusions

The goal of our analysis was to revisit the benefits of portfolio diversification (e.g., Markowitz (1952)), in particular international diversification (e.g., Solnik (1974)) and diversification across size or market capitalization (e.g., Banz (1981) and Reinganum (1981)). We consider Canadian small stocks as a unique asset class. Consistent with existing research, we find a significant size effect in the Canadian market, however, we find that the size effect is persistent over time and does appear to include a risk premium related to changes in economic conditions particularly around crises periods. Our results are consistent with the general notion that small stocks have higher betas than large stocks, but the return differences during and subsequent to major market

events suggest that during those periods small stocks are much more sensitive to risk than traditional risk measures such as beta would dictate. This provides evidence which supports the empirical application of the return differential between small and large stocks as a factor in the three factor asset pricing model of Fama and French's (1992, 1993) and its derivatives.

As a result of the excess returns apparently available from Canadian small stocks, we investigate the benefits of considering small stocks as part of an overall portfolio both domestically (i.e., from a purely Canadian perspective) as well as globally. We find clear evidence that both types of investors can benefit from diversification where this diversification includes a tilt toward small market capitalization stocks. Because of the potential constraints limiting the ability to invest in the small size portfolio, we also examine the potential investability of the stocks in this portfolio. With the limited average trading volume for the stocks in this portfolio, it is recognized that investability considerations could diminish the potential benefits from such a diversification strategy, but nonetheless such a strategy may be worth pursuing. We provide an approach for examining investability issues including transaction costs, ownership stake, and liquidity, which should be included in any empirical studies that focus on small stocks.

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Table 1
Summary Statistics

Summary statistics of monthly returns of portfolios, 1950-2009, as well as size, as measured by market capitalization of equity as of December 31 of each year, average number of stocks, and average monthly trading volume in thousands of shares, average prices, and average betas (as reported in the CFMRC database, based on 60 months of data for regressions).Betas are available starting in 1958 and trading volume is available starting in 1963. The Sharpe ratio is measured as the mean monthly return in excess of the monthly Treasury bill return (from the CFMRC database) divided by the monthly standard deviation of returns. P1 is the portfolio comprised of the smallest decile stocks while P10 is the largest. S30 and S50 are the portfolios comprised of the smallest 30% and 50% respectively, while B30 and B50 are the portfolios comprised of the biggest 30% and 50% respectively. Each year on the last trading day (i.e., around December 31) stocks are sorted by size and must have a traded price on that day or the previous day. Panel A displays equal-weighted returns while Panel B displays value-weighted returns.

Panel A: Equal-Weighted Returns (%), Sharpe Ratio, Size and Number of Stocks

Portfolio	Mean Return	Median Return	Standard Deviation	Sharpe Ratio	Minimum Return	Maximum Return	Average FirmSize ($millions)	Average Number of Stocks
P1 (small)	3.21	1.69	10.29	0.27	-47.76	99.43	1.83	47
P2	1.77	1.29	6.95	0.19	-29.18	44.58	4.57	47
P3	1.11	1.00	5.84	0.11	-27.07	41.18	8.22	47
P4	1.07	1.10	5.71	0.11	-32.54	22.26	13.53	47
P5	0.95	0.88	5.58	0.09	-29.56	25.06	21.81	47
P6	0.87	1.07	5.34	0.08	-26.38	27.81	35.62	47
P7	0.80	0.77	5.32	0.06	-28.05	19.14	61.05	47
P8	0.94	1.13	5.30	0.09	-24.08	31.68	118.19	47
P9	0.89	0.83	5.12	0.08	-27.25	44.31	291.38	47
P10 (big)	0.88	1.05	4.60	0.09	-23.04	18.96	2,239.11	47
S30	2.74	1.82	9.00	0.25	-46.79	66.53	4.87	142
S50	2.09	1.79	7.35	0.22	-39.36	42.95	9.99	237
B50	0.94	1.16	5.21	0.09	-27.22	19.45	549.07	237
B30	0.94	1.11	5.08	0.09	-25.40	19.50	882.89	142

Panel B: Value-Weighted Returns (%), Trading Volume, and Prices

Portfolio	Mean Return	Median Return	Standard Deviation	Minimum Return	Maximum Return	Average Trading Volume	Average Price ($)	Average Beta
P1 (small)	3.17	1.81	11.07	-48.08	131.36	699.6	2.23	1.14
P2	1.74	1.20	6.87	-28.63	42.77	772.1	4.38	1.15
P3	1.10	0.97	5.87	-26.94	44.94	910.7	5.74	1.10
P4	1.05	1.09	5.67	-32.39	22.33	756.6	7.92	1.11
P5	0.95	0.86	5.56	-29.47	25.85	960.2	9.55	1.12
P6	0.87	1.09	5.32	-26.95	23.73	950.7	13.16	1.06
P7	0.80	0.78	5.34	-28.54	20.84	1,184.0	16.60	1.03
P8	0.93	1.06	5.29	-25.07	27.58	1,768.4	21.89	1.01
P9	0.93	0.88	5.09	-25.40	46.32	2,476.2	35.07	0.96
P10 (big)	0.90	1.15	4.70	-20.05	18.20	6,315.7	39.43	0.99
S30	1.71	1.58	6.75	-32.08	40.60	794.1	4.12	1.13
S50	1.25	1.24	5.98	-31.88	28.23	819.8	5.96	1.12
B50	0.92	1.07	4.74	-21.13	17.59	2,539.0	25.23	1.01
B30	0.92	1.07	4.74	-20.88	17.50	3,520.1	32.13	0.99

Table 2
Small versus Big Portfolio Returns by Decade

Average monthly portfolio returns, 1950-2009, overall and by decade. P1, S30, and S50 are the portfolios comprised of the smallest 10%, 30% and 50% respectively, while P10, B30, and B50 are the portfolios comprised of the biggest 10%, 30% and 50% respectively. Each year on the last trading day (i.e., around December 31) stocks are sorted by size and must have a traded price on that day or the previous day. T-test p-values are reported for tests of differences in means between corresponding small and big portfolios. Panel A displays equal-weighted returns while Panel B displays value-weighted returns.

Panel A: Equal-Weighted

	Returns (%)						t-test p-values		
Portfolio	**P1 (small)**	**S30**	**S50**	**B50**	**B30**	**P10 (big)**	**P1-P10**	**S30-B30**	**S50-B50**
Overall	3.21	2.74	2.09	0.94	0.94	0.88	0.000	0.000	0.000
1950-1959	1.59	1.30	1.14	0.95	0.98	0.77	0.131	0.310	0.367
1960-1969	2.78	2.44	2.02	1.02	0.94	0.90	0.012	0.012	0.036
1970-1979	3.16	2.83	2.35	1.35	1.22	1.03	0.007	0.034	0.111
1980-1989	2.32	2.04	1.45	0.88	1.09	1.28	0.173	0.184	0.273
1990-1999	5.84	4.82	3.25	0.63	0.73	0.71	0.000	0.000	0.002
2000-2009	3.43	2.87	2.21	0.79	0.69	0.58	0.007	0.027	0.084

Panel B: Value-Weighted

	Returns (%)						t-test p-values		
Portfolio	**P1 (small)**	**S30**	**S50**	**B50**	**B30**	**P10 (big)**	**P10-P10**	**S30-B30**	**S50-B50**
Overall	3.17	1.71	1.25	0.92	0.92	0.90	0.000	0.005	0.119
1950-1959	0.98	0.79	0.88	0.81	0.81	0.71	0.351	0.487	0.446
1960-1969	2.93	1.93	1.51	0.87	0.85	0.84	0.018	0.015	0.006
1970-1979	3.21	1.93	1.73	1.09	1.06	1.01	0.006	0.130	0.195
1980-1989	2.34	0.93	0.71	1.10	1.11	1.16	0.144	0.413	0.314
1990-1999	6.01	2.80	1.33	1.11	1.13	1.17	0.001	0.020	0.372
2000-2009	3.32	1.78	1.33	0.50	0.50	0.48	0.009	0.086	0.173

Table 3
Small versus Big Portfolio Returns by Month

Average monthly portfolio returns, 1950-2009, during January versus February through December. P1, S30, and S50 are the portfolios comprised of the smallest 10%, 30% and 50% respectively, while P10, B30, and B50 are the portfolios comprised of the biggest 10%, 30% and 50% respectively. Each year on the last trading day (i.e., around December 31) stocks are sorted by size and must have a traded price on that day or the previous day. T-test p-values are reported for tests of differences in means between corresponding small and big portfolios. Panel A displays equal-weighted returns while Panel B displays value-weighted returns.

Panel A: Equal-Weighted

	Returns (%)						t-test p-values		
Portfolio	**P1 (small)**	**S30**	**S50**	**B50**	**B30**	**P10 (big)**	**P1-P10**	**S30-B30**	**S50-B50**
January	11.80	10.36	8.06	2.88	2.32	1.74	0.000	0.000	0.000
February	4.81	3.84	3.00	0.94	0.85	0.66	0.002	0.008	0.028
March	2.38	2.35	1.93	1.43	1.42	1.15	0.121	0.202	0.313
April	3.99	3.22	2.48	0.62	0.83	0.71	0.024	0.046	0.055
May	2.43	2.41	1.84	0.90	1.01	1.16	0.099	0.898	0.167
June	2.08	1.33	0.65	-0.15	-0.04	0.38	0.193	0.184	0.245
July	1.84	1.34	1.06	0.95	0.90	0.78	0.157	0.321	0.447
August	2.09	1.75	1.16	0.37	0.40	0.66	0.133	0.132	0.246
September	2.84	1.93	0.94	-1.00	-1.12	-1.04	0.014	0.022	0.063
October	-0.27	-0.75	-1.02	-1.30	-1.04	-0.70	0.384	0.422	0.422
November	2.32	1.90	1.33	1.25	1.48	1.88	0.370	0.371	0.473
December	2.23	3.17	3.60	4.28	4.21	3.13	0.205	0.179	0.240
Feb. to Dec.	2.43	2.04	1.54	0.76	0.81	0.80	0.000	0.001	0.011

Table 3 (continued)
Small versus Big Portfolio Returns by Month

Panel B: Value-Weighted

	Returns (%)						t-test p-values		
Portfolio	**P1 (small)**	**S30**	**S50**	**B50**	**B30**	**P10 (big)**	**P1-P10**	**S30-B30**	**S50-B50**
January	11.44	7.03	5.32	1.94	1.82	1.64	0.000	0.000	0.001
February	4.05	2.04	1.75	0.57	0.56	0.47	0.006	0.065	0.091
March	2.51	1.74	1.37	1.45	1.43	1.35	0.144	0.379	0.466
April	3.41	1.79	1.43	0.65	0.68	0.66	0.049	0.122	0.181
May	2.44	1.67	1.16	1.10	1.13	1.15	0.103	0.286	0.472
June	2.29	0.08	-0.33	0.17	0.20	0.33	0.212	0.448	0.280
July	1.43	0.31	0.55	1.01	0.99	0.94	0.305	0.180	0.280
August	2.01	1.31	0.59	0.54	0.52	0.53	0.124	0.232	0.479
September	3.15	0.41	-0.29	-1.21	-1.22	-1.23	0.017	0.064	0.181
October	-0.50	-1.36	-1.41	-0.54	-0.49	-0.34	0.456	0.254	0.247
November	2.49	0.90	0.58	1.78	1.84	2.04	0.374	0.192	0.112
December	3.31	4.55	4.23	3.51	3.48	3.22	0.471	0.154	0.174
Feb. to Dec.	2.42	1.23	0.89	0.82	0.84	0.83	0.000	0.104	0.416

Table 4

Small versus Big Portfolio Returns During Expansion or Recession Periods

Average monthly value-weighted portfolio returns, 1950-2009, during expansionary or recessionary periods. Recession dates prior to 2008 are from Atta-Mensah and Tkacz (1998); the 2008-2009 recession date is based on announced quarterly real GDP changes. P1, S30, and S50 are the portfolios comprised of the smallest 10%, 30% and 50% respectively, while P10, B30, and B50 are the portfolios comprised of the biggest 10%, 30% and 50% respectively. Each year on the last trading day (i.e., around December 31) stocks are sorted by size and must have a traded price on that day or the previous day. T-test p-values are reported for tests of differences in means between corresponding small and big portfolios. Panel A displays expansionary period returns while Panel B displays recessionary period returns. Monetary policy is loose (tight) if the bank rate is below (above) the 12-month moving average.

Panel A: Expansions

	Returns						t-test p-values		
Year/Month	**P1 (small)**	**S30**	**S50**	**B50**	**B30**	**P10 (big)**	**P1-P10**	**S30-B30**	**S50-B50**
1950/1-1956/12	0.96	0.83	1.35	1.12	1.14	1.06	0.449	0.299	0.356
1958/1-1960/3	2.16	1.48	0.86	0.82	0.79	0.67	0.165	0.233	0.483
1961/4-1974/5	2.89	1.74	1.32	0.70	0.69	0.68	0.003	0.015	0.020
1975/4-1979/12	4.57	3.06	2.96	1.87	1.81	1.69	0.015	0.107	0.128
1980/7-1981/6	2.48	1.36	2.16	0.43	0.42	0.86	0.317	0.377	0.251
1983/1-1990/3	2.40	0.76	0.35	1.14	1.17	1.18	0.138	0.315	0.153
1991/4-2008/9	4.33	2.24	1.28	0.91	0.93	0.96	0.000	0.020	0.254
2009/7-2009/12	4.91	5.35	6.01	2.13	2.03	1.68	0.092	0.042	0.046
Average	3.17	1.71	1.25	0.92	0.92	0.99	0.000	0.005	0.119

Panel B: Recessions

	Returns						t-test p-values		
Year/Month	**P1 (small)**	**S30**	**S50**	**B50**	**B30**	**P10 (big)**	**P1-P10**	**S30-B30**	**S50-B50**
1957/1-1957/12	-2.67	-1.58	-2.47	-1.85	-1.89	-1.98	0.386	0.440	0.373
1960/4-1961/3	2.03	1.28	1.52	1.75	1.73	1.73	0.451	0.399	0.444
1974/6-1975/3	0.68	-0.22	-0.25	0.37	0.43	0.33	0.470	0.443	0.445
1980/1-1980/6	9.94	6.51	5.04	3.33	3.29	3.44	0.294	0.354	0.413
1981/7-1982/12	-0.63	-0.74	-0.50	-0.27	-0.25	-0.13	0.430	0.429	0.467
1990/4-1991/3	12.02	1.64	-0.25	0.21	0.21	0.35	0.149	0.260	0.416
2008/10-2009/6	3.41	3.16	2.49	-0.62	-0.67	-0.77	0.272	0.281	0.317
Average	2.82	0.92	0.89	0.68	0.68	0.15	0.119	0.375	0.386

Panel C: Loose versus Tight Monetary Policy

	Returns						t-test p-values		
Regime	**P1 (small)**	**S30**	**S50**	**B50**	**B30**	**P10 (big)**	**P1-P10**	**S30-B30**	**S50-B50**
Loose	4.09	2.36	1.87	1.14	1.12	1.06	0.000	0.002	0.030
Tight	2.21	1.05	0.62	0.69	0.71	0.74	0.014	0.227	0.438

Table 5
Canada – U.S. Comparison

Average monthly value-weighted portfolio returns (Return), standard deviations (Std. Dev.) return differences between Canadian and the U.S. portfolios, and Sharpe ratios (Sharpe) 1950-2009. Returns are in local currencies for each country. P1 is the portfolio comprised of the smallest decile stocks while P10 is the largest. S30 and S50 are the portfolios comprised of the smallest 30% and 50% respectively, while B30 and B50 are the portfolios comprised of the biggest 30% and 50% respectively. All U.S. data including the Fama and French's SMB factor are from Ken French's webpage,http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/.In the row "S50-B50" below, the U.S. data are based the SMB factor. T-test p-values are reported for tests of differences in means between the Canadian and U.S. samples.

	Canada			U.S.				
Portfolio	**Return**	**Std. Dev.**	**Sharpe**	**Return**	**Std. Dev**	**Sharpe**	**Return Differences**	**t-test p-value**
P1 (small)	3.17	11.07	0.24	1.17	6.09	0.13	1.99	0.000
P2	1.74	6.87	0.19	1.14	5.99	0.13	0.60	0.041
P3	1.10	5.87	0.11	1.19	5.74	0.14	-0.09	0.381
P4	1.05	5.67	0.10	1.14	5.52	0.14	-0.09	0.377
P5	0.95	5.56	0.09	1.15	5.33	0.14	-0.20	0.241
P6	0.87	5.32	0.08	1.10	5.02	0.14	-0.23	0.200
P7	0.80	5.34	0.06	1.11	4.93	0.15	-0.31	0.127
P8	0.93	5.29	0.09	1.06	4.82	0.14	-0.14	0.297
P9	0.93	5.09	0.09	1.02	4.45	0.14	-0.09	0.356
P10 (big)	0.90	4.70	0.09	0.89	4.15	0.12	0.01	0.494
P1-P10	2.27	10.32	0.18	0.28	4.66	-0.02	1.99	0.000
S30	1.71	6.75	0.19	1.17	5.85	0.13	0.54	0.054
B30	0.92	4.74	0.10	0.93	4.19	0.13	-0.01	0.479
S30-B30	0.79	5.21	0.06	0.24	3.71	-0.04	0.55	0.011
S50	1.25	5.98	0.13	n/a	n/a	n/a	n/a	n/a
B50	0.92	4.74	0.10	n/a	n/a	n/a	n/a	n/a
S50-B50	0.33	3.88	-0.03	0.18	2.93	-0.07	0.16	0.189

Table 6
Diversified Balance Portfolio Comparison

Comparison of annualized returns (Return), standard deviations (SD), and Sharpe Ratios (Sharpe) on a variety of balanced portfolios including and excluding an investment in Canadian small stocks, 1950-2009 and two sub-periods, 1950-1979 and 1980-2009. Stocks are measured by the overall CFRM index value-weighted return, small stocks include a value-weighted portfolio comprised of the smallest 10%, and bonds represent the long-term government bond returns. The Sharpe ratio is measured as annualized portfolio returns in excess of Treasury bill returns divided by annualized standard deviation of returns.

	1950-2009			1950-1979			1980-2009		
	Return	SD	Sharpe	Return	SD	Sharpe	Return	SD	Sharpe
100% stocks	11.79%	15.44%	0.396	12.46%	14.15%	0.570	11.12%	16.64%	0.250
100% small stocks	45.39%	38.36%	1.035	33.25%	29.12%	0.991	58.13%	45.46%	1.126
100% bonds	7.33%	8.41%	0.197	3.24%	5.48%	-0.211	11.46%	10.40%	0.432
50% stocks, 50% bonds	9.46%	9.60%	0.394	7.61%	8.20%	0.392	11.29%	10.78%	0.401
40% stocks, 10% small stocks, 50% bonds	12.43%	10.07%	0.670	9.50%	8.44%	0.605	15.34%	11.40%	0.735
60% stocks, 40% bonds	9.88%	10.56%	0.398	8.48%	9.29%	0.440	11.25%	11.67%	0.368
50% stocks, 10% small stocks, 40% bonds	12.86%	11.04%	0.651	10.40%	9.50%	0.632	15.30%	12.33%	0.780

Table 7

Comparison of International Stock Returns with Canadian Market and Small Stock Returns

Comparison of U.S. dollar total returns across ten developed markets: Australia, Canada (Can), France, Germany (Germ), Hong Kong (HK), Italy, Japan, Netherlands (Neth), U.K. and U.S., Monthly data for the 1973-2009 period are obtained from Datastream. Canadian small stocks (Can small) are comprised of value-weighted returns of the smallest 10% (P1, see Table 1) converted to U.S. dollars. Panel A indicates correlations. Panel B provides a comparison of returns (Return), standard deviations (SD), and Sharpe Ratios (Sharpe) on a variety of portfolios including and excluding an investment in Canadian small stocks. The Sharpe ratio is measured as annualized portfolio returns in excess of U.S. Treasury bill returns (from Ken French's website) divided by annualized standard deviation of returns.

Panel A: Correlations

	Australia	**Can**	**France**	**Germ**	**HK**	**Italy**	**Japan**	**Neth**	**UK**	**US**	**Can small**
Australia	1.000										
Can	0.655	1.000									
France	0.512	0.558	1.000								
Germ	0.456	0.515	0.700	1.000							
HK	0.407	0.415	0.371	0.389	1.000						
Italy	0.381	0.436	0.586	0.542	0.290	1.000					
Japan	0.364	0.353	0.433	0.413	0.310	0.366	1.000				
Neth	0.554	0.675	0.742	0.792	0.445	0.544	0.480	1.000			
UK	0.556	0.590	0.626	0.559	0.431	0.481	0.415	0.718	1.000		
US	0.566	0.752	0.576	0.558	0.402	0.412	0.348	0.697	0.633	1.000	
Can small	**0.317**	**0.372**	**0.174**	**0.155**	**0.234**	**0.205**	**0.110**	**0.221**	**0.245**	**0.213**	**1.000**

Panel B: Diversified Portfolios for a U.S. Investor

	Return	**Std Dev**	**Sharpe**
100% U.S. equities	11.29%	15.99%	0.345
90% U.S. equities, 10% Canadian equities	11.42%	15.90%	0.355
90% U.S. equities, 10% equal-weighted international	11.59%	15.71%	0.370
90% U.S. equities, 10% Canadian small stocks	15.24%	15.87%	0.596
Equal-weighted international	13.96%	17.03%	0.480
Equal-weighted international and Canadian small stocks	17.37%	17.09%	0.678

Table 8
Investability of Canada Size Portfolios

Summary statistics of monthly value-weighted returns (Return) and standard deviations (Std Dev) of portfolios, 1950-2009, as measured by market capitalization of equity as of December 31 of each year. Filters are used to eliminate stocks in the portfolios according to the turnover measured as the average trading volume in a given year divided by the total market capitalization.

	Portfolio	P1 (small)	P2	P3	P4	P5	P6	P7	P8	P9	P10 (big)
Unconstrained	**Return**	**3.17%**	**1.74%**	**1.10%**	**1.05%**	**0.95%**	**0.87%**	**0.80%**	**0.93%**	**0.93%**	**0.90%**
	Std Dev	11.07%	6.87%	5.87%	5.67%	5.56%	5.32%	5.34%	5.29%	5.09%	4.70%
Turnover > 10%	**Return**	**2.87%**	**1.63%**	**0.88%**	**0.98%**	**0.67%**	**0.87%**	**0.75%**	**0.85%**	**0.87%**	**0.88%**
	Std Dev	10.66%	7.70%	6.68%	6.58%	6.36%	6.06%	6.04%	5.58%	5.44%	4.51%
Turnover > 30%	**Return**	**2.65%**	**1.45%**	**0.80%**	**0.87%**	**0.57%**	**0.78%**	**0.68%**	**0.78%**	**0.80%**	**0.84%**
	Std Dev	10.36%	7.25%	6.50%	6.38%	6.19%	5.93%	5.94%	5.49%	5.33%	4.45%
Turnover > 50%	**Return**	**2.59%**	**1.35%**	**0.72%**	**0.82%**	**0.50%**	**0.74%**	**0.64%**	**0.74%**	**0.77%**	**0.81%**
	Std Dev	10.27%	7.14%	6.41%	6.29%	6.12%	5.88%	5.89%	5.45%	5.31%	4.42%

Table 9
Further Investigation of the Investability of Canada Size Portfolios

Average monthly compound returns (Returns) and standard deviations (Std Dev) from investments in Canadian small stocks in the smallest decile (P1), the two smallest deciles (P1/P2) and the three smallest deciles (P1/P2/P3) based on simulations over the 1995-2009 period using daily data for each stock. Portfolios are value-weighted. For annual rebalancing, a flat commission rate of $100 per trade is incorporated. Panel A reports results based on various levels of initial investments in the portfolio ($10 million, $30 million, or $50 million) but with no restrictions placed on the maximum ownership position in any one stock and allowing for trading in up to 100% of the actual volume on the rebalancing day(s) in January each year. Panel B reports results based on various levels of initial investments in the portfolio ($10 million, $30 million, or $50 million), with restrictions placed on the maximum ownership position of 30% in any one stock and allowing for trading in up to either 10%, 20%, or 30% of the actual volume on the rebalancing day(s) in January each year. For comparison, the average monthly compound total return on the S&P/TSX Canadian market index was 0.79%.

Panel A: No ownership restrictions and trading allowed up to 100% of actual volume

Initial Portfolio Investment	Portfolio(s)	P1	P1/P2	P1/P2/ P3
$10 million	**Return**	**5.66%**	**3.06%**	**1.88%**
	Std Dev	42.36%	11.92%	8.47%
$30 million	**Return**	**3.92%**	**3.38%**	**1.80%**
	Std Dev	26.86%	15.99%	8.27%
$50 million	**Return**	**3.39%**	**3.02%**	**1.71%**
	Std Dev	23.27%	14.12%	8.09%

Panel B: 30% maximum ownership restriction in any one stock and trading up to 10-30% of actual volume

Initial Portfolio Investment	Maximum Trading Volume	Portfolio(s)	P1	P1/P2	P1/P2/ P3
$10 million	**10%**	**Return**	**3.23%**	**2.67%**	**1.54%**
		Std Dev	23.69%	13.35%	8.12%
	20%	**Return**	**3.55%**	**3.13%**	**1.68%**
		Std Dev	24.24%	15.56%	8.15%
	30%	**Return**	**3.83%**	**3.31%**	**1.78%**
		Std Dev	26.44%	15.61%	8.21%
$30 million	**10%**	**Return**	**2.14%**	**1.99%**	**1.86%**
		Std Dev	15.31%	10.08%	10.80%
	20%	**Return**	**2.39%**	**2.35%**	**2.21%**
		Std Dev	14.31%	10.96%	13.64%
	30%	**Return**	**2.65%**	**2.53%**	**1.57%**
		Std Dev	16.69%	11.70%	8.10%
$50 million	**10%**	**Return**	**1.80%**	**1.69%**	**1.58%**
		Std Dev	14.42%	9.52%	8.78%
	20%	**Return**	**2.10%**	**2.01%**	**1.96%**
		Std Dev	13.33%	9.53%	11.45%
	30%	**Return**	**2.22%**	**2.17%**	**2.18%**
		Std Dev	13.45%	9.97%	13.27%

Figure 1

Domestic Portfolio Comparison

Comparison of annualized returns and standard deviations on a variety of balanced Canadian portfolios including and excluding an investment in Canadian small stocks, 1950-2009. Stocks are measured by the overall CFRM index value-weighted return, small stocks include a value-weighted portfolio comprised of the smallest 10%, and bonds represent the long-term government bond returns.

Figure 2
International Stock Portfolio Comparisons with Canadian Small Stocks
Comparison of U.S. dollar total returns for U.S. equities, international equities (Australia, Canada, France, Germany, Hong Kong, Italy, Japan, Netherlands, U.K. and U.S.), and Canadian small stocks. Monthly data for the 1973-2009 period are obtained from Datastream. Canadian small stocks (Can small) are comprised of value-weighted returns of the smallest 10% (P1, see Table 1) converted to U.S. dollars.