THE DIVERSIFICATION EFFECTS OF THE INCLUSION OF REAL ESTATE ASSETS IN A CANADIAN INVESTMENT PORTFOLIO: A 2010 TO 2018 PERSPECTIVE

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Abstract

This study investigates the effects of adding real estate investments such as REITs and real estate mutual funds to a Canadian equities and fixed income portfolio during the time period from 2010 to 2018. Detailed analysis has been performed to arrive at the conclusion that adding real estate funds to a Canadian investment portfolio can significantly improve the returns for the investor. Diversifying by adding real estate assets to a portfolio not only improves the return, but also lowers the overall risk of the portfolio.

Even though there is significant overlap between the constituents of the S&P TSX Composite Real Estate sector and the real estate funds, the data and analysis presented in this paper demonstrates that it is still very advisable to include real estate funds into Canadian investment portfolios.

There are many studies which have examined the effects of adding real estate investment trusts to a portfolio. However, there are fewer recent studies which have examined these effects for a Canadian investment portfolio that is not yet invested in real estate assets. This study uses the monthly returns of the S&P TSX Composite, S&P TSX REIT, the Bloomberg Canadian REIT Index (BBCREIT) and the Thompson Reuters Canadian All bond All Index (TRCAALL) in order to create an optimal tangency portfolio, including a thorough risk/return analysis, a data robustness test for different time periods from 2010 to 2018, and a regression analysis is also included.

Keywords

Real estate investment trusts (REITs); Investment portfolio; Minimum-Variance Portfolio (Efficient Frontier); Regression analysis; Sharpe ratio; real estate mutual fund trust.

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Introduction

Diversification is a means to reduce the risk of loss of capital. Investing all the capital in one investment vehicle, like – equities, bonds, currency, etc – might lead to considerable loss of capital if the chosen vehicle underperforms. However, if the capital is invested in many different vehicles, the risk of loss of capital is substantially reduced [2], [4].

If the diversification is achieved by investing in growth and defensive assets, superior return on investment can be achieved by substantially reducing the risk of loss of capital [3]. If the defensive assets underperform, the growth assets not only tend to compensate the loss of defensive assets but instead tend to generate higher returns [3], [5]. If the growth assets underperform, the defensive assets tend to protect the invested capital [6], [8]. Hence, apart from reducing the loss of capital, diversification helps in generating higher returns.

In 1952, Harry Markowitz introduced the Modern Portfolio Theory (MPT). Modern Portfolio Theory (MPT) is a formal extension and representation of the benefits of diversification. Modern Portfolio Theory (MPT) proposes to construct a portfolio of assets which have low correlation between them in order to achieve the highest return for the lowest level of risk [9], [17], [19].

In this paper, the effects of adding real estate investment trusts and real estate focused mutual funds to a traditional Canadian equity and bond investor's portfolio is analysed. For the purpose of this study a traditional Canadian investor is one who does not invest in real estate investment trusts (REITs) or real estate funds.

This study starts with a theoretical description of the concepts used in this study. After which, a detailed analysis of the effects that the inclusion of real estate assets has on the return and risk metrics of a traditional Canadian equities and fixed income portfolio.

Related literature

In their prize-winning paper "International evidence on real estate as a portfolio diversifier", (2004) in the Journal of Real Estate Research [28], Hoesli, M., Lekander, J., Witkiewicz, W. present data on the benefits of including real estate assets in mixed asset portfolios. [28] The author's conclusion is that real estate is indeed an effective portfolio diversification tool, and that the optimal allocation to real estate is between 15% to 25%, and that the inclusion of the

real estate assets leads to an overall risk reduction for the mixed asset portfolio by about 5% ton 10% if diversifying with domestic real estate assets and 10% to 20% if diversifying with international real estate assets [28].

The authors Hoesli, M., Lekander, J., Witkiewicz, W. (2004) present a multitude of supporting literature, including Chaudhry, Myer and Webb's (1999) paper titled "Stationarity and Cointegration in Systems with Real Estate and Financial Assets" in the Journal of Real Estate Finance and Economics, the findings of which suggest that stocks have an inverse long-term relationship to real estate, and that the impact of stocks on the real estate market is much lower than its impact on bonds [50].

Hoesli, M., Lekander, J., Witkiewicz, W. (2004) also mention the intricacies pertaining to real estate data, namely that most appraisal-based real estate indices are smoothed. [28] The authors suggest looking at the serial correlation of the data in question to see if the data may be smoothed and to desmooth it if deemed advisable [50] by using a variant of a model introduced by Geltner (1993) [52] in the paper titled "Estimating Market Values from Appraised Values Without Assuming an Efficient Market" in the Journal of Real Estate Research, where Geltner (1993) proposes to use the average of the standard deviation of equities and fixed income instruments in the desmoothing process, instead of the assumption that the standard deviation for real estate is half that of equities, as has been made in many earlier studies [52].

There is also literature that challenges the smoothing assumption and suggests that the smoothing assumption can be explained by the fact that most researchers assume erroneously in the first place that there is smoothing in real estate data. [51] An example of such literature is presented in Lai and Wang's (1998) paper titled "Appraisal Smoothing: The Other Side of the Story" in the Real Estate Economics, in which the authors suggest that the positive risk-adjusted returns seen across many real estate assets is better explained by the fact that the real estate markets are illiquid and that the investors are simply being compensated for the illiquidity of the market as well as the high information costs associated with real estate [51].

The time window of the data analyzed by the authors is from 1987 to 2001, and analyzes returns data for asset classes (equities, fixed income, real estate) domestically and

internationally. The data looks at returns for Australia, France, UK, Sweden, Switzerland, The Netherlands, USA [50].

Purpose of the research

The purpose of this study is to analyze the effects on portfolio returns and corresponding risk levels of the inclusion of Canadian real estate assets (Canadian REITs or Canadian mutual funds that invest in Canadian real estate and/or REITs) into Canadian equity and fixed income portfolios, in order to see if the diversification benefits mentioned in the related literature hold true for Canadian investors in the 2010 to 2018 timeframe.

The time window for the study is from January 2010 to December 2018 in order to ensure that the data is recent so that the impact of recent economic and political changes are factored in, and so that the aftermath of the economic crises of 2008 is absorbed and represented in the recent data.

Definition of a Real Estate Investment Trust (REIT)

Real estate investment trust is a trust or entity which utilizes the pooled capital of many investors to purchase and manage the income generated by a property [7], [12]. The property may include any income generating property, like – offices, apartments, retirement homes, industries, etc. Real estate investment trusts originated in the United States. The structure and operations of real estate investment trust can be summarised in the picture below [16], [17], [24]:

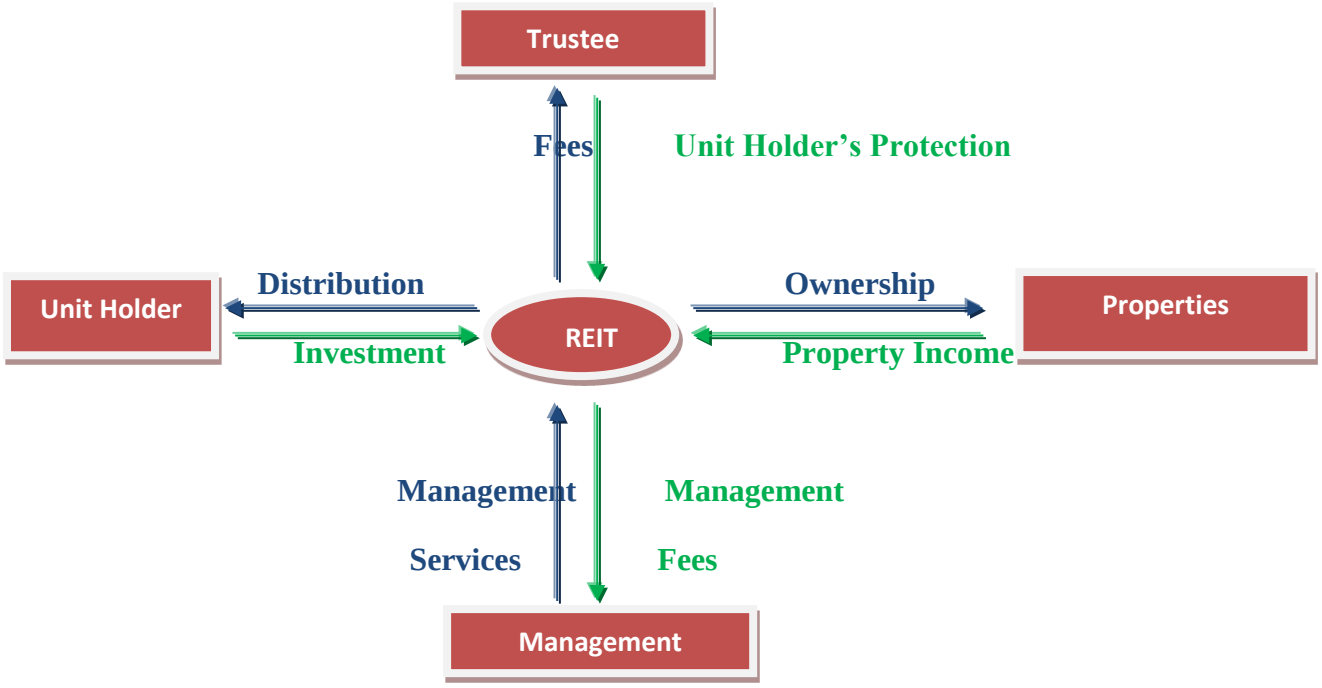

Figure 1

Real estate investment trusts allow investors to purchase units of real estate investment trusts on an exchange. This facilitates the public trading of real estate investment trusts. The first Canadian REIT was listed on the TSX in 1993. It should be noted that the traditional value of a property and the value of a REIT on the same property may be different. This leads to a REIT on a property to trade at a discount or at a premium to the actual value of the property [23], [25].

How Real Estate Investment Trusts (REITs) Operate

The operation of REITs can be summarised in four simple steps [20], [21].

Investors buy shares in REITs. REITs can be purchased either from publicly traded stock exchanges or from private sponsors. REITs then buy, develop, and, manage real estate assets. REITs generate income through rent, lease, or sale of real estate assets. REITs distribute 90% of their income to the investors.

Types of Real Estate Investment Trusts (REIT)

Real estate investment trusts (REIT) are a unique industry. REITs differ from commercial real estate as well. This difference is the reason why the prices of REITs and the actual properties in a REIT differ. Based on their operations real estate investment trusts can be classified as [18], [22]:

1- Equity REITs,
2- Mortgage REITs,
3- Hybrid REITs

Equity REITs

- These REITs purchase, manage, and own the property
- They differ from the real estate developers in the sense that these REITs don't sell the property; instead, they own and manage it.
- Income is generated by renting and leasing of the property own by these REITs
- 90% of Canadian REITs are equity REITs

Mortgage REITs

- These REITs do not own properties; instead, they loan money for mortgages. They even purchase existing mortgages or mortgage backed securities.
- There primary income is from interest received on the loan/mortgage.
- These REITs are sensitive to changes in interest rates; since, the dividend distribution comes from the interest earned.

Hybrid REITs

- These are combination of Equity REITs and Mortgage REITs
- They own property, as well as make loans
- They earn money through rent income, lease income as well as interest income.

Features of Canadian REITs

Governance

Canadian REITs are governed by the declaration made by the trust forming the REIT. Certain provisions of the Income Tax Act are also applicable to Canadian REITs [27].

Instrument

Canadian REITs must be closed-ended or open-ended mutual trust funds [28].

Revenue

At least 95% of the income earned by the REIT must be from renting or leasing of the property in case of equity REITs [29].

Asset Rule

At least 80% of the properties owned by an REIT should be in Canada. No more than 10% of the assets owned by an REIT could consist of bonds or equity [27].

Distribution of Income

Distribution of income to unit holders is decided by the trustee of the REITs. However, 85% to 95% of the profit earned by an REIT is distributed to it unit holders [30].

Taxation

As long as the income is distributed to unit holders, the income of an REIT is not taxed [30].

Canadian Investment Portfolio

For the purpose of this study, a Canadian investment portfolio that is not invested in real estate is first selected. It is assumed that the portfolio is invested in stocks and bonds. The study analyzes the returns generated by the portfolio after REITs and real estate focused are introduced [45].

Data Selection

The data of the below mentioned indices are used in this study:

- Thomson Reuters Canadian All Bond All (TRCAALL) – from January 2010 to December 2018 (Monthly Data)
- S&P_TSX REIT – from January 2010 to December 2018 (Monthly Data)
- Bloomberg Canadian REIT Index (BBCREIT) – from January 2010 to December 2018 (Monthly Data)
- S&P_TSX Composite – from January 2010 to December 2018 (Monthly Data)

*All currency values are in Canadian dollars (CAD).

Monthly data from January 2010 to December 2018 for Thomson Reuters Canadian All Bond All (TRCAALL) index, S&P_TSX REIT and the S&P_TSX Composite was obtained from www.investing.com [1]. The monthly returns data for the Bloomberg Canadian REIT Index (BBCREIT) was obtained from the Bloomberg terminal [49].

It should be noted S&P_TSX Composite has just ~3.4% [49] exposure to real estate. Thus, S&P_TSX Composite and S&P_TSX REIT can be considered as completely unrelated [46].

There are two main reasons for selecting the data range from January 2010 to December 2018:

1- To ensure that the data is relatively recent so that the impact of recent economic and political changes are factored in.
2- The aftermath of the economic crises of 2008 is absorbed and represented by the data from January 2010 to December 2018.

As the modern portfolio theory is applicable not only to individual stocks or bonds, indices rather than individual stocks, bonds, mutual funds or REITs are studied in this paper [37].

Research Approach

Modern Portfolio Theory (MPT) has been utilized to study the diversification effects of adding real estate investment trusts (REITs) and mutual funds that invest in Canadian real estate to a traditional Canadian investor's portfolio.

The yearly and monthly returns of S&P_TSX REIT, S&P/TSX Composite, the Thomson Reuters Canadian All Bond All (TRCAALL), has been analysed.

To further examine the impact of investing in an index of mutual funds that invest in real estate instead of the S&P_TSX REIT index, some further analysis was done by substituting the Bloomberg Canadian REIT Index (BBCREIT) returns in the place of the S&P_TSX REIT index returns. The Bloomberg Canadian Real Estate Investment Trust Index (BBCREIT) is a market capitalization weighted index of closed-end mutual fund trusts having significant exposure to Canadian real estate. [49]

Even though the BBCREIT index and the S&P TSX Composite has significant overlap in terms of constituents, the real estate sector weight on the S&P TSX is only ~3.4% [49] of the index, and the inclusion of real estate funds still has a tremendous impact on risk adjusted returns for an equities or fixed income portfolio.

Mean variance model and the efficient frontier have been used to construct a minimum-variance portfolio and then proceeded to finding the optimal tangency portfolio and the Capital Allocation Line (CAL). The optimal tangency portfolio was found and shown relative to all the other asset holdings. A regression analysis have also been performed to validate the findings of the risk return analysis.

A data robustness test has also been performed in order to bring validity to the results by analyzing the efficient frontiers and risk/return profile of the data throughout several time windows within the main 2010 to 2018 timeframe. This process involves removing two years from the data and recomputing the efficient frontiers, CAL and portfolio weights. The resulting data is then plotted and presented.

Returns Analysis

Equity Portfolio (Stocks, REITs and real estate funds)

Let us consider a traditional investor who has invested only in stocks constituting the index S&P/TSX Composite stocks index.

With dividends included and assuming reinvestment of dividends, the return generated by S&P/TSX Composite from January 1, 2010 to December 31, 2018 is 61.7%. This means that $10,000 invested on January 1, 2010 would have become $16,169 by December 31, 2018.

It is apparent that the dividends increase the total return for the 2010 to 2018 time period by 32.595%, namely from 29.1% to 61.7%.

Now, let us diversify the investment of this investor by introducing S&P TSX REIT index into the portfolio. To achieve this diversification, let us equally weigh the test portfolio and invest $5,000 in the S&P TSX REIT index and $5,000 in the S&P/TSX Composite index (the total investment is still $10,000).

The investment period in both instruments is from January 1, 2010 to December 31, 2018.

An investment of $5,000 in the S&P TSX REIT and $5,000 in the S&P TSX Composite would have become $15,128 on December 31, 2018, a total period return of 51.28%.

Now, to compare the returns performance between S&P TSX REIT and the Bloomberg Canadian REIT Index (BBCREIT), let us equally weigh the test portfolio and this time invest $5,000 in the BBCREIT and $5,000 in the S&P TSX Composite (the total investment is still $10,000).

The investment period in both instruments is still from January 1, 2010 to December 31, 2018.

An investment of $5,000 in the Bloomberg Canadian REIT Index (BBCREIT), Index and $5,000 in the S&P/TSX Composite would have become $13,878 on December 31, 2018. Thus, there is an excess return of 7.5% by diversifying the investment into the BBCREIT Index instead of the S&P TSX REIT Index purely on the price returns metric and without including dividends into the calculation.

But when dividends are included and reinvested for both the Bloomberg Canadian REIT Index (BBCREIT), and the S&P TSX Composite, the returns are magnified for the combined portfolio, as shown in Table 1.

Return Period	BBCREIT Index with dividends reinvested	S&P_TSX Composite with dividends
Jan-2010 to Dec-2018	170.743559233376000%	61.695%
Worth of $5,000 in	$13,537	$8,085
Worth of $10,000 = (13,537 + 8,085=$21,622)		
With 50% diversification in REIT $10,000 invested on Jan 1, 2010 would have become $21,622 on Dec 31, 2018		

Table 1

The combined portfolio with dividends being included and reinvested generated a 116.22% return for the same 9-year time period, therefore demonstrating that stable reinvested dividends are the backbone of a successful investment portfolio.

This result displays the benefits of reinvestment of dividends and the diversification with a real estate funds.

Return Analysis for a fixed income portfolio

Bond Portfolio

As investors are reaching their retirement age, larger portions of their respective investment portfolios are allocated in fixed income securities.

Therefore, let us consider a Canadian investor who has invested only in Canadian bonds. The return generated by the Thomson Reuters Canadian All Bond All (TRCAALL) index from January 1, 2010 to December 31, 2018 is 45.5%. This positive return means that an investor who had invested in $10,000 in bonds on January 1, 2010 would have made a considerable sum of money; the worth of $10,000 invested on January 1, 2010 would have increased to $14,550 on December 31, 2018.

However, if this investor would have diversified with REITs by investing 50% in the bond index and 50% in S&P TSX REITs index, he/she would have made slightly less.

Let us assume that this investor invests $5,000 in Thomson Reuters Canadian All Bond All (TRCAALL) Index and $5,000 in S&P TSX REIT index– from January 1, 2010 to December 31, 2018.

By diversifying a portfolio using REITs during this timeframe, the worth of $10,000 invested on January 1, 2010 would have become $14,318 on December 31, 2018, a return of 43.18% over 9 years compared to a return of 45.50% over 9 years had the investor just invested in the bond index. This finding demonstrates an example of a case when diversifying with an index of bonds may be superior than to diversify with REITs.

If the investor had diversified their portfolio by equally weighing it between bonds and the BBCREIT Index instead, they would have had a balance of $14,698, which is a return of 46.98% over 9 years. Therefore, just as in the case with equities, diversifying with real estate funds is advantageous over REITs during this time period.

Let us now analyse the monthly returns of the TRCAALL Bond Index and the S&P_TSX REIT from January 1, 2010 to December 31, 2018; and, check if the results obtained with the yearly returns hold.

The Table 2 shows the monthly mean return, standard deviation of monthly returns, and variance of monthly returns of S&P_TSX REIT, and, TRCAALL Bond Index, individually as well as combined in an equally weighted portfolio, from January 1, 2010 to December 31, 2018.

Risk/Return Analysis	TRCAALL Bond Index	S&P_TSX REIT	TRCAALL Bond Index & S&P_TSX REIT Combined
Monthly Mean Return	0.37%	0.37%	0.37%
Standard Deviation of Monthly Returns	0.0118	0.0273	0.0170
Variance of Returns	0.000139	0.000746	0.000290
Sharpe Ratio	0.196705597	0.083473467	0.135225963

Table 2

The combined monthly return of Thomson Reuters Canadian All Bond All (TRCAALL) Index and S&P TSX REIT is equal to the monthly return of the TRCAALL Index as well as of the S&P TSX REIT. The standard deviation of TRCAALL Bond Index returns is lower than both the individual S&P TSX REIT index as well as the combined equally weighted portfolio. This data further supports that the Canadian bond index has performed exceptionally well from 2010 to 2018, offering the same return as the S&P TSX REIT and for a much lower level of risk. Also, the Sharpe ratio of the 100% weighted REITs portfolio is considerably lower than the Sharpe ratio of a bonds portfolio, therefore clearly showing that REITs do not offer any risk adjusted benefit to a portfolio of bonds, and in fact reduce the risk adjusted returns when added to a bonds or equities portfolio for that matter.

The monthly correlation between S&P TSX REIT and TRCAALL Bond Index is 0.42. This is a moderately high correlation therefore the S&P TSX REIT and the TRCAALL Bond index do not act as good diversifiers for each other. This high correlation can be explained by the fact that the TRCAALL Bond index tracks bonds of all maturities, and includes several corporate bonds with varying risk, therefore it has a higher correlation to the overall market and to Canadian REITs.

To analyze the diversification effectiveness of the BBCREIT Index instead of the S&P TSX REIT index in a fixed income portfolio, we compare the monthly covariance and correlation between them.

The very low correlation of 0.09 between the BBCREIT index and the TRCAALL bond index underlines the tremendous difference between the return/risk characteristics between the returns from REITs and from mutual funds that invest in real estate. This low correlation between these two indices may help a Canadian investor to reduce the risk in their bond portfolio by diversifying with real estate mutual funds instead of REITs.

The Table 3 shows the risk/return metrics for an equally weighted portfolio between the BBCREIT Index and the TRCAALL Bond index.

Risk/Return Analysis	TRCAALL Bond Index	BBCREIT Index	TRCAALL Bond Index & BBCREIT Index Combined
Monthly Mean Return	0.37%	0.96%	0.67%
Standard Deviation of Monthly Returns	0.0118	0.0266	0.0150
Variance of Returns	0.000139	0.000707	0.000225
Sharpe Ratio	0.196705597	0.307755771	0.34988242

Table 3

The combined equally weighted portfolio's monthly mean return increases from 0.37% to 0.67% when the real estate mutual fund index is included in the portfolio with a 50% weight as a diversifier, however the variance and standard deviation increases, therefore making the portfolio riskier, but as the Sharpe ratio of 0.34988 of the equally weighted portfolio demonstrates, the inclusion of real estate funds into a portfolio of bonds drastically increases the risk adjusted return of the equally weighted portfolio.

Regression Analysis

Equally weighted portfolio of stocks, REITs and bonds with REITs as the independent variable

The purpose of this regression analysis is to determine how the S&P TSX REIT index monthly returns interact with the combined monthly returns of an equally weighted portfolio of S&P TSX Composite, S&P TSX REIT and TRCAALL bond Index, the independent variable being the S&P_TSX REIT monthly returns and the dependent variable being the combined monthly returns of an equally weighted portfolio of S&P TSX Composite, S&P TSX REIT and TRCAALL bond Index.

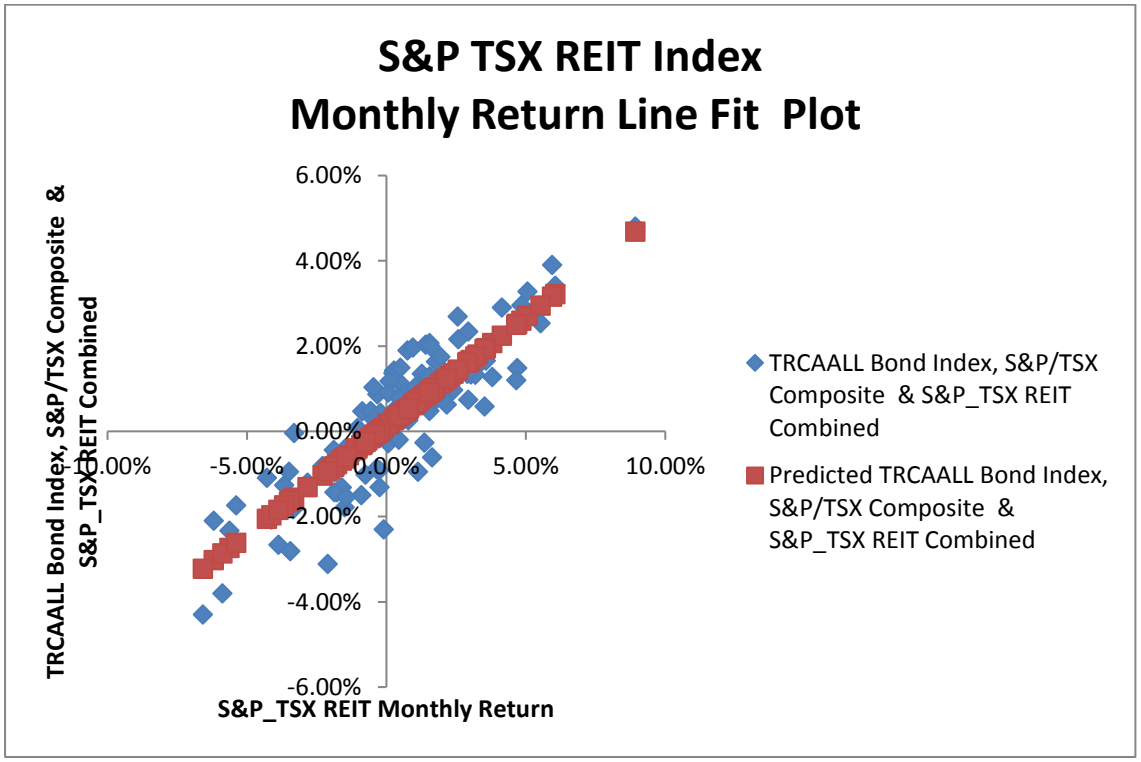

Figure 2

The regression analysis confirms that the combined returns of the equally weighted portfolio between S&P_TSX REIT, S&P/TSX Composite, and the Thomson Reuters Canadian All Bond All (TRCAALL) bond index are heavily dependent on the return of the S&P_TSX REIT. The correlation between the independent variable and the dependent one is 0.869. (Full regression statistics are available in Appendix 14)

Equally weighted portfolio of stocks, Bloomberg real estate funds and bond Index with the Bloomberg real estate funds index as the independent variable

The purpose of this regression analysis is to determine how the Bloomberg Canadian REIT Index (BBCREIT) monthly returns interact with the combined monthly returns of an equally weighted portfolio of S&P TSX Composite, BBCREIT and Thomson Reuters Canadian All Bond All (TRCAALL) bond Index, the independent variable being the BBCREIT Index monthly returns and the dependent variable being the combined monthly returns of an equally weighted portfolio of S&P TSX Composite, BBCREIT and TRCAALL bond Index.

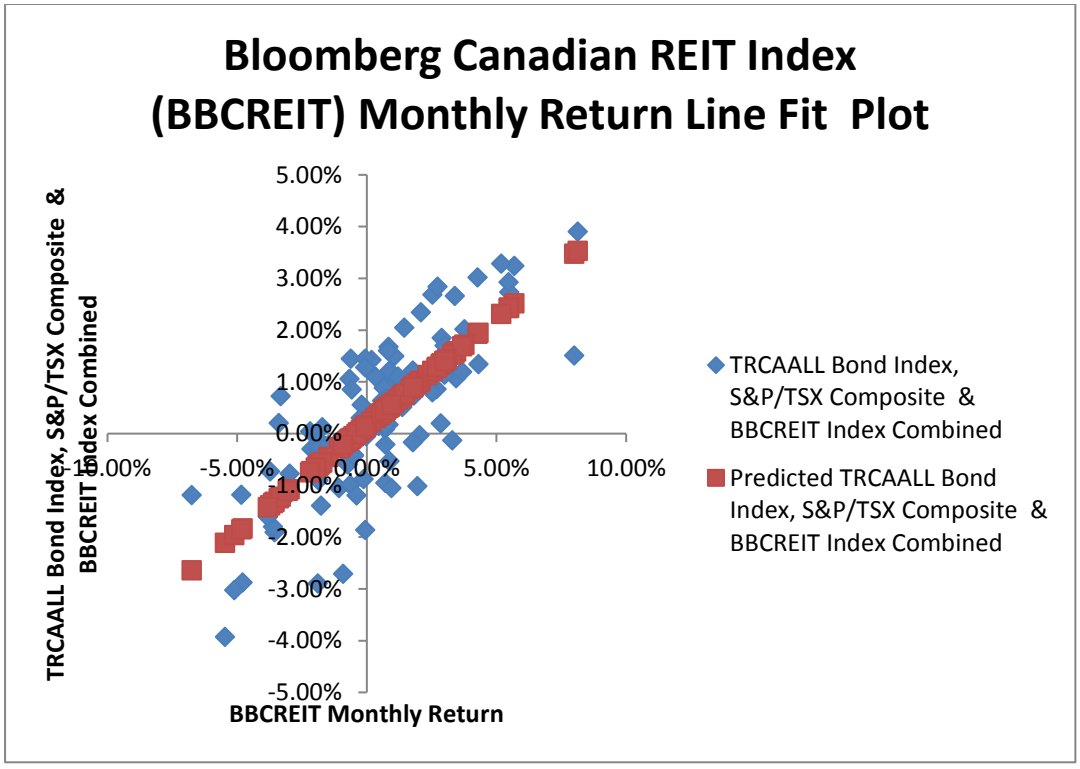

Figure 3

The regression data confirms that the combined returns of the equally weighted portfolio between the Bloomberg Canadian REIT Index (BBCREIT), S&P/TSX Composite, and the Thomson Reuters Canadian All Bond All (TRCAALL) bond index are heavily dependent on the return of the BBCREIT, but less so then the previous equally weighted portfolio that was

diversified with S&P TSX REIT instead. The correlation between the independent variable and the dependent one is 0.774. (Full regression statistics available in Appendix 15)

This finding suggests that diversifying using the BBCREIT Index instead of the S&P TSX REIT index brings more value to a portfolio since the index does have a lower correlation to the overall combined portfolio, therefore helping to generate a higher risk adjusted return for the investment portfolio that is diversified with the BBCREIT Index.

The Efficient Frontier and the Minimum-Variance portfolio

Different combinations of the assets in a portfolio would provide different returns. Calculating the right combination of each asset in a portfolio to achieve the desired results is known as the efficient frontier. The chart in Figure 4 shows the efficient frontier for the Bloomberg real estate funds, REITs, stocks and bonds from 2010 to 2018.

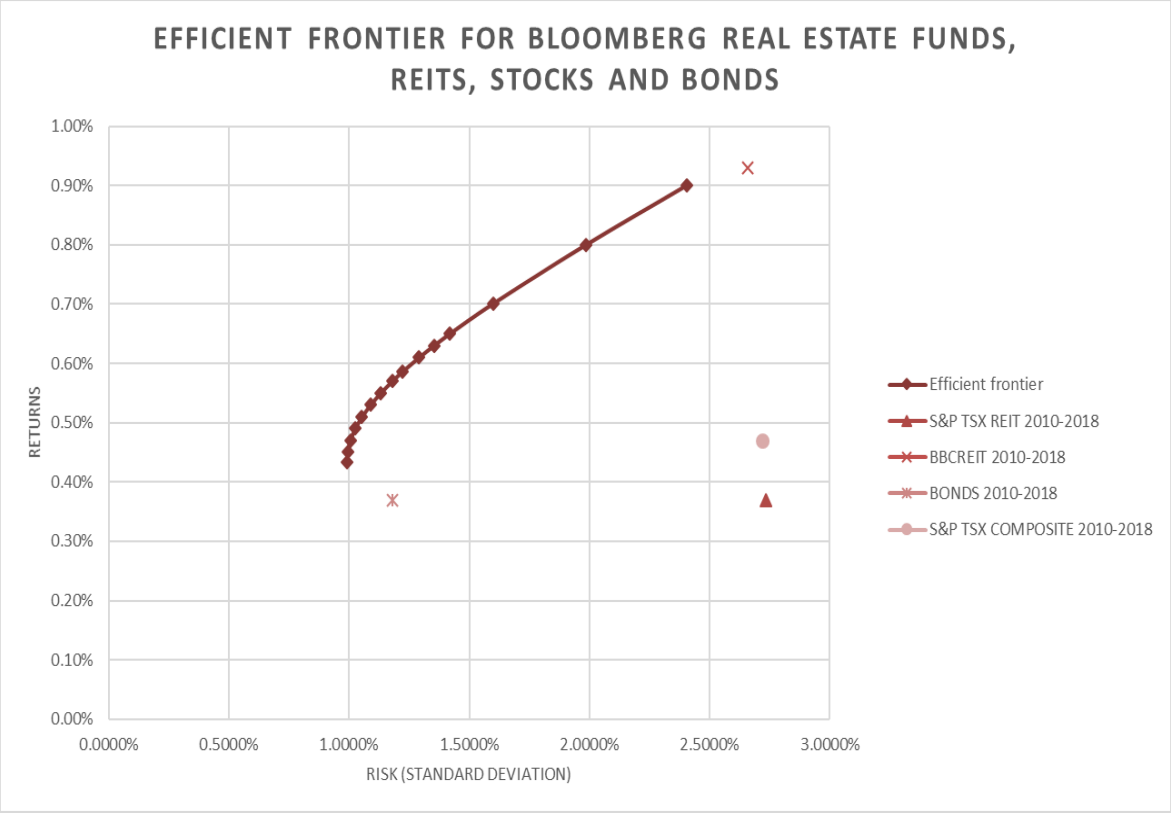

Figure 4

The efficient frontier in Figure 4 has been calculated using monthly returns of S&P_TSX REIT, TRCAALL bond index, the S&P TSX Composite and the Bloomberg real estate funds index (BBCREIT) from January 1, 2010 to December 31, 2018.

Risk/Return Analysis	S&P_TSX REIT	BBCREIT Index	TRCAALL Bond Index	S&P/TSX Composite
Monthly Mean Return	0.37%	0.96%	0.37%	0.47%
Standard Deviation of	0.0273	0.0266	0.0118	0.0272
Variance of Returns	0.000746	0.000707	0.000139	0.000739

Table 4

The Table 4 reflects the monthly mean returns for all 4 assets, as well as their respective risk levels.

Let us now build a minimum-variance portfolio with the lowest possible combined portfolio variance by using the monthly returns data of all 4 assets analyzed in this paper, namely the S&P_TSX REIT index, the BBCREIT Bloomberg real estate funds Index, the TRCAALL Bond Index and the S&P TSX Composite stocks index.

MINIMUM-VARIANCE PORTFOLIO				
Asset	Portfolio Allocation	Monthly risk free rate	*Portfolio Variance*	*Portfolio Risk*
BBCREIT Index	7.42%	0.14%	0.0000981490	0.9907%
TRCAALL Bond Index	75.43%			
S&P_TSX REIT	0.00%		*Desired Portfolio return*	*Sharpe Ratio*
S&P/TSX Composite	17.14%		0.43%	0.294513208
TOTAL	100.00%			

Table 5

The portfolio allocation of the minimum-variance portfolio with the lowest combined portfolio variance is one that has a weight of 7.4% in the BBCREIT Index, 75.43% weight in the TRCAALL Bond Index, none in the S&P TSX REIT index and the remaining 17.14%

weight in the S&P TSX Composite. The resulting risk (standard deviation) of this portfolio is 0.009907.

The constraint used to compute the minimum-variance portfolio weights is that the total weights must equal to 100% (No short positions or cash positions allowed). Since monthly returns data is used, the portfolio can be optimally rebalanced periodically, even on a monthly basis as long as the transaction fees permit it.

The fact that the S&P TSX REIT weight is 0% in the minimum-variance portfolio is no surprise since all the previous findings in the paper where confirming that the real estate mutual fund index BBCREIT brings superior risk/return benefits to a Canadian portfolio of equities and bonds than the REITs index.

Optimal portfolio and the Capital Allocation Line

Let us now find the tangency portfolio for the 4 assets analyzed. The returns data used are monthly returns.

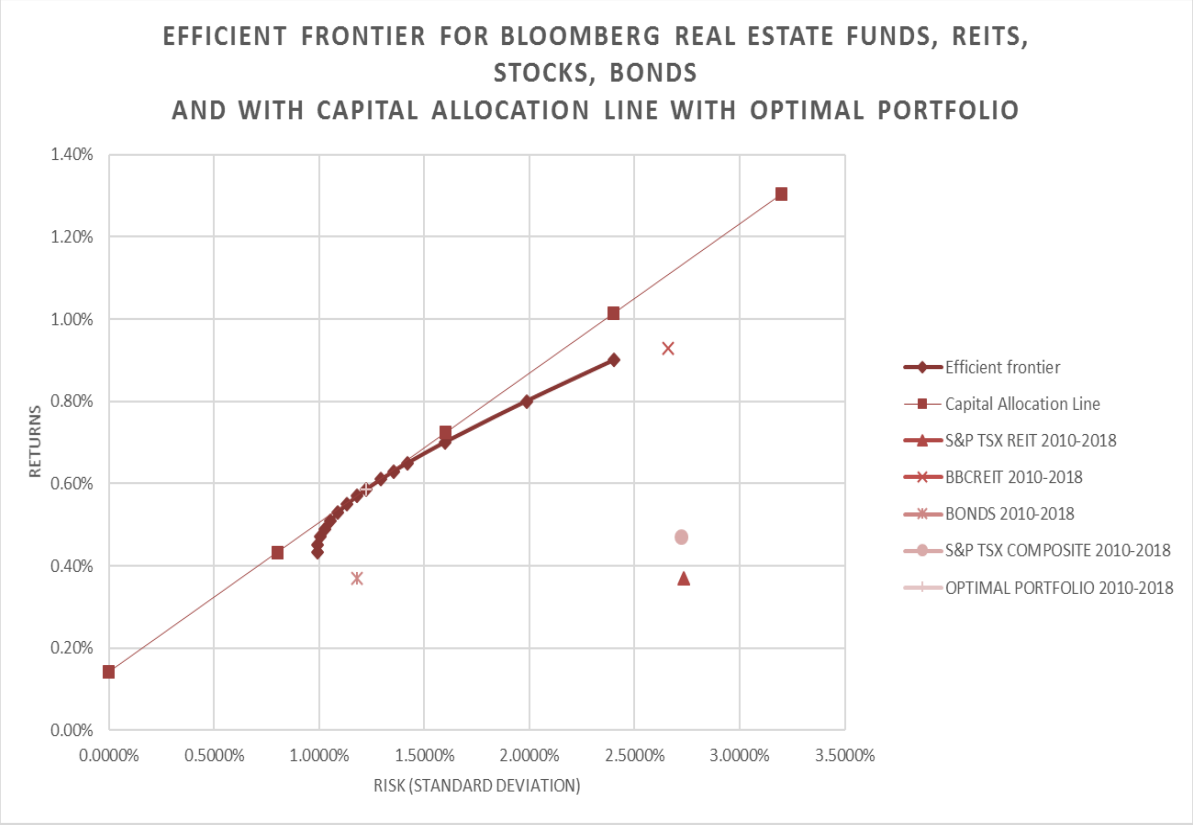

Figure 5

The tangency portfolio is the optimal portfolio that is simultaneously on the efficient frontier line of the portfolios as well as on the Capital Allocation Line (CAL). This allows an investor to select the portfolio allocation that will generate the highest risk adjusted return.

The constraint used to compute the optimal tangency portfolio weights is that the total weights must equal to 1 (No short positions allowed). Since monthly returns data is used, the portfolio is optimally rebalanced every month, transaction fees permitting.

The risk-free rate used was 1.7% based on the Canadian 10 year treasury bill yield, which was then converted to a monthly basis for the purpose of this analysis.

OPTIMAL PORTFOLIO				
Asset	Portfolio Allocation	Monthly risk free rate	*Portfolio Variance*	*Portfolio Risk*
BBCREIT Index	34.36%	0.1417%	0.0150%	1.2228%
TRCAALL Bond Index	53.74%			
S&P_TSX REIT	0.00%		*Desired Portfolio return*	*Sharpe Ratio*
S&P/TSX Composite	11.90%		0.59%	0.363520028
TOTAL	100%			

Table 6

This tangency portfolio is the portfolio with the highest Sharpe ratio of 0.36352, meaning it offers the highest risk adjusted return possible for a portfolio with a combination of the 4 assets analyzed. The weights of the tangency portfolio do not include any weight in the S&P TSX REIT index, and instead weighs the Bloomberg real estate index at 34.36%, the Thompson Reuters bond index at 53.74% and the remaining 11.90% in stocks.

The resulting optimal portfolio return is 0.59% monthly, and the monthly portfolio risk is 1.228%.

These findings confirm that the Bloomberg real estate funds index is a far superior asset to diversify with compared to REITs, and that a portfolio of bonds, equities and real estate funds would have performed very well from 2010 to 2018.

Data Robustness Test

In this section, a data robustness test of the monthly data has been performed by first removing the last 2 years of monthly returns data (2010 to 2016) and then the first 2 years of

data (2012 to 2018), calculating the efficient frontiers and the Capital Allocation Line (CAL) for each respective period, and plotting them to compare between each other as well as relative to the entire 2010 to 2018 period efficient frontier and CAL.

The purpose of this test and analysis is to demonstrate the validity of the hypothesis that the combination of the least volatile asset class (bonds) and real estate funds does enable an investor to create an optimal tangency portfolio regardless of the time window from 2010 to 2018, but to also demonstrate the effect that the time period selection has on the risk/return profile of the investment portfolios.

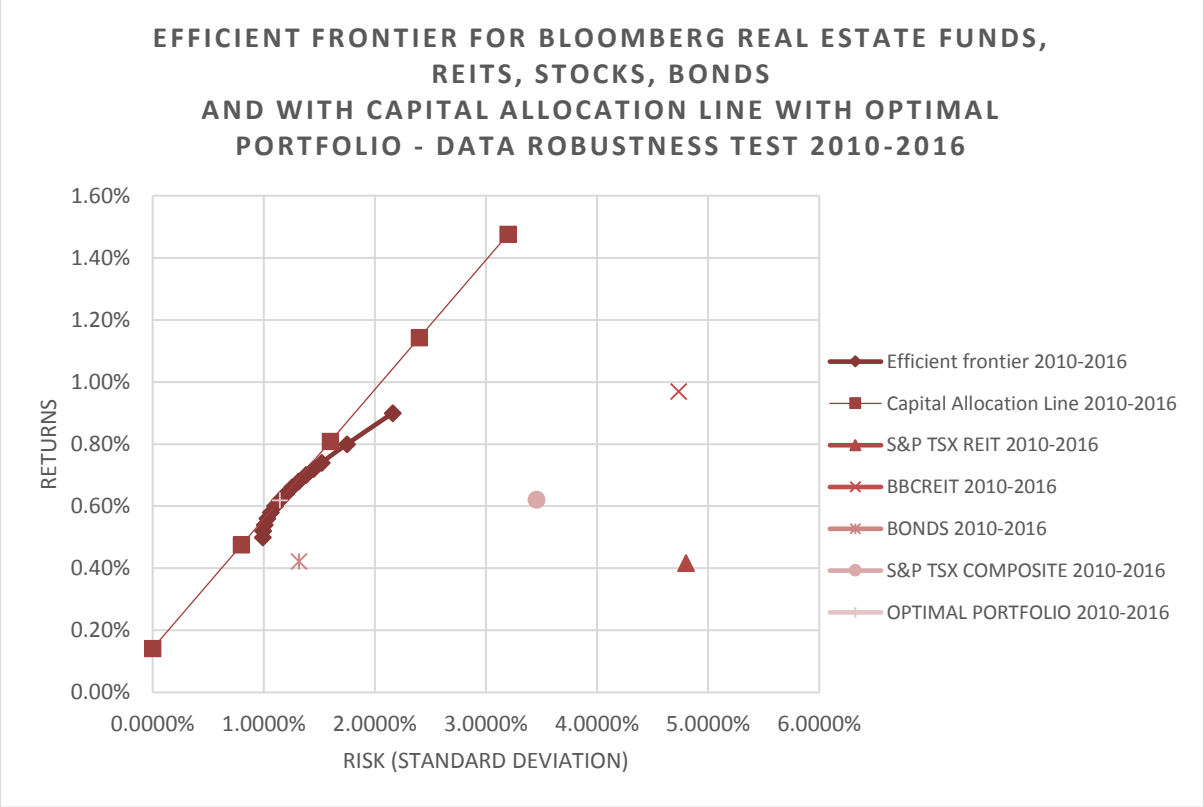

Figure 6

The first time period is from 2010 to 2016, with the last 2 years of data removed, and the resulting efficient frontier and Capital Allocation line is shown in Figure 6. The noticeable shift in the slope of the CAL and the upward shift in most assets can be explained by the fact that the Bloomberg real estate funds index and the S&P TSX Composite experienced a significant returns increase following the 2008 crash, therefore significantly increasing the

Sharpe ratio of the portfolio. Also, the portfolio variance from 2010 to 2016 is slightly lower than for the whole period of 2010 to 2018. The tangency portfolio for this period had a monthly return of 0.62% and a risk of 1.14%, resulting in a Sharpe ratio of 0.417.

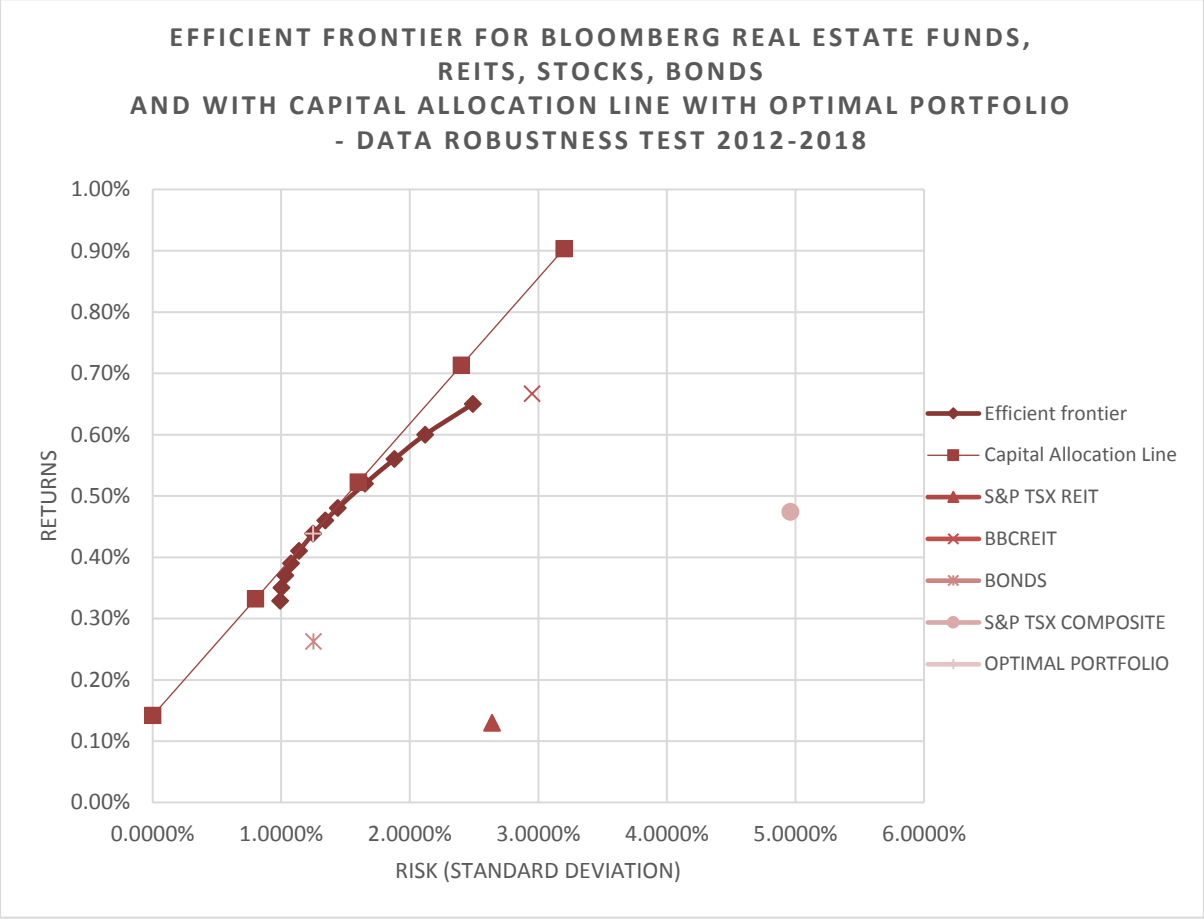

Figure 7

The second time period is from 2012 to 2018, with the first 2 years of data removed, and the resulting efficient frontier and Capital Allocation line is shown in Figure 7. The significant lower slope of the Capital Allocation Line in this time period is mainly due to the lower overall returns for all assets when compared to the prior 2010 to 2016 period, as well as the higher risk of the S&P TSX Composite. Also, the portfolio variance from 2012 to 2018 is slightly lower than for the whole period of 2010 to 2018. The tangency portfolio for this period had a monthly return of 0.44% and a portfolio risk of 1.2478%, resulting in a Sharpe ratio of 0.238.

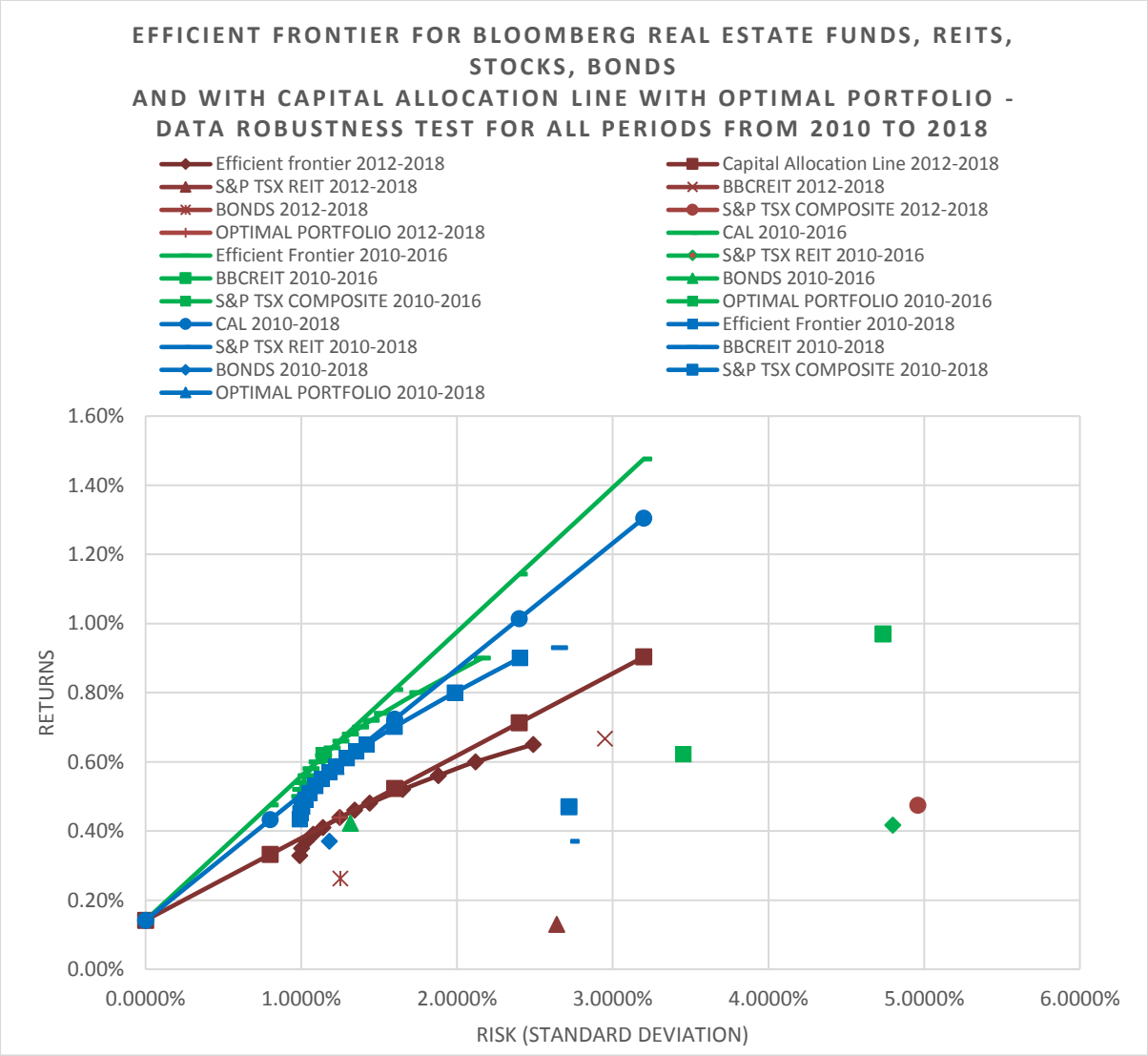

Figure 8

The combination of the results from this data robustness test are presented in Figure 8, which demonstrates that the shift in risk/return profile that the portfolio and individual assets undergo. The slope of the Capital Allocation Line (CAL) does change quite significantly if the data selected is from 2010 to 2016 instead of the entire 2010-2018 period. However, even though the risk/return profiles of the 100% weighted portfolios of each asset (ie. Bonds, stocks, REITS, real estate funds) do shift, their relative positioning is only slightly changed, relatively speaking, when looking at the risk aspect.

Some notable changes are the optimal portfolio weights and risk return profiles for each time period.

OPTIMAL PORTFOLIO 2010-2018				
Asset	Portfolio Allocation	Monthly risk free rate	*Portfolio Variance*	*Portfolio Risk*
BBCREIT Index	34.36%	0.14%	0.0150%	1.2228%
TRCAALL Bond Index	53.74%			
S&P_TSX REIT	0.00%		*Desired Portfolio return*	*Sharpe Ratio*
S&P/TSX Composite	11.90%		0.59%	0.363520028
TOTAL	100%			
OPTIMAL PORTFOLIO 2010-2016				
Asset	Portfolio Allocation	Monthly risk free rate	*Portfolio Variance*	*Portfolio Risk*
BBCREIT Index	28.10%	0.14%	0.0131%	1.1439%
TRCAALL Bond Index	55.72%			
S&P_TSX REIT	0.00%		*Desired Portfolio return*	*Sharpe Ratio*
S&P/TSX Composite	16.17%		0.62%	0.41706539
TOTAL	100.00%			
OPTIMAL PORTFOLIO 2012-2018				
Asset	Portfolio Allocation	Monthly risk free rate	*Portfolio Variance*	*Portfolio Risk*
BBCREIT Index	32.90%	0.14%	0.0156%	1.2478%
TRCAALL Bond Index	46.69%			
S&P_TSX REIT	0.00%		*Desired Portfolio return*	*Sharpe Ratio*
S&P/TSX Composite	20.41%		0.44%	0.237991696
TOTAL	100.00%			

Table 7

Table 7 presents the respective weights, risk and returns of the optimal tangency portfolio for each different time period in question. A noticeable finding is that the optimal portfolio for the first period from 2010 to 2016 has a higher return and lower risk, 0.62% and 1.1439% respectively, therefore generating a higher Sharpe ratio of 0.417. The asset weights for this tangency portfolio are 28.1% in real estate funds, 55.72% in bonds, and 16.17% in stocks.

The 2012 to 2018 time period tangency portfolio shows lower returns and a slightly higher risk, and this is also affected by the shift in asset weights from bonds into more risky assets such as real estate funds and stocks.

Overall, the prevailing noticeable trend is that the risk adjusted returns of the tangency portfolio has deteriorated between 2010 and 2018, which is understandable as the returns right after the 2008 crash and the ensuing bull run were quite high for many assets, especially assets such as real estate and stocks.

Also, there is a noticeable shift in the portfolio weights away from bonds and into real estate funds and stocks during the 2nd time period from 2012 to 2018, which explains the increase in portfolio risk.

Conclusion

As was suggested by Hoesli, M., Lekander, J., Witkiewicz, W. in their paper "International evidence on real estate as a portfolio diversifier" (2004) in the Journal of Real Estate Research [28], diversifying a Canadian equities or fixed income portfolio with real estate mutual funds can significantly enhance the performance of a traditional Canadian investor's portfolio. However, from the systematic analysis of the yearly and monthly returns of S&P_TSX REIT, BBCREIT Index, S&P/TSX Composite and the Thompson Reuters TRCAALL bond index, the suggested weight in real estate assets for a Canadian investor can be from 25% to as high as 34% based on the optimal tangency portfolio, with bonds maintain a weight of 54% and the remaining ~11% in stocks. The research in this study also demonstrates that the Bloomberg Canadian REIT Index of real estate funds is a better performing real estate asset than the S&P TSX REIT, which enables the diversified portfolio to display higher returns and lower overall risk.

Sharpe ratio and regression analysis of the returns of S&P_TSX REIT, S&P/TSX Composite, and the TRCAALL Bond Index presented in this study further validate the claim that real estate funds substantially improve the performance of a traditional Canadian investor's portfolio. The Sharpe ratio analysis shows that a significant inclusion of bonds and a lower weight of real estate funds into a Canadian investment portfolio generates a higher return for a lower overall risk.

The data robustness test was conducted to validate the data and demonstrate that the value of real estate funds as a portfolio diversifier holds true even when examining different time periods. The findings in the data robustness analysis

According to Modern Portfolio Theory, a stable asset and a risky asset can be combined in any combination to generate a portfolio return. To get a positive portfolio return, optimization can be achieved using the efficient frontier to minimize the variance of the portfolio for a given level of return, and then finding the tangency portfolio by using the Capital Allocation

Line. This study demonstrates that even though real estate funds were a great diversifying asset, bonds were also a great asset to include in a portfolio from 2010 to 2018.

Risk averse investors should consider diversifying their equity portfolios by putting a higher weight on bonds instead of real estate funds and aim to achieve the minimum-variance portfolio without overtrading and incurring excessive trading fees. As opposed to investment in actual real estate property, investment in real estate funds is relatively simple in the sense that real estate funds can be bought and sold with a relatively low investment, however they may have a few more restrictions on them than REITs. Also, real estate funds may have an overall higher MER than most REITs. Morawski et al. (2008) state that REITs provide a higher return than regular real estate property, since regular real estate properties have high transaction cost and illiquidity. On the other hand, this paper demonstrates that real estate funds can generate a significantly higher risk adjusted return for Canadian investors.

This study comprehensively demonstrates that the inclusion of Canadian real estate assets (REITs and real estate funds) can greatly improve the overall returns and lower the risk for a traditional Canadian investor's portfolio(s). However, it should be noted that for the time period from 2010 to 2018, Canadian bonds were also a great diversification asset as well as real estate funds and should therefore be weighed accordingly in a Canadian investment portfolio. Even though the S&P TSX Composite has significant overlap with constituents of real estate funds, the real estate exposure on the S&P TSX Composite is very small, hence real estate is still a great asset to diversify a portfolio with due to its relatively low correlation to bonds and equities as well as the relatively high returns.

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Appendix 1 - S&P_TSX Composite Data

Date	Price	Open	High	Low	Vol.	Change %
Jan-10	11,094.31	11,847.34	12,070.20	11,084.27	3.34B	-5.55%
Feb-10	11,629.63	11,147.49	11,763.31	10,990.41	3.14B	4.83%
Mar-10	12,037.73	11,682.78	12,129.26	11,629.63	4.11B	3.51%
Apr-10	12,210.70	12,069.91	12,321.76	11,953.95	3.93B	1.44%
May-10	11,762.99	12,273.98	12,294.63	11,179.97	4.72B	-3.67%
Jun-10	11,294.42	11,702.20	12,077.01	11,244.03	4.36B	-3.98%
Jul-10	11,713.43	11,245.26	11,822.68	11,065.53	3.71B	3.71%
Aug-10	11,913.86	11,829.32	11,990.76	11,469.25	3.92B	1.71%
Sep-10	12,368.65	11,978.29	12,406.36	11,914.23	4.50B	3.82%
Oct-10	12,676.24	12,400.11	12,710.19	12,262.69	3.95B	2.49%
Nov-10	12,952.88	12,725.90	13,114.05	12,501.82	4.67B	2.18%
Dec-10	13,443.22	13,067.03	13,493.64	12,952.88	4.12B	3.79%
Jan-11	13,551.99	13,530.35	13,588.47	13,139.50	4.73B	0.81%
Feb-11	14,136.50	13,617.70	14,160.70	13,552.27	4.40B	4.31%
Mar-11	14,116.10	14,167.01	14,329.49	13,237.93	5.29B	-0.14%
Apr-11	13,944.79	14,118.21	14,314.45	13,584.55	4.02B	-1.21%
May-11	13,802.88	13,944.79	14,089.10	13,264.80	3.96B	-1.02%
Jun-11	13,300.87	13,806.13	13,823.43	12,763.54	4.49B	-3.64%
Jul-11	12,945.63	13,315.42	13,516.17	12,858.39	3.63B	-2.67%
Aug-11	12,768.70	13,010.58	12,996.10	11,617.81	5.56B	-1.37%
Sep-11	11,623.84	12,770.65	12,798.53	11,293.63	5.12B	-8.97%
Oct-11	12,252.06	11,516.86	12,541.84	10,848.19	4.83B	5.40%
Nov-11	12,204.11	11,963.21	12,542.58	11,420.78	4.40B	-0.39%
Dec-11	11,955.09	12,174.09	12,268.91	11,468.70	4.20B	-2.04%
Jan-12	12,452.15	12,097.23	12,615.99	11,955.94	4.22B	4.16%
Feb-12	12,644.01	12,510.67	12,788.63	12,291.76	4.12B	1.54%
Mar-12	12,392.18	12,642.98	12,731.49	12,194.53	4.94B	-1.99%
Apr-12	12,292.69	12,381.48	12,526.55	11,868.97	3.64B	-0.80%
May-12	11,513.21	12,325.70	12,364.59	11,256.72	4.20B	-6.34%
Jun-12	11,596.56	11,413.12	11,824.61	11,209.55	4.10B	0.72%
Jul-12	11,664.71	11,727.50	11,936.16	11,366.74	3.33B	0.59%
Aug-12	11,949.26	11,693.11	12,196.77	11,475.43	3.04B	2.44%
Sep-12	12,317.46	11,977.96	12,529.77	11,904.48	3.64B	3.08%
Oct-12	12,422.91	12,372.45	12,494.00	12,137.18	3.29B	0.86%
Nov-12	12,239.36	12,408.53	12,511.46	11,761.34	3.41B	-1.48%
Dec-12	12,433.53	12,253.70	12,457.33	12,095.45	3.47B	1.59%
Jan-13	12,685.24	12,571.76	12,895.28	12,430.41	3.67B	2.02%
Feb-13	12,821.83	12,741.18	12,832.71	12,602.54	3.33B	1.08%
Mar-13	12,749.90	12,798.74	12,904.71	12,622.50	3.67B	-0.56%
Apr-13	12,456.50	12,751.60	12,750.96	11,916.64	3.85B	-2.30%
May-13	12,650.42	12,408.00	12,889.26	12,275.98	3.97B	1.56%

Jun-13	12,129.11	12,661.22	12,681.22	11,759.04	3.80B	-4.12%
Jul-13	12,486.64	12,178.05	12,772.06	12,055.63	3.36B	2.95%
Aug-13	12,653.90	12,486.64	12,812.58	12,400.15	3.26B	1.34%
Sep-13	12,787.19	12,654.31	12,964.86	12,654.31	3.30B	1.05%
Oct-13	13,361.26	12,787.19	13,471.06	12,678.02	3.40B	4.49%
Nov-13	13,395.40	13,362.93	13,517.02	13,285.23	3.21B	0.26%
Dec-13	13,621.55	13,395.40	13,644.28	13,059.74	3.05B	1.69%
Jan-14	13,694.94	13,621.40	14,002.39	13,473.23	3.96B	0.54%
Feb-14	14,209.59	13,694.94	14,280.85	13,450.31	3.65B	3.76%
Mar-14	14,335.31	14,209.67	14,406.86	14,139.29	3.66B	0.88%
Apr-14	14,651.87	14,335.31	14,662.01	14,221.39	3.51B	2.21%
May-14	14,604.16	14,651.87	14,765.15	14,473.78	3.00B	-0.33%
Jun-14	15,146.01	14,604.19	15,146.01	14,604.19	3.39B	3.71%
Jul-14	15,330.74	15,146.01	15,527.30	15,021.05	3.32B	1.22%
Aug-14	15,625.73	15,330.77	15,653.38	15,056.11	2.73B	1.92%
Sep-14	14,960.51	15,626.85	15,685.13	14,821.71	3.74B	-4.26%
Oct-14	14,613.32	14,958.50	14,958.50	13,646.79	4.60B	-2.32%
Nov-14	14,744.70	14,632.15	15,184.36	14,327.02	4.01B	0.90%
Dec-14	14,632.44	14,753.51	14,789.02	13,635.53	5.84B	-0.76%
Jan-15	14,673.48	14,637.34	14,853.30	13,892.57	5.18B	0.28%
Feb-15	15,234.34	14,713.87	15,349.01	14,713.87	4.29B	3.82%
Mar-15	14,902.44	15,240.93	15,283.72	14,606.19	4.48B	-2.18%
Apr-15	15,224.52	14,925.16	15,524.75	14,878.53	3.77B	2.16%
May-15	15,014.09	15,224.38	15,416.56	14,934.30	3.48B	-1.38%
Jun-15	14,553.33	15,040.88	15,182.22	14,482.16	3.73B	-3.07%
Jul-15	14,468.44	14,588.16	14,748.00	13,938.90	3.80B	-0.58%
Aug-15	13,859.12	14,465.83	14,622.35	12,705.17	4.21B	-4.21%
Sep-15	13,306.96	13,691.80	13,876.00	12,964.12	4.46B	-3.98%
Oct-15	13,529.17	13,362.53	14,053.19	13,086.39	4.84B	1.67%
Nov-15	13,469.83	13,530.95	13,790.07	13,030.46	4.01B	-0.44%
Dec-15	13,009.95	13,488.41	13,653.70	12,617.66	4.50B	-3.41%
Jan-16	12,822.13	12,920.64	12,954.89	11,531.22	5.13B	-1.44%
Feb-16	12,860.35	12,766.15	12,984.72	11,985.68	5.55B	0.30%
Mar-16	13,494.36	12,896.32	13,685.45	12,857.97	6.12B	4.93%
Apr-16	13,951.45	13,404.58	13,972.62	13,217.17	4.95B	3.39%
May-16	14,065.78	13,963.92	14,172.35	13,535.54	4.74B	0.82%
Jun-16	14,064.54	14,017.03	14,450.91	13,609.58	5.24B	-0.01%
Jul-16	14,582.74	14,200.05	14,609.02	14,080.24	3.87B	3.68%
Aug-16	14,597.95	14,555.20	14,855.69	14,428.23	3.81B	0.10%
Sep-16	14,725.86	14,573.27	14,841.36	14,319.11	4.39B	0.88%
Oct-16	14,787.27	14,722.54	14,963.60	14,468.03	3.95B	0.42%
Nov-16	15,082.85	14,827.87	15,141.02	14,481.59	4.98B	2.00%
Dec-16	15,287.59	15,138.60	15,432.61	15,000.60	4.47B	1.36%
Jan-17	15,385.96	15,366.79	15,674.30	15,313.02	4.33B	0.64%
Feb-17	15,399.24	15,423.79	15,943.09	15,327.23	4.40B	0.09%

Mar-17	15,547.75	15,534.68	15,664.08	15,241.55	5.24B	0.96%
Apr-17	15,586.13	15,586.99	15,792.61	15,427.32	3.93B	0.25%
May-17	15,349.91	15,601.65	15,700.55	15,164.73	4.78B	-1.52%
Jun-17	15,182.19	15,363.07	15,594.17	15,077.95	5.04B	-1.09%
Jul-17	15,143.87	15,217.37	15,319.22	14,915.78	3.06B	-0.25%
Aug-17	15,211.87	15,192.12	15,324.56	14,918.57	3.37B	0.45%
Sep-17	15,634.94	15,194.73	15,692.03	14,953.90	3.87B	2.78%
Oct-17	16,025.59	15,639.95	16,064.68	15,619.23	3.48B	2.50%
Nov-17	16,067.48	16,093.39	16,131.79	15,829.44	3.89B	0.26%
Dec-17	16,209.13	16,058.21	16,232.24	15,853.07	3.50B	0.88%
Jan-18	15,951.67	16,213.37	16,421.42	15,898.74	4.64B	-1.59%
Feb-18	15,442.68	15,920.00	15,922.59	14,785.78	4.45B	-3.19%
Mar-18	15,367.29	15,452.72	15,791.15	15,150.54	4.56B	-0.49%
Apr-18	15,607.88	15,351.18	15,702.59	14,991.21	4.12B	1.57%
May-18	16,061.50	15,592.52	16,238.81	15,548.70	4.53B	2.91%
Jun-18	16,277.73	16,075.78	16,489.46	16,037.97	4.44B	1.35%
Jul-18	16,434.01	16,332.35	16,586.46	16,227.25	3.51B	0.96%
Aug-18	16,262.88	16,383.82	16,494.09	16,075.34	4.37B	-1.04%
Sep-18	16,073.14	16,276.26	16,300.67	15,975.75	4.80B	-1.17%
Oct-18	15,027.28	16,152.28	16,193.06	14,639.70	6.14B	-6.51%
Nov-18	15,197.82	15,032.79	15,393.05	14,810.56	5.58B	1.13%
Dec-18	14,322.86	15,358.94	15,378.90	13,776.88	5.58B	-5.76%

Appendix 2 – Thompson Reuters Canadian All Bond Index (TRCAALL)

Date	Price	Open	High	Low	Change %
Jan-10	151.42	151.42	151.42	151.42	2.08%
Feb-10	151.607	151.607	151.607	151.607	0.12%
Mar-10	150.739	150.739	150.739	150.739	-0.57%
Apr-10	150.861	150.861	150.861	150.861	0.08%
May-10	153.188	153.188	153.188	153.188	1.54%
Jun-10	155.994	155.994	155.994	155.994	1.83%
Jul-10	156.755	156.755	156.755	156.755	0.49%
Aug-10	160.397	160.397	160.397	160.397	2.32%
Sep-10	161.927	161.927	161.927	161.927	0.95%
Oct-10	162.292	162.292	162.292	162.292	0.23%
Nov-10	160.393	160.393	160.393	160.393	-1.17%
Dec-10	160.747	160.747	160.747	160.747	0.22%
Jan-11	159.487	159.487	159.487	159.487	-0.78%
Feb-11	159.928	159.928	159.928	159.928	0.28%
Mar-11	159.782	159.782	159.782	159.782	-0.09%
Apr-11	161.265	161.265	161.265	161.265	0.93%
May-11	164.045	164.045	164.045	164.045	1.72%
Jun-11	164.147	164.147	164.147	164.147	0.06%
Jul-11	167.06	167.06	167.06	167.06	1.77%
Aug-11	169.821	169.821	169.821	169.821	1.65%
Sep-11	173.521	173.521	173.521	173.521	2.18%
Oct-11	172.745	172.745	172.745	172.745	-0.45%
Nov-11	174.417	174.417	174.417	174.417	0.97%
Dec-11	177.799	177.799	177.799	177.799	1.94%
Jan-12	178.757	178.757	178.757	178.757	0.54%
Feb-12	177.792	177.792	177.792	177.792	-0.54%
Mar-12	177.302	177.302	177.302	177.302	-0.28%
Apr-12	177.463	177.463	177.463	177.463	0.09%
May-12	182.181	182.181	182.181	182.181	2.66%
Jun-12	181.587	181.587	181.587	181.587	-0.33%
Jul-12	183.018	183.018	183.018	183.018	0.79%
Aug-12	182.716	182.716	182.716	182.716	-0.17%
Sep-12	184.132	184.132	184.132	184.132	0.77%
Oct-12	183.638	183.638	183.638	183.638	-0.27%
Nov-12	184.816	184.816	184.816	184.816	0.64%
Dec-12	184.486	184.486	184.486	184.486	-0.18%
Jan-13	182.977	182.977	182.977	182.977	-0.82%
Feb-13	184.653	184.653	184.653	184.653	0.92%
Mar-13	185.685	185.685	185.685	185.685	0.56%
Apr-13	188.015	188.015	188.015	188.015	1.25%
May-13	184.891	184.891	184.891	184.891	-1.66%
Jun-13	180.835	180.835	180.835	180.835	-2.19%

Jul-13	181.291	181.291	181.291	181.291	0.25%
Aug-13	180.059	180.059	180.059	180.059	-0.68%
Sep-13	180.935	180.935	180.935	180.935	0.49%
Oct-13	182.812	182.812	182.812	182.812	1.04%
Nov-13	182.084	182.015	182.015	182.015	-0.40%
Dec-13	181.283	181.283	181.283	181.283	-0.44%
Jan-14	186.528	186.528	186.528	186.528	2.89%
Feb-14	187.149	185.288	185.288	185.288	0.33%
Mar-14	186.795	186.795	186.795	186.795	-0.19%
Apr-14	187.874	187.874	187.874	187.874	0.58%
May-14	190.545	190.545	190.545	190.545	1.42%
Jun-14	191.083	191.083	191.083	191.083	0.28%
Jul-14	192.585	192.585	192.585	192.585	0.79%
Aug-14	194.927	194.927	194.927	194.927	1.22%
Sep-14	193.518	193.518	193.518	193.518	-0.72%
Oct-14	194.574	194.574	194.574	194.574	0.55%
Nov-14	198.009	198.009	198.009	198.009	1.77%
Dec-14	199.267	199.267	199.267	199.267	0.64%
Jan-15	209.654	209.654	209.654	209.654	5.21%
Feb-15	209.147	209.147	209.147	209.147	-0.24%
Mar-15	208.465	208.465	208.465	208.465	-0.33%
Apr-15	205.383	205.383	205.383	205.383	-1.48%
May-15	205.456	205.456	205.456	205.456	0.04%
Jun-15	203.882	203.882	203.882	203.882	-0.77%
Jul-15	207.252	207.252	207.252	207.252	1.65%
Aug-15	204.517	204.517	204.517	204.517	-1.32%
Sep-15	204.524	204.524	204.524	204.524	0.00%
Oct-15	203.713	203.713	203.713	203.713	-0.40%
Nov-15	203.938	203.938	203.938	203.938	0.11%
Dec-15	206.642	206.642	206.642	206.642	1.33%
Jan-16	207.503	207.503	207.503	207.503	0.42%
Feb-16	207.936	207.936	207.936	207.936	0.21%
Mar-16	209.715	209.715	209.715	209.715	0.86%
Apr-16	209.551	209.551	209.551	209.551	-0.08%
May-16	211.753	211.753	211.753	211.753	1.05%
Jun-16	216.184	216.184	216.184	216.184	2.09%
Jul-16	218.314	218.314	218.314	218.314	0.99%
Aug-16	218.477	218.477	218.477	218.477	0.07%
Sep-16	219.385	219.385	219.385	219.385	0.42%
Oct-16	216.761	216.761	216.761	216.761	-1.20%
Nov-16	211.256	211.256	211.256	211.256	-2.54%
Dec-16	210.09	210.09	210.09	210.09	-0.55%
Jan-17	209.63	209.63	209.63	209.63	-0.22%
Feb-17	211.854	211.854	211.854	211.854	1.06%
Mar-17	213.027	213.027	213.027	213.027	0.55%

Apr-17	216.478	216.478	216.478	216.478	1.62%
May-17	218.824	218.824	218.824	218.824	1.08%
Jun-17	216.104	216.104	216.104	216.104	-1.24%
Jul-17	211.412	211.412	211.412	211.412	-2.17%
Aug-17	214.877	214.877	214.877	214.877	1.64%
Sep-17	211.757	211.757	211.757	211.757	-1.45%
Oct-17	215.794	215.794	215.794	215.794	1.91%
Nov-17	217.951	217.951	217.951	217.951	1.00%
Dec-17	217.139	217.139	217.139	217.139	-0.37%
Jan-18	215.227	215.227	215.227	215.227	-0.88%
Feb-18	215.239	215.239	215.239	215.239	0.01%
Mar-18	217.334	217.334	217.334	217.334	0.97%
Apr-18	214.781	214.781	214.781	214.781	-1.17%
May-18	216.904	216.904	216.904	216.904	0.99%
Jun-18	218.554	218.554	218.554	218.554	0.76%
Jul-18	216.466	216.466	216.466	216.466	-0.96%
Aug-18	218.131	218.131	218.131	218.131	0.77%
Sep-18	215.707	215.707	215.707	215.707	-1.11%
Oct-18	214.165	214.165	214.165	214.165	-0.71%
Nov-18	216.721	216.721	216.721	216.721	1.19%
Dec-18	220.314	220.314	220.314	220.314	1.66%

Appendix 3 - S&P_TSX REIT Data

Date	Price	Open	High	Low	Vol.	Change %
Jan-10	117.34	115.66	118.31	114.41	43.50M	1.64%
Feb-10	118.22	117.31	120.67	112.18	43.14M	0.75%
Mar-10	117.83	118.69	121.86	117.79	61.13M	-0.33%
Apr-10	120.27	118.05	120.89	116.39	47.10M	2.07%
May-10	116.25	120.65	121.42	109.87	52.52M	-3.34%
Jun-10	117.83	116.37	121.32	113.6	42.46M	1.36%
Jul-10	124.97	118.13	125.96	117.85	31.60M	6.06%
Aug-10	131.02	126.12	131.02	123.75	40.21M	4.84%
Sep-10	137.65	131.22	137.65	130.66	63.71M	5.06%
Oct-10	138.42	137.48	139.99	135.41	52.27M	0.56%
Nov-10	132.49	138.67	140.6	130.82	59.02M	-4.28%
Dec-10	132.85	133.07	133.82	129.88	62.41M	0.27%
Jan-11	137.9	133.51	139.27	132.85	58.13M	3.80%
Feb-11	143.61	138.62	144.21	137.02	48.52M	4.14%
Mar-11	150.35	143.91	150.46	137.84	61.10M	4.69%
Apr-11	148.32	149.97	150.35	145.49	41.78M	-1.35%
May-11	149.37	148.1	150.62	147.95	40.61M	0.71%
Jun-11	148.03	149.65	149.6	143.74	49.23M	-0.90%
Jul-11	148.14	148.13	151.73	146.27	33.28M	0.07%
Aug-11	145.93	148.17	148.19	128.5	71.20M	-1.49%
Sep-11	145.78	146.12	148.88	141.58	62.70M	-0.10%
Oct-11	147.16	145.27	147.57	136.74	51.44M	0.95%
Nov-11	150.53	145.69	150.53	144.62	53.84M	2.29%
Dec-11	152.87	150.34	153.32	149.2	55.32M	1.55%
Jan-12	155.03	154.23	157.49	152.91	56.98M	1.41%
Feb-12	159.71	155.07	159.82	154.62	68.07M	3.02%
Mar-12	159.13	159.51	162.75	155.96	89.87M	-0.36%
Apr-12	163.8	158.93	163.8	158.06	48.69M	2.93%
May-12	163.4	164.16	166.19	162.41	52.80M	-0.24%
Jun-12	166.19	162.99	166.19	160.57	66.67M	1.71%
Jul-12	171.62	166.16	175.01	166.14	49.23M	3.27%
Aug-12	170.15	171.49	176.39	169.43	51.58M	-0.86%
Sep-12	170.58	170.53	173.4	166.83	64.60M	0.25%
Oct-12	167.36	170.64	170.87	163.53	52.84M	-1.89%
Nov-12	163.99	167.26	168.56	160.1	53.21M	-2.01%
Dec-12	169.85	164.21	170.46	162.54	78.69M	3.57%
Jan-13	170.43	170.45	171.82	166.82	106.28M	0.34%
Feb-13	171.56	170.66	172	169.42	95.24M	0.66%
Mar-13	170.4	170.9	171.56	168.3	81.59M	-0.68%
Apr-13	178.32	170.17	178.32	168.87	83.71M	4.65%
May-13	167.28	177.01	178.32	166.21	72.93M	-6.19%

Jun-13	156.27	167.34	167.42	147.12	98.74M	-6.58%
Jul-13	151.1	157.24	157.5	150.53	80.81M	-3.31%
Aug-13	145.82	151.1	152.38	145.55	77.97M	-3.49%
Sep-13	149.34	145.82	153.35	145.62	75.23M	2.41%
Oct-13	153.15	149.34	155.73	146.84	75.78M	2.55%
Nov-13	149.65	153.15	154.83	147.71	72.72M	-2.29%
Dec-13	151.81	149.65	151.87	145.97	64.96M	1.44%
Jan-14	151.97	151.81	154.86	149.72	65.36M	0.11%
Feb-14	156.42	151.97	156.9	150.73	60.11M	2.93%
Mar-14	158.27	156.42	158.27	154.51	66.18M	1.18%
Apr-14	160.28	158.27	162.47	156.53	59.72M	1.27%
May-14	161.41	160.28	164.72	159.38	53.53M	0.71%
Jun-14	162.22	161.41	164.41	158.95	62.51M	0.50%
Jul-14	161.3	162.22	164.64	159.16	59.02M	-0.57%
Aug-14	164.16	161.3	166.36	161.15	50.55M	1.77%
Sep-14	158.49	164.16	165.31	156.43	81.92M	-3.45%
Oct-14	164.07	158.17	164.07	155.92	64.87M	3.52%
Nov-14	164.19	163.75	164.92	160.89	62.54M	0.07%
Dec-14	158.18	163.93	163.93	152.76	92.97M	-3.66%
Jan-15	172.3	158.3	174.83	158.3	92.69M	8.93%
Feb-15	171.51	172.53	174.43	168.66	68.83M	-0.46%
Mar-15	168.48	171.59	172.73	161.65	86.32M	-1.77%
Apr-15	169.84	168.59	172.08	167.55	74.64M	0.81%
May-15	160.28	169.74	170.9	160.28	72.20M	-5.63%
Jun-15	157.87	160.23	162.89	154.73	97.22M	-1.50%
Jul-15	157.58	158.03	163.73	154.06	65.39M	-0.18%
Aug-15	148.31	157.63	158.53	139.85	77.84M	-5.88%
Sep-15	149.99	147.7	150.81	145.25	77.50M	1.13%
Oct-15	150.49	150.01	155.84	147.84	75.11M	0.33%
Nov-15	148.26	150.69	151.01	144.49	87.83M	-1.48%
Dec-15	142.15	148.27	149	138.12	89.15M	-4.12%
Jan-16	142.78	141.7	143.04	132.13	107.93M	0.44%
Feb-16	146.21	142.46	147	135.85	90.97M	2.40%
Mar-16	154.89	146.37	158.25	146.37	99.08M	5.94%
Apr-16	157.9	154.49	158.97	153.89	76.88M	1.94%
May-16	158.64	157.88	162.93	155.28	84.55M	0.47%
Jun-16	167.41	158.59	167.48	158.23	96.23M	5.53%
Jul-16	170.01	168.09	171.32	166.88	83.34M	1.55%
Aug-16	160.84	169.85	170.01	160.38	91.75M	-5.39%
Sep-16	159.16	160.61	163.7	156.48	105.35M	-1.04%
Oct-16	154.65	159.13	159.13	152.52	95.88M	-2.83%
Nov-16	152.93	154.8	154.97	146.22	123.86M	-1.11%
Dec-16	157.81	152.44	158.04	151.22	103.02M	3.19%
Jan-17	157.07	157.87	160.08	155.22	93.14M	-0.47%
Feb-17	161.62	156.92	163.25	155.75	96.98M	2.90%

Mar-17	161.28	161.45	161.88	157.07	124.96M	-0.21%
Apr-17	162.91	161.61	166.02	161.03	86.24M	1.01%
May-17	161.54	162.75	163.95	159.46	95.28M	-0.84%
Jun-17	158.96	161.17	163.45	158.31	96.72M	-1.60%
Jul-17	156	159.19	159.19	155.72	85.56M	-1.86%
Aug-17	157.73	156.12	158.23	154.44	101.84M	1.11%
Sep-17	157	157.72	157.92	155.19	85.34M	-0.46%
Oct-17	159.48	157.51	161.5	157.17	84.19M	1.58%
Nov-17	162.26	159.66	164.44	159.44	77.33M	1.74%
Dec-17	163.86	162.08	165.39	161.23	77.59M	0.99%
Jan-18	163.43	163.83	166.05	161.35	166.24M	-0.26%
Feb-18	161.08	163.18	163.62	155.32	118.40M	-1.44%
Mar-18	163.85	160.95	164.21	160.13	114.09M	1.72%
Apr-18	163.23	163.65	164.49	160.96	89.68M	-0.38%
May-18	167.44	163.11	169.42	162.72	101.15M	2.58%
Jun-18	169.22	167.43	171.22	166.96	115.96M	1.06%
Jul-18	170.56	169.12	172.44	169.12	82.88M	0.79%
Aug-18	174.26	170.74	177.27	170.31	80.63M	2.17%
Sep-18	172.96	174.2	179.25	172.13	105.27M	-0.75%
Oct-18	169.32	172.82	173	165.44	108.87M	-2.10%
Nov-18	171.93	169.63	174.89	166.78	106.28M	1.54%
Dec-18	165.28	172.57	174.62	162.06	128.92M	-3.87%

Appendix 4 – Bloomberg Canadian Real Estate Investment Trusts Index (BBCREIT)

Date	Price	Change %
Jan-10	131.33	7.99%
Feb-10	134.06	2.08%
Mar-10	134.52	0.34%
Apr-10	135.71	0.88%
May-10	138.47	2.03%
Jun-10	133.54	-3.56%
Jul-10	134.66	0.84%
Aug-10	142.32	5.69%
Sep-10	148.4	4.27%
Oct-10	156.55	5.49%
Nov-10	157.65	0.70%
Dec-10	152.3	-3.39%
Jan-11	153.03	0.48%
Feb-11	158.22	3.39%
Mar-11	163.67	3.44%
Apr-11	170.72	4.31%
May-11	169	-1.01%
Jun-11	170.2	0.71%
Jul-11	168.9	-0.76%
Aug-11	168.34	-0.33%
Sep-11	165.15	-1.89%
Oct-11	164.13	-0.62%
Nov-11	166.49	1.44%
Dec-11	170.96	2.68%
Jan-12	173.43	1.44%
Feb-12	177.5	2.35%
Mar-12	182.56	2.85%
Apr-12	181.63	-0.51%
May-12	187.61	3.29%
Jun-12	187.01	-0.32%
Jul-12	190.17	1.69%
Aug-12	197.33	3.77%
Sep-12	196	-0.67%
Oct-12	196.93	0.47%
Nov-12	193.26	-1.86%
Dec-12	189.74	-1.82%
Jan-13	196.02	3.31%
Feb-13	197.56	0.79%
Mar-13	198.45	0.45%
Apr-13	196.98	-0.74%

May-13	204.23	3.68%
Jun-13	193.06	-5.47%
Jul-13	180.01	-6.76%
Aug-13	174.64	-2.98%
Sep-13	168.13	-3.73%
Oct-13	172.39	2.53%
Nov-13	176.74	2.52%
Dec-13	172.96	-2.14%
Jan-14	174.8	1.06%
Feb-14	175.11	0.18%
Mar-14	180.5	3.08%
Apr-14	182.07	0.87%
May-14	183.8	0.95%
Jun-14	185.29	0.81%
Jul-14	186.5	0.65%
Aug-14	185.41	-0.58%
Sep-14	189.02	1.95%
Oct-14	182.18	-3.62%
Nov-14	187.44	2.89%
Dec-14	187.39	-0.03%
Jan-15	181.16	-3.32%
Feb-15	195.89	8.13%
Mar-15	195.64	-0.13%
Apr-15	192.02	-1.85%
May-15	193.38	0.71%
Jun-15	184.11	-4.79%
Jul-15	180.64	-1.88%
Aug-15	180.53	-0.06%
Sep-15	171.31	-5.11%
Oct-15	172.56	0.73%
Nov-15	174.01	0.84%
Dec-15	172.14	-1.07%
Jan-16	165.58	-3.81%
Feb-16	165.57	-0.01%
Mar-16	170.09	2.73%
Apr-16	179.38	5.46%
May-16	182.57	1.78%
Jun-16	184.78	1.21%
Jul-16	194.36	5.18%
Aug-16	197.02	1.37%
Sep-16	187.48	-4.84%
Oct-16	186.54	-0.50%
Nov-16	180.84	-3.06%
Dec-16	178.16	-1.48%
Jan-17	183.5	3.00%

Feb-17	183.07	-0.23%
Mar-17	188.02	2.70%
Apr-17	187.64	-0.20%
May-17	188.95	0.70%
Jun-17	187.74	-0.64%
Jul-17	184.43	-1.76%
Aug-17	181.25	-1.72%
Sep-17	182.31	0.58%
Oct-17	182.2	-0.06%
Nov-17	184.64	1.34%
Dec-17	187.33	1.46%
Jan-18	188.97	0.88%
Feb-18	188.22	-0.40%
Mar-18	184.52	-1.97%
Apr-18	187.87	1.82%
May-18	187.75	-0.06%
Jun-18	193.37	2.99%
Jul-18	194.46	0.56%
Aug-18	195.81	0.69%
Sep-18	199.29	1.78%
Oct-18	197.47	-0.91%
Nov-18	193.14	-2.19%
Dec-18	194.98	0.95%

Appendix 5 – Bloomberg Canadian Real Estate Investment Trusts Index (BBCREIT) Dividends

DATE	Dividends
29/01/2010	0.74622
26/02/2010	0.76004
31/03/2010	0.76324
30/04/2010	0.75537
31/05/2010	0.75537
30/06/2010	0.76491
30/07/2010	0.76799
31/08/2010	0.91322
30/09/2010	0.77916
29/10/2010	0.77389
30/11/2010	0.78443
31/12/2010	0.78122
31/01/2011	0.77451
28/02/2011	0.79417
31/03/2011	0.78537
29/04/2011	0.80746
31/05/2011	0.79665
30/06/2011	0.79665
29/07/2011	0.79986
31/08/2011	0.8067
30/09/2011	0.80719
31/10/2011	0.81103
30/11/2011	0.80714
30/12/2011	0.80714
31/01/2012	0.81179
29/02/2012	0.7952
30/03/2012	0.80905
30/04/2012	0.791
31/05/2012	0.83506
29/06/2012	0.81221
31/07/2012	0.81559
31/08/2012	0.81637
28/09/2012	0.81489
31/10/2012	0.81828
30/11/2012	0.822
31/12/2012	0.89787
31/01/2013	0.84034
28/02/2013	0.8414
29/03/2013	0.91041
30/04/2013	0.82671

31/05/2013	0.86248
28/06/2013	0.86359
31/07/2013	0.86595
30/08/2013	0.866
30/09/2013	0.88065
31/10/2013	0.88073
29/11/2013	0.87962
31/12/2013	0.87842
31/01/2014	0.88432
28/02/2014	0.88182
31/03/2014	0.88919
30/04/2014	0.88529
30/05/2014	0.88586
30/06/2014	0.88682
31/07/2014	0.8869
29/08/2014	0.88625
30/09/2014	0.8908
31/10/2014	0.89889
28/11/2014	0.88223
31/12/2014	1.15752
30/01/2015	0.89456
27/02/2015	0.89455
31/03/2015	0.90182
30/04/2015	0.8942
29/05/2015	0.89062
30/06/2015	0.89781
31/07/2015	0.88781
31/08/2015	0.88808
30/09/2015	0.89498
30/10/2015	0.89694
30/11/2015	0.88842
31/12/2015	1.07276
29/01/2016	0.89928
29/02/2016	0.87069
31/03/2016	0.87274
29/04/2016	1.03238
31/05/2016	0.86842
30/06/2016	0.87018
29/07/2016	0.89164
31/08/2016	0.87342
30/09/2016	0.8734
31/10/2016	0.89903
30/11/2016	0.8739
30/12/2016	0.88129
31/01/2017	0.90279

28/02/2017	0.88245
31/03/2017	0.88429
28/04/2017	0.91356
31/05/2017	0.88517
30/06/2017	0.88543
31/07/2017	0.90194
31/08/2017	0.87057
29/09/2017	0.87545
31/10/2017	0.90356
30/11/2017	0.87615
29/12/2017	0.88227
31/01/2018	0.89302
28/02/2018	0.86541
30/03/2018	0.85242
30/04/2018	0.88192
31/05/2018	0.87969
29/06/2018	0.88679
31/07/2018	0.92076
31/08/2018	0.89309
28/09/2018	0.88468
31/10/2018	0.91763
30/11/2018	0.98866
31/12/2018	0.91464

Appendix 6 - S&P_TSX Composite Dividend Data

DATE	Dividends
29/01/2010	53.48072
26/02/2010	37.42179
31/03/2010	38.24173
30/04/2010	45.04233
31/05/2010	37.91056
30/06/2010	30.87711
30/07/2010	55.51121
31/08/2010	32.57732
30/09/2010	38.704
29/10/2010	51.00825
30/11/2010	27.97423
31/12/2010	31.80886
31/01/2011	48.52162
28/02/2011	33.57982
31/03/2011	35.98744
29/04/2011	41.19711
31/05/2011	32.81352
30/06/2011	29.00228
29/07/2011	52.21507
31/08/2011	29.89282
30/09/2011	30.02021
31/10/2011	57.18654
30/11/2011	19.70796
30/12/2011	31.60161
31/01/2012	46.1703
29/02/2012	28.51756
30/03/2012	29.53507
30/04/2012	49.69299
31/05/2012	23.89421
29/06/2012	30.90656
31/07/2012	49.10243
31/08/2012	24.38985
28/09/2012	38.2039
31/10/2012	45.10732
30/11/2012	21.33998
31/12/2012	34.65335
31/01/2013	46.77909
28/02/2013	27.27957
29/03/2013	38.38541
30/04/2013	42.89871
31/05/2013	25.21913
28/06/2013	38.86089

31/07/2013	43.8868
30/08/2013	25.12989
30/09/2013	39.65529
31/10/2013	45.31116
29/11/2013	22.8731
31/12/2013	39.12077
31/01/2014	45.65724
28/02/2014	23.91567
31/03/2014	37.581
30/04/2014	43.11462
30/05/2014	24.884
30/06/2014	30.4009
31/07/2014	51.12226
29/08/2014	23.5323
30/09/2014	30.5686
31/10/2014	48.31737
28/11/2014	22.8895
31/12/2014	37.83278
30/01/2015	39.2148
27/02/2015	25.96642
31/03/2015	29.53689
30/04/2015	43.6129
29/05/2015	26.02718
30/06/2015	29.04007
31/07/2015	45.76643
31/08/2015	26.58959
30/09/2015	28.54785
30/10/2015	47.0966
30/11/2015	22.46254
31/12/2015	28.37455
29/01/2016	43.70826
29/02/2016	23.98327
31/03/2016	25.87944
29/04/2016	41.24536
31/05/2016	24.37033
30/06/2016	24.64599
29/07/2016	42.78835
31/08/2016	24.78263
30/09/2016	25.34101
31/10/2016	45.71667
30/11/2016	16.41909
30/12/2016	25.49026
31/01/2017	41.05218
28/02/2017	21.3133
31/03/2017	23.15016

28/04/2017	39.7632
31/05/2017	19.80363
30/06/2017	23.52135
31/07/2017	41.58708
31/08/2017	20.25061
29/09/2017	27.15998
31/10/2017	36.96429
30/11/2017	16.56369
29/12/2017	23.48778
31/01/2018	38.75241
28/02/2018	21.18354
30/03/2018	27.2739
30/04/2018	31.58339
31/05/2018	21.274
29/06/2018	27.59575
31/07/2018	32.62996
31/08/2018	23.07315
28/09/2018	27.33551
31/10/2018	34.43741
30/11/2018	16.23796
31/12/2018	24.46966

Appendix 7 – S&P TSX REIT and TRCAAL Bond index covariance matrix (monthly returns)

Monthly returns Covariance Matrix	S&P_TSX REIT	TRCAALL Bond Index
S&P/TSX REIT	0.000739511	0.00013
TRCAALL Bond Index	0.00013	0.000137979

Appendix 8 – S&P TSX REIT and S&P/TSX Composite Index covariance matrix (monthly returns)

Covariance Matrix	S&P/TSX Composite	S&P_TSX REIT
S&P/TSX Composite	0.000733	0.000256
S&P_TSX REIT	0.000256	0.000740

Appendix 9 – BBCREIT Index and S&P/TSX Composite Index covariance matrix (monthly returns)

Covariance Matrix	S&P/TSX Composite	BBCREIT Index
S&P/TSX Composite	0.000733	0.000144
BBCREIT Index	0.000144	0.000700

Appendix 10 – BBCREIT Index and TRCAALL Bond Index covariance matrix (monthly returns)

Covariance Matrix	BBCREIT Index	TRCAALL Bond Index
BBCREIT Index	0.0007005	0.00003
TRCAALL Bond Index	0.00003	0.000137979

Correlation Matrix	BBCREIT Index	TRCAALL Bond Index
BBCREIT Index	1	0.09
TRCAALL Bond Index	0.09	1

Appendix 11 - S&P_TSX REIT and S&P/TSX Composite Correlation and Covariance

The covariance and correlation matrix of annual returns for S&P_TSX REIT, and, S&P/TSX are shown below:

Correlation Matrix	S&P_TSX REIT	S&P_TSX Composite
S&P_TSX REIT	1	0.4155
S&P_TSX Composite	0.4155	1

Covariance Matrix	S&P_TSX REIT	S&P_TSX Composite
S&P_TSX REIT	0.00984	0.00484
S&P_TSX Composite	0.00484	0.01380

The data shows that the correlation between S&P_TSX REIT and S&P/TSX is positive. However, this positive correlation is relatively low. It is because of this low correlation between S&P_TSX REIT and S&P/TSX, their combined returns are higher with low risk (low standard deviation and variance).

Appendix 12 - BBCREIT Index and S&P/TSX Composite Correlation and Covariance

The covariance and correlation matrix of annual returns for BBCREIT, and, S&P/TSX are shown below:

Correlation Matrix	*BBCREIT Index*	*S&P_TSX Composite*
BBCREIT Index	1	0.261703344
S&P_TSX Composite	0.261703344	1

Covariance Matrix	*BBCREIT Index*	*S&P_TSX Composite*
BBCREIT Index	0.00652	0.002481311
S&P_TSX Composite	0.002481311	0.01380

The data above displays one of the underlying reasons why it is advantageous for a Canadian investor to diversify using the BBCREIT Index; it has a lower correlation and lower correlation to the S&P/TSX Composite than the S&P_TSX REIT Index does.

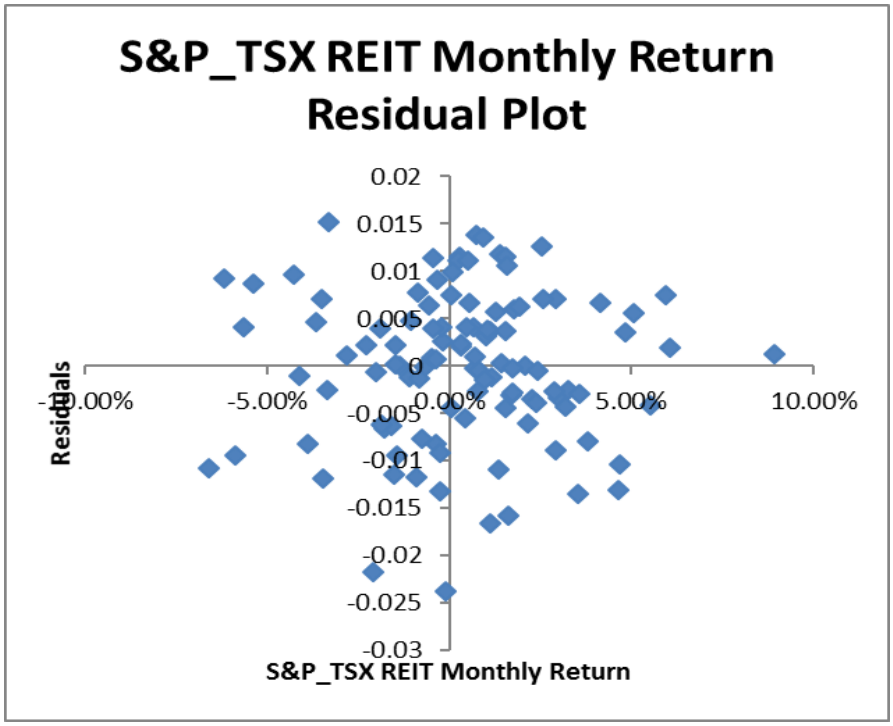
Appendix 13 – Regression Statistics for S&P TSX REIT

Equally weighted portfolio of stocks, REITs and bonds with REITs as the independent variable

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.00133072	0.000773116	1.72124222	0.088124252	-0.000202058	0.002863497	-0.000202058	0.002863497
S&P_TSX REIT	0.509770566	0.028170541	18.09587391	3.39425E-34	0.453919728	0.565621404	0.453919728	0.565621404

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.020754759	0.020754759	327.4606525	3.39425E-34
Residual	106	0.006718378	6.33809E-05		
Total	107	0.027473137			

Regression Statistics	
Multiple R	0.869169987
R Square	0.755456466
Adjusted R Square	0.753149451
Standard Error	0.007961214
Observations	108

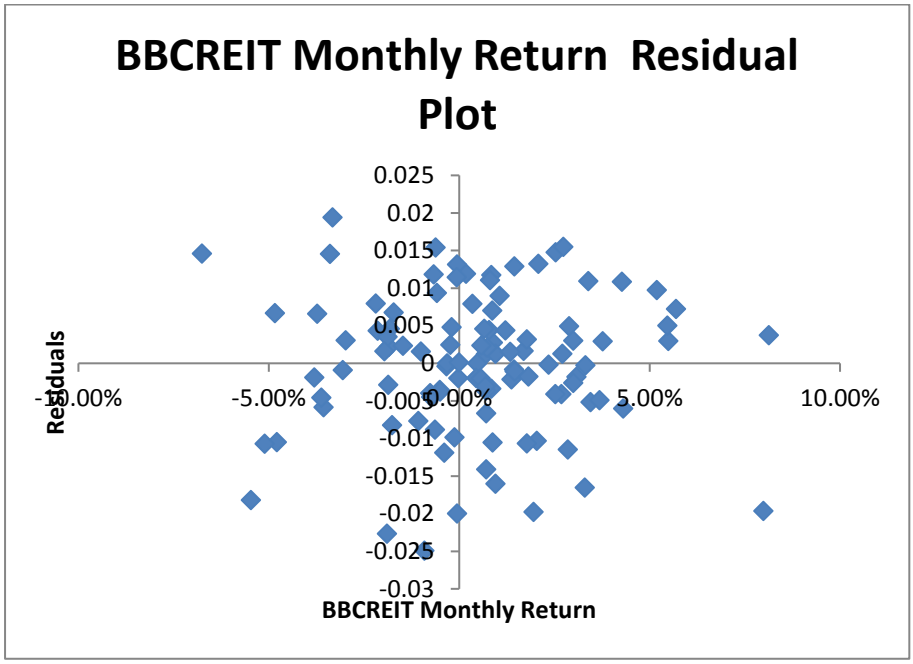


Appendix 14 – Regression Statistics for BBCREIT

Equally weighted portfolio of stocks, Bloomberg real estate funds and bond Index with the Bloomberg real estate funds index as the independent variable

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.013015193	0.013015193	158.5231843	8.85996E-23
Residual	106	0.008702894	8.21028E-05		
Total	107	0.021718087			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.001597916	0.00088571	1.804107874	0.074054367	-0.00015809	0.003353921	-0.00015809	0.003353921
BBCREIT M	0.414771954	0.032942988	12.59059904	8.85996E-23	0.349459276	0.480084632	0.349459276	0.480084632



Regression Statistics	
Multiple R	0.774131113
R Square	0.599278981
Adjusted R Square	0.595498594
Standard Error	0.009061058
Observations	108